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Date: January 27, 2012
Refer To: ENV-DO-12-0002

Ms. Claudia Hosch, Chief
NPDES Permits and TMDL Branch (6WQ)
U.S. Environmental Protection Agency, Region 6
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Dallas, TX 75202-2733

Dear Ms. Hosch:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT NO. NM0028355, 2012 NPDES PERMIT RE-APPLICATION

Enclosed are one original and one copy of the application (Volumes I and II) for renewal of the National Pollutant Discharge Elimination System (NPDES) reference Permit No. NM0028355 for the Los Alamos National Laboratory (LANL). This Permit Re-Application is being submitted by the U.S. Department of Energy (DOE) and the Los Alamos National Security (LANS), LLC in accordance with the requirements of 40 CFR 122.21 and the current NPDES permit. This Permit Re-Application includes: (1) an introduction addressing environmental and other conditions at LANL; (2) completed U.S. Environmental Protection Agency (EPA) Form 1- "General Information"; (3) completed EPA Form 2C – "Existing Manufacturing, Commercial, Mining and Silvicultural Operations" covering 11 outfalls; and (4) other information submitted in support of this Permit Re-Application.

The information used in preparation of this Permit Re-Application was collected at affected outfalls over a 5-year period and represents the best information available to the applicants at the present time.

DOE/LANS appreciate the assistance provided by Mr. Isaac Chen, Region 6 Permit Writer, regarding the preparation of this Permit Re-Application. DOE/LANS will continue to work closely with EPA during the Permit development process in order to provide a new Permit, which meets all applicable regulatory requirements under the Clean Water Act.

If you need additional information regarding the Permit Re-Application, please contact Gene Turner, DOE, at (505) 667-5794 or Mike Saladen, LANS, at (505) 665-6085.

Sincerely,



Alison Dorries
Division Leader
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Sincerely,



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Environmental Protection Division – Water Quality and RCRA Group (ENV-RCRA)

LOS ALAMOS NATIONAL LABORATORY

LA-UR-12-00359

2012 NPDES Permit Re-Application

Permit No. NM 0028355

For
Los Alamos National Laboratory
Los Alamos, NM

Submitted By
U.S. Department of Energy– Los Alamos Site Office and Los
Alamos National Security, LLC

Prepared By
Los Alamos National Laboratory
Water Quality & RCRA Group (ENV-RCRA)

February 2012

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ATTACHMENTS

No.	Title
Form 1	U.S. Environmental Protection Agency (EPA) Form 1- "General Information"
001	Outfall 001 – Fact Sheet, Photographs, DMR Summary, and Form 2C
13S	Outfall 13S – Fact Sheet, Photographs, DMR Summary, and Form 2C
051	Outfall 051 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A022	Outfall 03A022 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A027	Outfall 03A027 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A048	Outfall 03A048 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A113	Outfall 03A113 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A160	Outfall 03A160 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A181	Outfall 03A181 – Fact Sheet, Photographs, DMR Summary, and Form 2C
03A199	Outfall 03A199 – Fact Sheet, Photographs, DMR Summary, and Form 2C
05A055	Outfall 05A055 – Fact Sheet, Photographs, DMR Summary, and Form 2C

APPENDICES

No.	Title
A	Historical and Existing NPDES Outfall Status Summary
B	Notice of Changed Condition/Planned Changes (August 2007 – September 2011)
C	Other Environmental Permits at LANL
D	Hazardous Waste Management Facility Maps and Listing of the Hazardous Waste Treatment Process Codes
E	Signatory Authority Letter
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G	Map of Spring and NPDES Outfall Locations
H	2010 Drinking Water Quality Data Report
I	Map of the Sanitary Waste Water System (SWWS) Plant Collection System
J	Map of the Radioactive Liquid Waste Collection System
K	LA-UR-11-01005, Radioactive Liquid Waste Treatment Facility Annual Report for 2009, February 2011
L	Sanitary Effluent Reclamation Facility (SERF)
M	LANL Policies and Procedures
N	Waste Acceptance Criteria for TA-50 RLWTF, TA-46 SWWS, and TA-16 HEWTF
O	Executive Summary of Implementation Plan
P	Sampling and Analysis Plan for Los Alamos National Laboratory's NPDES Permit Re-Application, August 2011

ACRONYMS/ABBREVIATIONS

CGP	Construction General Permit
CWA	Clean Water Act
DOE	U.S. Department of Energy
DP	Discharge Plan
EA	Environmental Assessment
ENV-DO	Environmental Protection Division
EPA	Environmental Protection Agency
ft	Feet/foot
HEWTF	High Explosives Wastewater Treatment Facility
IP	Individual Permit
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security
LDCC	Laboratory Data Communications Center
MSGP	Multi-Sector General Permit
NEPA	National Environmental Policy Act
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
RLWTF	Radioactive Liquid Waste Treatment Facility
SAP	Sampling and Analysis Plan
SERF	Sanitary Effluent Reclamation Facility
SMO	Sample management office
SWEIS	Site Wide Environmental Impact Statement
SWWS	Sanitary Waste Water System
TA	Technical Area
TRU	Transuranic
WAC	Waste Acceptance Criteria
WCATS	Waste Compliance and Tracking System
WMC	Waste Management Coordinator
WPF	Waste Profile Form
ZLD	Zero Liquid Discharge

EXECUTIVE SUMMARY

Approximately every five years the Los Alamos National Laboratory (Laboratory) must apply for renewal of the existing Industrial Point-Source National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 issued by the U.S. Environmental Protection Agency (EPA) under the requirements specified in the Clean Water Act Section 402 and 40 CFR 122. The existing permit expires on July 31, 2012. The NPDES permit and regulations require the Laboratory to submit a re-application 180 days prior to the expiration of the existing permit (i.e., February 2, 2012).

This document serves as the 2012 NPDES Permit Re-Application package for the renewal of NPDES Permit No. NM0028355 for the following eleven (11) outfalls:

- 001 - Power Plant (TA-3-22)
- 13S - Sanitary Waste Water System (SWWS) Plant (TA-46-347)
- 051 - Radioactive Liquid Waste Treatment Facility (RWLTF) (TA-50-1)
- 03A022 - Cooling Tower Blow Down (TA-3-2274)
- 03A027 - Cooling Tower Blow Down (TA-3-285 and 2327)
- 03A048 - Cooling Tower Blow Down (TA-53-964 and 979)
- 03A113 - Cooling Tower Blow Down (TA-53-293, 952)
- 03A160 - Cooling Tower Blow Down (TA-35-124)
- 03A181 - Cooling Tower Blow Down (TA-55-6)
- 03A199 - Cooling Tower Blow Down (TA-3-1837)
- 05A055 - High Explosives Wastewater Treatment Facility (HEWTF) (TA-16-1508)

1.0 INTRODUCTION

The current Los Alamos National Laboratory (LANL or Laboratory), National Pollutant Discharge Elimination System (NPDES) Industrial Discharge Permit No. NM0028355 will expire July 31, 2012. The NPDES permit and regulations require the Permittees to submit a re-application 180 days prior to the expiration of the existing permit, February 2, 2012. This document serves as the 2012 NPDES Permit Re-Application package for the renewal of NPDES Permit No. NM0028355 submitted to the U.S. Environmental Protection Agency (EPA) by the U.S. Department of Energy (DOE) and the Los Alamos National Security (LANS) LLC. The DOE/NNSA and LANS are hereinafter referred to as the "co-permittees or permittees."

This 2012 NPDES Permit Re-Application package has been prepared and is submitted in accordance with the provisions of the Clean Water Act (CWA) (33 U.S.C. 1251 – 1387) and the NPDES Permit Program requirements provided in 40 CFR 122.21. It is the intent of the package to provide the EPA permit writer, New Mexico Environment Department (NMED) and others with adequate background information concerning each outfall, the surrounding environmental conditions, and associated future activities at the Laboratory to promote review of the technical data and preparation of the permit. The Permittees would like to invite EPA representatives to visit the Laboratory during the review process to gain firsthand knowledge and understanding of the information provided, identify potential issues, and answer any questions regarding proposed changes to the permitted outfalls and NPDES facilities presented in this re-application package.

Due to the complex nature of the NPDES Permit Re-Application and potential need for supplemental information, the applicant requests that all previous applications, modifications, maps, data, and pertinent correspondence submitted in reference to NPDES Permit No. NM0028355 transmitted to the EPA up to the time the new permit is issued, be considered part of this re-application. The applicant will continue to provide copies of all such information to the EPA Permit Writer as new information becomes available.

2.0 BACKGROUND

The existing NPDES Industrial Discharge Permit became effective on August 1, 2007. It originally included 17 outfalls located at seven (7) Technical Areas (TAs) spread out over a approximately 40 square mile area within the Laboratory boundaries. The LANL NPDES Industrial Discharge Permit has been historically administered through categorical classification of wastewater discharges. The remaining 11 outfalls currently permitted are grouped into the following five (5) major waste stream categories:

- Power Plant/Sanitary Effluent Reclamation Facility (SERF) Discharge (001)
- Treated Cooling Water Discharges (03A)
- High Explosives Wastewater Discharge (05A)
- Sanitary Wastewater Discharge (13S)
- Radioactive Liquid Wastewater Discharge (051)

NPDES Permit No. NM0028355 is currently the only active NPDES Industrial Outfall Discharge permit at the Laboratory. Table 1 summarizes the permit activities associated with Permit No. NM0028355 over the last 21 years.

Table 2.1
Summary of NPDES Permit Activity at the Laboratory

Application		NPDES Permit		Outfalls Eliminated and/or Removed
Date	No. Outfalls	Effective Date	No. Remaining Outfalls	
Prior to 1990	141	NA	NA	<ul style="list-style-type: none"> • 24 outfalls eliminated prior to the effective date of the first permit.
1990	117	Sept 1, 2003	34	<ul style="list-style-type: none"> • 83 outfalls were eliminated due to the completion of the Waste Stream Characterization and Corrections Project and the Outfall Reduction Project.
1998	35	Feb 1, 2001	21	<ul style="list-style-type: none"> • 14 outfalls were not permitted because the supply wells associated with them were transferred from DOE to Los Alamos County before the permit was issued. • Request made to EPA to delete 4 outfalls (03A024, 03A047, 03A049, and 05A097) in August of 2004 because they were no longer in use.
2004	17	Aug 1, 2007	15	<ul style="list-style-type: none"> • 03A158 was not permitted because the TA-21-209 cooling tower was decommissioned and the outfall eliminated before the permit was issued. • 03A028 was not permitted because the TA-15-185 and TA-15-202 Phermex facilities were decommissioned before the permit was issued. • 03A021 and 03A185 were tied to the Sanitary Waste Water System (SWWS) Plant in 2010 as part of the Outfall Reduction Project. Outfalls 02A129 (TA-21 Steam Plant) and 03A130 (TA-11 cooling tower) no longer discharge to the environment. EPA deleted these 4 outfalls from the Laboratory's permit on October 11, 2011.

Appendix A provides a list of all historical and existing outfalls and provides a status summary.

2.1 NPDES Outfall Reduction Projects

In December 2007 DOE/LANS completed LA-UR-07-8312, *NPDES Permit Compliance and Outfall Reduction Strategy*, which provided recommendations and options for the treatment, reduction, and/or elimination of the outfalls at LANL. The report was prepared to assess the potential for outfall reductions in response to the more stringent effluent discharge limits provided in the NPDES Permit that became effective on August 1, 2007. The report recommended projects to eliminate thirteen (13) outfalls. Six of them have since been removed either due to decontamination and decommissioning activities at the Laboratory or the implementation of one of the Outfall Reduction Projects identified in LA-UR-07-8312. There are four (4) additional outfalls identified for elimination/reduction over the next 2 – 5 years. These include 03A027, 03A160, 03A181, and 03A199, which will likely be connected to the Sanitary Waste Water System (SWWS) Plant or directly to the SERF. This permit re-application package describes the strategy for each outfall in Section 4.0.

A National Environmental Policy Act (NEPA) categorical exclusion for the Waste Stream Corrections Project (i.e., Outfall Reduction Project) was issued by DOE in January 1996 and an *Environmental Assessment (EA) for Effluent Reduction* was completed by the Permittees in September 1996.

This categorical exclusion and EA support the reduction/elimination of the discharges from all of the Laboratory outfalls except the following:

- Outfall 001, TA-3-22 Power Plant
- Outfall 05A055, TA-16 High Explosives Wastewater Treatment Facility (HEWTF)
- Outfall 13S, TA-46 SWWS Plant
- Outfall 051, TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF)
- Outfall 03A199, Laboratory Data Communications Center (LDCC) Cooling Tower

The TA-16 HEWTF (Outfall 05A055) was analyzed separately and was determined to be covered under an existing DOE-approved categorical exclusion for Safety and Environmental Improvements at LANL. The outfall reduction project for RLWTF (Outfall 051) was included as an option in the 2008 Site Wide Environmental Impact Statement (SWEIS) (DOE, 2008). In September 2008, NNSA issued the first Record of Decision for the 2008 SWEIS. The DOE chose to implement the No Action Alternative with the addition of some elements of the Expanded Operations Alternative. Final design of a new RLWTF and design and construction of the Zero Liquid Discharge (ZLD) component were part of the elements of the Expanded Operations Alternative that were approved to move forward. Mitigation commitments associated with this project are included in the Mitigation Action Plan for the 2008 SWEIS.

In 2008, the PR-ID documentation was submitted for the proposed actions reducing or eliminating discharges from the LDCC Cooling Tower (Outfall 03A199); TA-46 SWWS (13S); and the TA-3 Power Plant (Outfall 001). In August 2010, an EA for the Expansion of the SERF and Environmental Restoration of Reach S-2 of Sandia Canyon at LANL (DOE EA-1736) and associated Finding of No Significant Impacts was issued by the NNSA. The NNSA determined that by using adaptive management practices in the implementation of specific resource mitigation commitments, the potential for adverse environmental effects from the proposed actions would be minimal.

2.2 Notices of Changed Conditions/Planned Changes

The existing permit requires the Permittees to give notice to the EPA of any planned physical alterations or additions that could significantly change the nature or increase the quantity and/or quality of pollutants discharged from any of its permitted outfalls. The existing permit at LANL was implemented in August 2007 and includes 23 Notices of Changed Condition/Planned Change. Appendix B provides a copy of each Notice of Changed Condition/Planned Change that was submitted to the EPA from August 2007 through December 2011.

2.3 Other Environmental Permits

The EPA and NMED regulate Laboratory operations under various environmental statutes (e.g., Clean Air Act, Clean Water Act, etc.) through operating permits, construction approvals, and the DOE/NMED Consent Order. These permits are designed by the regulatory agencies to allow Laboratory operations to be conducted while assuring that the public, air, land, soils, water, and biota are protected. Appendix C provides a detailed list of the other environmental permits at LANL.

The following bullets provide a summary:

- **NPDES Construction General Permit:** The Construction General Permit (CGP) regulates storm water discharges from construction activities disturbing one or more acres, including those construction activities that are part of a larger common plan of development collectively disturbing one or more acres. LANS and the general contractor apply individually for NPDES CGP coverage and are co-permittees at most construction sites. Compliance with the NPDES CGP includes developing and implementing a Storm Water Pollution Prevention Plan before soil disturbance can begin, conducting site inspections once soil disturbance has commenced and continues through final stabilization. There are currently 16 Active Construction General Permit Notice of Intent documents at LANL (Appendix C).
- **NPDES Storm Water Multi-Sector General Permit (MSGP):** The NPDES Industrial Storm Water Permit Program regulates storm water discharges from identified regulated industrial activities and their associated facilities. These activities include metal fabrication; hazardous waste treatment and storage; vehicle and equipment maintenance; recycling activities; electricity generation; warehousing activities; and asphalt manufacturing. LANS and DOE are co-permittees under the EPA 2008 NPDES Storm Water MSGP for Industrial Activities (MSGP-2008). The current MSGP was effective September 29, 2008.
- **NPDES Permit No. NM0030759 – Storm Water Individual Permit:** The Individual Permit (IP) authorizes the discharge of storm water associated with industrial activities at the Laboratory from specified solid waste management units and areas of concern. It contains non-numeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program, to minimize pollutants in storm water discharges. It requires the Permittees to implement site-specific control measures (including best management practices) to address the non-numeric technology-based effluent limits as necessary to minimize pollutants in their storm water discharges. The current NPDES IP Permit, incorporating the latest modifications, became effective on November 1, 2010.
- **U.S. Army Corps of Engineer, Section 401/404 Dredge and Fill Permits:** DOE/LANS are responsible for making sure that it is in compliance with the CWA Sections 401 and 404. Section 401 requires state certification when applying for a federal permit to either build or operate a facility that has a potential to discharge pollutants into any body of water. The purpose of these requirements and subsequent permits are to ensure that the surface water quality is protected from unregulated discharge of dredged or fill material. Appendix C identifies the Section 404 Dredge and Fill Permits that LANL currently has on file with the U.S. Army Corps of Engineers.
- **Septic Tank Permits:** Historically, LANL septic systems were either registered or permitted by the State of New Mexico, Environmental Improvement Division, under the Liquid Waste Disposal and Treatment Regulations (20.7.3 NMAC). DOE/LANS originally submitted a Discharge Plan (DP) application for the LANL septic systems on April 28, 2006. On June 22, 2010 DOE/LANS resubmitted an up-to-date Discharge Plan Application (DP-1589) for the domestic septic tanks/leachfield systems currently in operation at the Laboratory. Appendix C provides a list of the current septic systems covered under DP-1589.

- **NM0890010515-1 Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit:** The RCRA permit regulates storage and treatment of hazardous wastes; the Laboratory disposes all hazardous waste off-site. The Laboratory's hazardous waste facility permit was initially granted in 1989 for storage and treatment operations. The current RCRA Hazardous Waste Permit became effective on December 30, 2010. Appendix D provides maps of the Hazardous Waste Management Facilities and a listing of the Hazardous Waste Treatment Process Codes.
- **P100R1 Air Quality Operating Permit:** The Federal Clean Air Act Operating Permit provides the terms and conditions that must be followed in order to operate applicable air emission sources (i.e., boilers, electric generators, power plant, a combustion turbine generator, a data disintegrator, two carpenter shops, a degreaser, and an asphalt plant) at the Laboratory. The Laboratory also reports emissions from chemical use associated with research and development and permitted beryllium activities. The current Air Quality Operating Permit became effective on August 7, 2009.
- **Groundwater Discharge Plans:** New Mexico Water Quality Control Commission regulations control liquid discharges onto or below the ground surface to protect all groundwater in New Mexico. Under the regulations, when required by NMED, a facility must submit a discharge plan and obtain a permit from the NMED (or approval from the New Mexico Oil Conservation Division for energy/mineral-extraction activities). Subsequent discharges must be consistent with the terms and conditions of the discharge permit. The Laboratory has one discharge permit (TA-46 SWWS Plant Discharge Permit [DP-857]) and two discharge plans are pending NMED approval (TA-50 RLWTF Discharge Plan [DP-1132] and Domestic Septic Tank/Leachfield Systems Discharge Plan [DP-1589]).

3.0 FACILITY DESCRIPTION

The Laboratory and the associated residential and commercial areas of Los Alamos and White Rock are located in Los Alamos County, in north-central New Mexico, approximately 60 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe (see Figure 3.1). The 40-square-mile Laboratory is situated on the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep east-to-west-oriented canyons cut by streams. Mesa tops range in elevation from approximately 7,800 feet (ft) on the flanks of the Jemez Mountains to about 6,200 ft at the edge of White Rock Canyon. Most Laboratory and community developments are confined to the mesa tops. The surrounding land is largely undeveloped and large tracts of land north, west, and south of the Laboratory site are held by the Santa Fe National Forest, the US Bureau of Land Management, National Park Service, the US General Services Administration, and Los Alamos County. The Pueblo de San Ildefonso borders the Laboratory to the east. The Laboratory is divided into 48 TAs (not including TA-0, which comprises leased space within the Los Alamos town site) covering 25,600 acres (see Figure 3.2).

3.1 Laboratory Research Activities

The Laboratory is a complex organization comprised of multiple disciplines and programs that include stockpile stewardship and extensive basic research in physics, chemistry, metallurgy, mathematics, computers, earth sciences, and electronics. Its original mission to design, develop, and test nuclear weapons has broadened and evolved as technologies, priorities, and the world community have changed. The Laboratory defines its vision as: "Los Alamos, the premier national security science laboratory." The current mission is to develop and apply

science and technology to ensure the safety and reliability of the United States' nuclear deterrent; reduce global threats; and solve other emerging national security challenges.

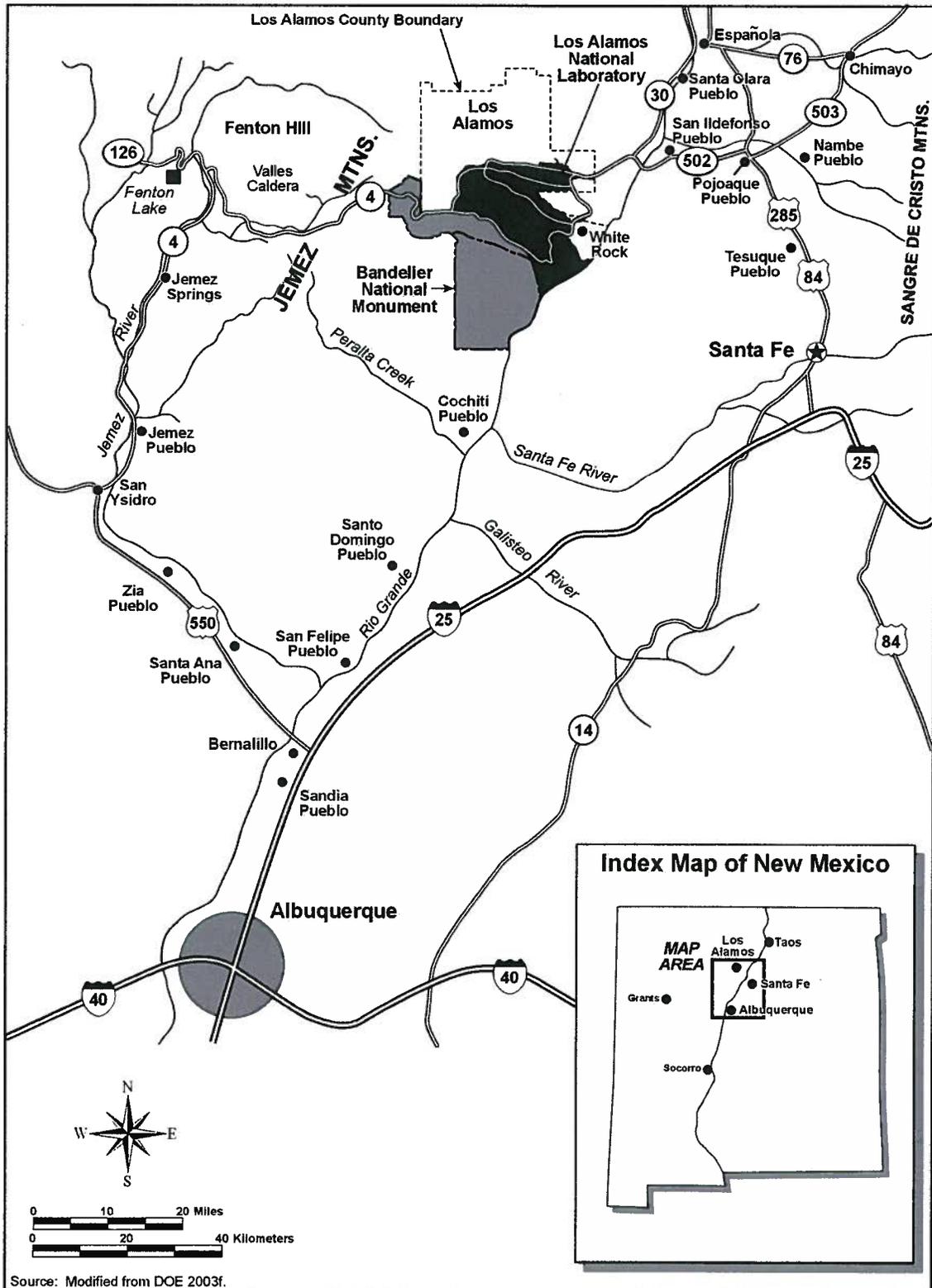


Figure 3.1 - Location of Los Alamos National Laboratory

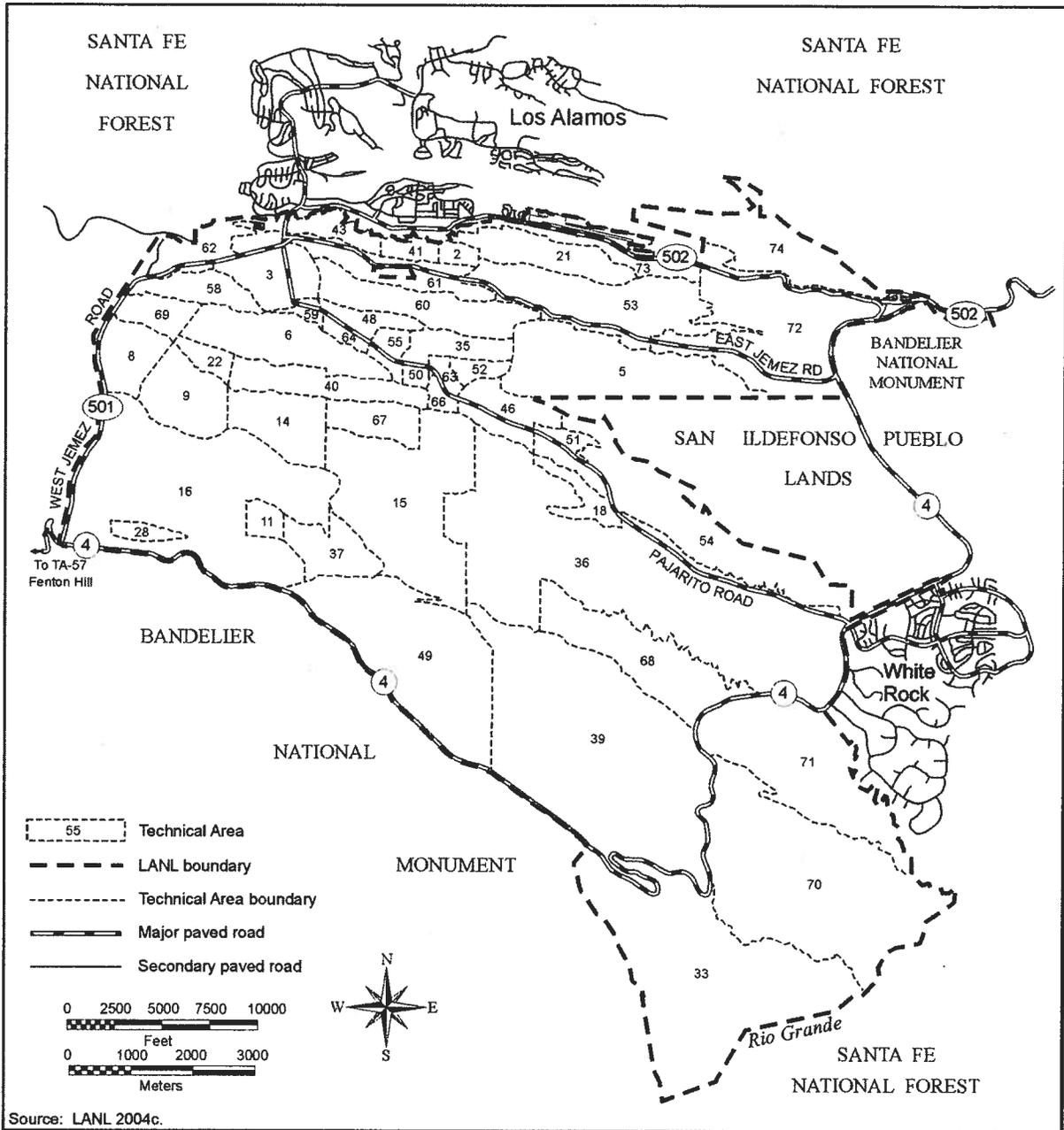


Figure 3.2 - Technical Areas of Los Alamos National Laboratory

3.2 Organization

The Laboratory is currently operated by LANS on behalf of the DOE and thus is a co-permittee of the NPDES Permit. LANS is responsible for all Laboratory site compliance. The Environmental Protection Division (ENV-DO) provides environmental protection leadership, service, and support to meet the Laboratory's environmental protection obligations and public

assurance needs. LANS senior management has delegated the authority and responsibility to the ENV-DO Division Leader (Appendix E) to act as the certifying official for environmental compliance permits and documents. The ENV Division Leader will be a signatory on the final 2012 NPDES Permit Re-Application.

3.3 Geological Setting

The Laboratory is located in northern New Mexico on the Pajarito Plateau, which is formed of volcanic tuff (welded volcanic ash) deposited by past volcanic eruptions from the Jemez Mountains to the west (see Figure 3.3). The geology of the LANL region is the result of complex faulting, sedimentation, volcanism, and erosion over the past 20 to 25 million years (DOE, 1999). The Jemez Mountains are a broad highland built up over the last 13 million years through volcanic activity. Late in the volcanic period, cataclysmic eruptions from calderas in the central part of the Jemez Mountains deposited the thick blankets of tuff that form the Pajarito Plateau (Broxton and Vaniman, 2004). Volcanic activity culminated with the eruption of the rhyolitic Bandelier Tuff from 1.6 to 1.22 million years ago. During emplacement, intense heat and hot volcanic gases welded portions of these tuffs into the hard, resistant deposits that make up the upper surface of the plateau. Most of the bedrock on LANL property is composed of the salmon-colored Bandelier Tuff (DOE, 1999).

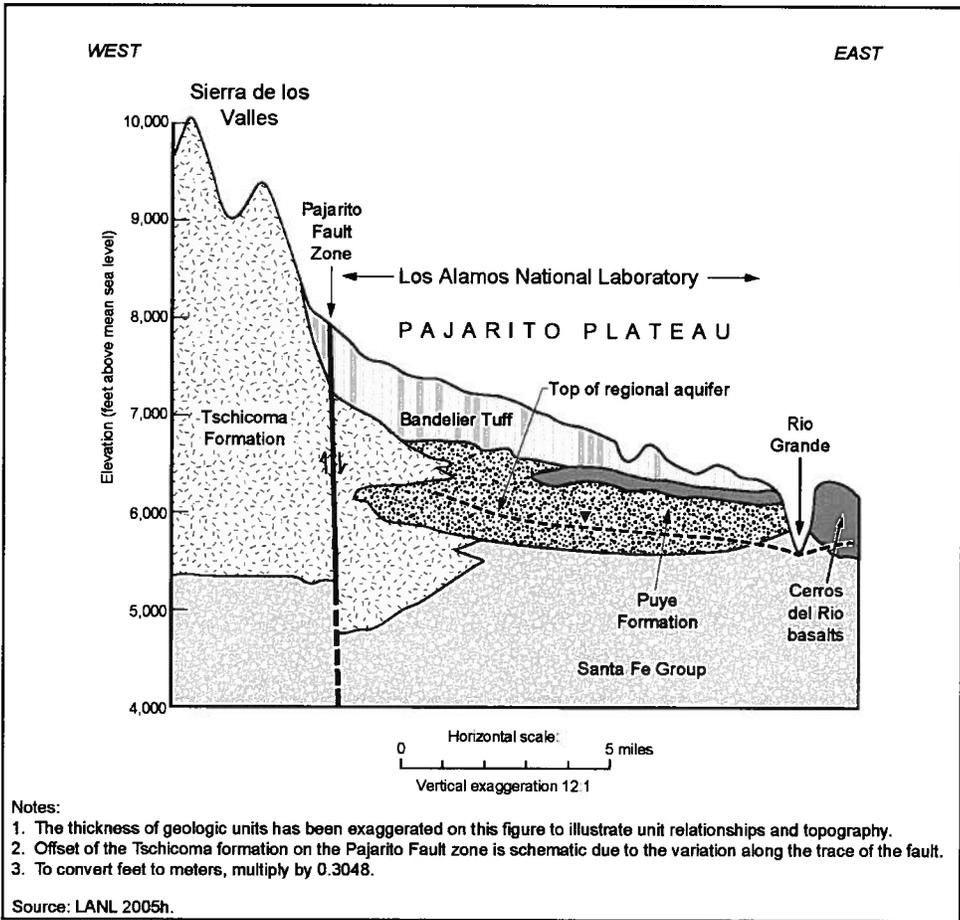


Figure 3.3 - Generalized Cross-Section of the Los Alamos National Laboratory Area

3.4 Climate

The Los Alamos area has a temperate, semiarid mountain climate. Large differences in locally observed temperature and precipitation exist because of the 1,000-ft elevation change across the Laboratory site and the complex topography. Four distinct seasons occur in Los Alamos County. Winters are generally mild, with occasional winter storms. Spring is the windiest season. Summer is the rainy season, with occasional afternoon thunderstorms. Fall is typically dry, cool, and calm. Daily temperatures are highly variable (a 23°F range on average). On average, winter temperatures range from 30°F to 50°F during the daytime and from 15°F to 25°F during the nighttime. The Sangre de Cristo mountains to the east of the Rio Grande Valley act as a barrier to wintertime arctic air masses that descend into the central United States, making the occurrence of local subzero temperatures rare. On average, summer temperatures range from 70°F to 88°F during the daytime and from 50°F to 59°F during the nighttime. From 1981 to 2010, the average annual precipitation (which includes both rain and the water equivalent of frozen precipitation) was 18.95 inches and the average annual snowfall amount was 58.7 inches. The months of July and August account for 36% of the annual precipitation and encompass the bulk of the rainy season, which typically begins in early July and ends in early September. Afternoon thunderstorms yield short, heavy downpours and an abundance of lightning. Local lightning density, among the highest in the United States, is estimated at 15 strikes per square mile per year. Lightning is most commonly observed between May and September (about 97% of the local lightning activity).

3.5 Hydrologic Setting

The Laboratory property contains parts or all of seven primary watersheds that drain directly into the Rio Grande, each defined by a master canyon (Los Alamos, Sandia, Mortandad, Pajarito, Water, Ancho, and Chaquehui) as shown on Figure 3.4. Each of these watersheds includes tributary canyons of various sizes. Los Alamos, Pajarito, and Water Canyons have their headwaters west of the Laboratory in the eastern Jemez Mountains (the Sierra de los Valles), mostly within the Santa Fe National Forest, while the remainder head on the Pajarito Plateau. Only the Ancho Canyon watershed is entirely located on Laboratory land. Canyons that drain Laboratory property are dry for most of the year, and no perennial surface water (i.e., water that is present all year) extends completely across Laboratory land in any canyon. Approximately three miles of canyon in the western part of the Laboratory have streams that are naturally perennial and fed by springs. These perennial segments are located in Water Canyon, Canon de Valle (a major tributary to Water Canyon), and Pajarito Canyon and its tributaries. Approximately four miles of canyon on Laboratory land have perennial streams created by discharges of sanitary effluent from the wastewater treatment plants in Pueblo and Sandia Canyons. Spring-fed perennial stream segments are also located in lower Ancho and Chaquehui Canyons on Laboratory land near the Rio Grande, as well as in other canyons upstream and downstream from the Laboratory.

The remaining stream channels are dry for varying lengths of time. The driest segments flow only after local precipitation events or during snowmelt periods, and flow in these streams is ephemeral. Other stream segments sometimes have alluvial groundwater that discharges into the stream bed and/or experience extensive snowmelt runoff and are considered intermittent. Intermittent streams may flow for several weeks to a year or longer.

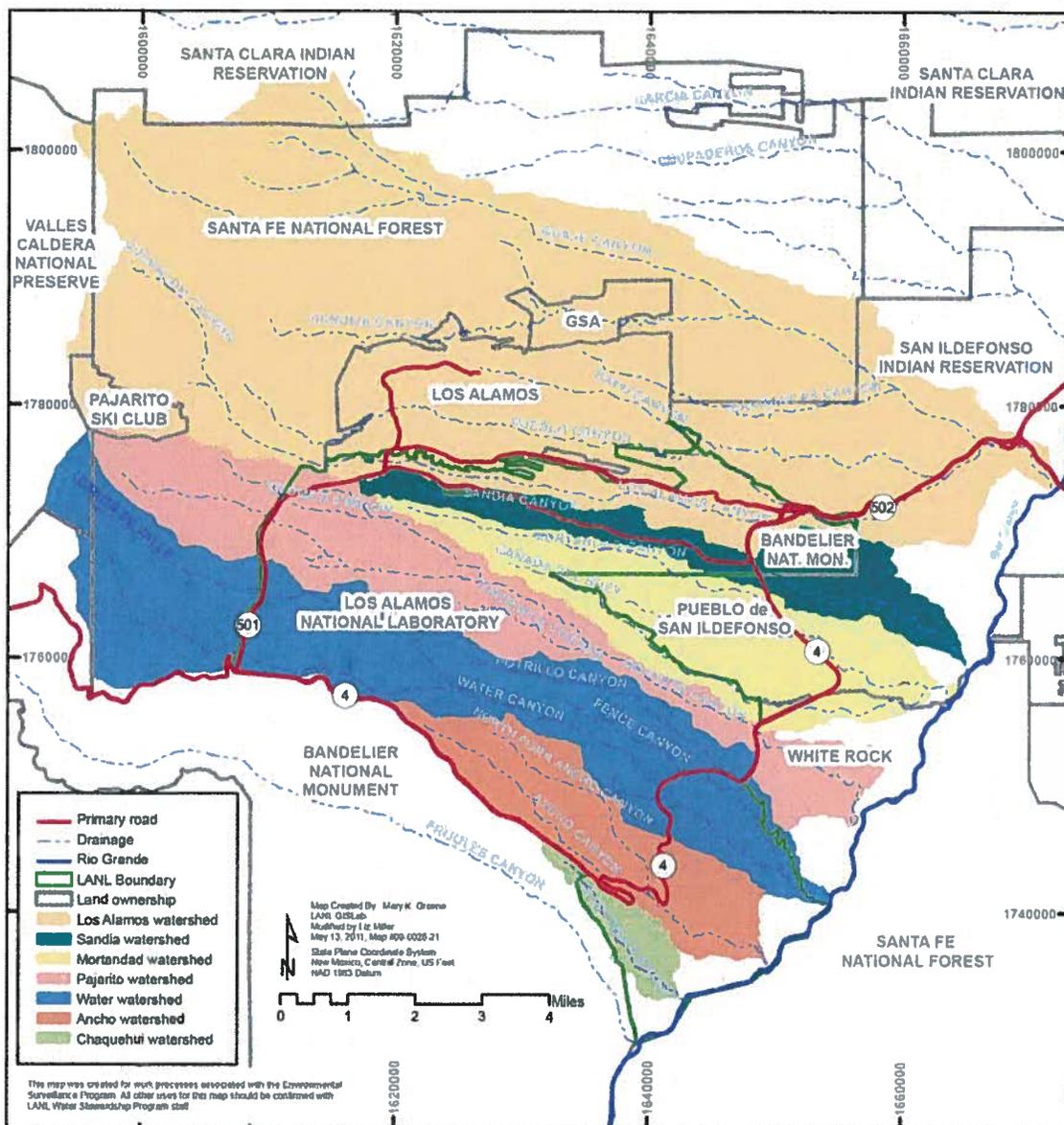


Figure 3.4 - Primary Watersheds at Los Alamos National Laboratory

To aid in water quality interpretation, we consider three basic types of stream flow. At times, the flow might represent a combination of several of these flow types:

- **Base flow**—persistent stream flow but not necessarily perennial water. This type of flow is generally present for periods of weeks or longer. The water source may be springs, effluent discharge, or alluvial groundwater that emerges along stream beds.
- **Snowmelt runoff**—flowing water present because of melting snow. This type of water may be present for up to a month or more and in some years may not be present at all.
- **Storm water runoff**—flowing water present in response to rainfall. These flow events are generally very short-lived, with flows lasting from less than an hour to—rarely—several days. Base flow and snowmelt runoff can be present for extended periods of time. Storm water runoff may provide a short-term water source for wildlife, particularly

when it collects in bedrock pools or other local depressions, and water quality will improve at these locations over time as the suspended sediment settles out. Storm water is capable of transporting sediment off site.

Except during major runoff events, the cumulative flow of wastewater discharges does not reach the Rio Grande. The intermittent runoff leaving Laboratory property is measured at gage stations located in each watershed. These flow measurements are periodically published in the Watershed Periodic Monitoring Reports or in reports for a given water year. Appendix F provides the Surface Water Data report for Water Year 2009. Appendix G provides a scaled full size map showing the location of the springs/baseflow associated with each watershed and the locations of the outfalls associated with this re-application document.

3.6 Groundwater Occurrence

The Laboratory is located on top of a thick zone of mainly unsaturated rock, with the primary aquifer found 600 - 1,200 ft below the ground surface. Groundwater occurs beneath the Pajarito Plateau in three modes: (1) perched alluvial groundwater in canyon bottoms; (2) zones of intermediate-depth perched groundwater whose location is controlled by availability of recharge and by subsurface changes in permeability; and (3) the regional aquifer beneath the Pajarito Plateau as shown on Figure 3.5.

Stream runoff may be supplemented or maintained by Laboratory discharges. Many relatively dry canyons have little surface water flow and little or no alluvial groundwater. Streams have filled some parts of canyon bottoms with alluvium up to a thickness of 100 ft. In wet canyons, stream runoff percolates through the alluvium until downward flow is impeded by less permeable layers, maintaining shallow bodies of perched groundwater within the alluvium. Contaminant distributions in the groundwater under the Pajarito Plateau suggest that the three systems may be in communication under certain conditions (Robinson, McLin, and Viswanathan, 2005). The hydrogeology of the Pajarito Plateau is typical of the semi-arid, sediment-filled basins along the Rio Grande Rift in that the basins receive recharge from mountain ranges along the margins (Broxton and Vaniman, 2005). The following bullets briefly discuss alluvial, perched, and regional groundwater:

- **Alluvial Groundwater:** Alluvial groundwater primarily occurs in canyons that originate in the Sierra de los Valles or in the Pajarito Plateau watersheds. Groundwater in the canyons is supported by seasonal runoff from the mountains, by episodic precipitation events on the plateau, perennial springs, and by discharge from LANL outfalls. The wastewater also plays a part in the hydrogeology of the canyons.
- **Deep Perched Groundwater:** Perched water is defined "as a hydrologic condition in the rock or sediment above the regional aquifer in which the rock pores are completely saturated with water." Perched water bodies are important elements of the hydrogeology of the site for several reasons. There is a probability that the zones can intercept contaminants being transported downward through the vadose zone. The perched water can be a permanent or long-term residence for contaminants because the chemical makeup of the rocks may result in adsorption. Perched water can also serve as a place where dilution occurs, lowering the concentration of contaminants. There is a possibility that perched zones may be intersected by streams in the lower parts of the canyons, resulting in lateral flow under the influence of gravity out of the canyon walls into the alluvial aquifer and subsequently to the Rio Grande.

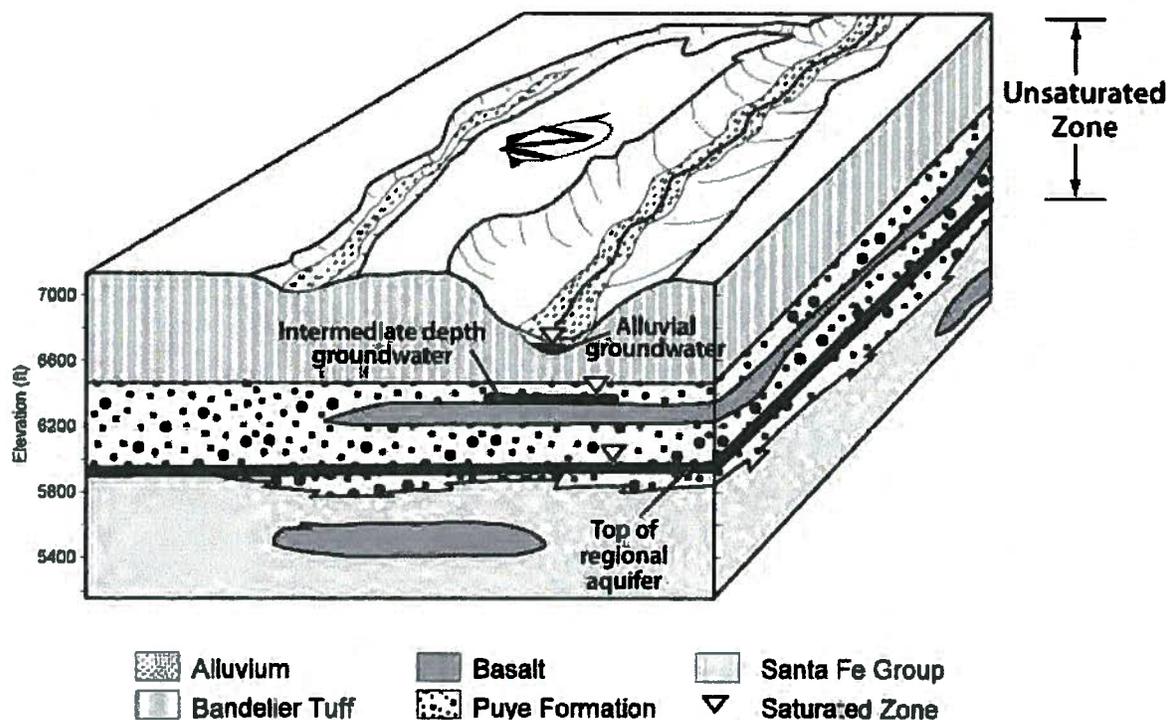


Figure 3.5 – Illustration of Geological and Hydrological Relationships on the Pajarito Plateau

- **Regional Groundwater:** The regional aquifer located below LANL is very deep (up to 1,200 feet [360 meters]) and is separated from the surface by a thick vadose zone with some perched water zones (Keating, Robinson, and Vesselinov, 2005). The depth to the water of the regional aquifer on the eastern part of the plateau near the rim of White Rock Canyon is about 614 feet (200 meters), about 210 feet (65 meters) above the level of the Rio Grande (Broxton and Vaniman, 2005). It has been reported that a well drilled in the lower Los Alamos Canyon near the Rio Grande flowed to the surface when installed in the regional aquifer, indicating confined or semi-confined conditions, and that there are seeps and springs in White Rock Canyon (Broxton and Vaniman, 2005).

The Laboratory uses groundwater for its potable water supply to laboratory facilities, sanitary facilities, and operations support facilities (cooling towers, power plant etc.). This groundwater contains various levels of natural elements that are dissolved as the water passes through the sub-surface geology. Appendix H provides the sampling results for well water as collected by the Los Alamos County Safe Drinking Water Act Sampling Program for 2010.

3.7 Soil Conditions

Most of the Laboratory facilities are located on mesa tops, where the soils are generally well-drained and thin. The parent materials are approximately 95% Bandelier Tuff, volcanic rocks of the tschicoma and Puye Formations, and the Cerros de Rio Basalts of the Chino Mesa, and the remnants of the El Cajete pumice. The remaining 5% was formed from colluviums, alluvium, andesitic rocks of the Paliza Canyon Formation, Cerro Rubio Quartz Latites, and tuffs associated with the sediments of the Cerro Toledo Rhyolite. The textures of these soils range from very fine sandy loams and clay loams to gravelly, sandy loams and stony, silty clay loams.

3.8 Wild Fires - Cerro Grande and Las Conchas

There have been two major forest fires in the vicinity of the Laboratory over the last 10 years. In May 2000, the Cerro Grande Fire burned approximately 47,000 acres, including about 7,700 acres of Laboratory lands (Balice, Bennett, and Wright, 2004). This fire severely burned much of the mountainside that drains onto the Laboratory (Gallaher and Koch, 2004). On June 26, 2011 a second major forest fire started due to an aspen tree collapsing a power line. The Las Conchas Fire burned 156,000 acres surrounding the Laboratory and the Los Alamos town site. Most of the fire burned on the Bandelier National Monument, Pueblo Land, and the Valle Caldera Preserve. It did include, however, a 2 acre spot fire on Laboratory property along the south boundary of TA-49. An additional 90 acres of Laboratory property were also burned due to fire-fighting efforts that included back burns west of State Road 501. In general, the effects of both fires included increased soil erosion due to loss of vegetative cover, formation of hydrophobic soils, and soil disturbance during construction of fire breaks, access roads, and staging areas used to support the fire-fighting efforts.

4.0 OUTFALL DESCRIPTIONS AND CLASSIFICATIONS

This 2012 NPDES Permit Re-Application Package includes 11 outfalls located at seven (7) Technical Areas (TAs) spread out over approximately a 40 square mile area within the Laboratory boundaries as shown in Table 4.1 and the map provided as Appendix G. These outfalls discharge into 4 of the watersheds in the LANL region, with the amount of discharge varying from year to year. Detailed treatment descriptions and future proposed changes to NPDES permitted facilities and outfalls are found in the EPA Form 2C Applications and Fact Sheets for each outfall.

**Table 4.1
 National Pollutant Discharge Elimination System Industrial Point Source Outfalls**

No. Outfall	Outfall Category	ID No.	Location/Facility	Watershed
1	Power Plant/SERF Discharge (001)	001	TA-3-22	Sandia
1	Sanitary Waste Water Treatment (13S)	13S	TA-46-347	Canada del Buey*
1	Radioactive Liquid Waste Treatment (051)	051	TA-50-1	Mortandad
7	Treated Cooling Water (03A)	03A022	TA-3-66	Mortandad
		03A027	TA-3-2327	Sandia
		03A048	TA-53-964, 979	Los Alamos
		03A113	TA-53-293, 952	Sandia
		03A160	TA-35-124	Mortandad
		03A181	TA-55-6	Mortandad
		03A199	TA-3-1837	Sandia
1	High Explosive Waste Water Treatment (05A)	05A055	TA-16-1508	Water/CdV

*Treated effluent from Outfall 13S is pumped to the TA-3 Re-Use tank, thence Outfall 001. The TA-46 SWWS Plant has never discharged into Canada del Buey. Canada del Buey is a tributary to Mortandad Canyon.

5.0 WASTE ACCEPTANCE, CHARACTERIZATION, AND CERTIFICATION PROGRAM

The Laboratory's waste management requirements are consistent with the applicable DOE orders, and state and federal regulations. All waste generators at the Laboratory are required to properly identify and document the characterization of any solid, hazardous, radioactive, or mixed waste pursuant to P409, *Waste Management* (Appendix M). This includes compliance

with the appropriate facility Waste Acceptance Criteria (WAC) and the preparation of a Waste Profile Form (WPF).

The Laboratory has ten recycling, waste storage, treatment, and disposal paths with specific WACs provided as attachments to P930-1, LANL Waste Acceptance Criteria. The following P930-1 attachments (Appendix N) are applicable to this 2012 NPDES Permit Re-Application:

- Attachment 16, P930-1: SWWS WAC
- Attachment 1, P930-1: RLWTF WAC

P930-1 does not include the WAC for some small specialty waste streams generated at the Laboratory. These waste streams have a site/facility specific WAC. The following site/facility specific WACs (Appendix N) are applicable to this 2012 NPDES Permit Re-Application:

- EP-RLW-AP-2902, Waste Acceptance Criteria for Transuranic (TRU) Radioactive Liquid Waste (RLWTF TRU WAC)
- LA-UR-08-1520, TA-16 Waste Acceptance Criteria (HEWTF WAC)

The WACs for the wastewater treatment facilities that may discharge to an NPDES permitted outfall are based on the NPDES effluent limits, New Mexico Water Quality Standards, RCRA Universal Treatment Standards, and/or other federal and state requirements. The treatment processes and capacities of these facilities are also considered during the development of the WACs.

The Laboratory utilizes the WPF to provide a complete and concise description of each waste stream including the details of the generating process. The WPF process provides generators with guidance to help make the determination of the physical, chemical, and radiological characteristics of the waste with sufficient accuracy to permit proper segregation, treatment, and disposal appropriate facility WAC. A WPF is required for all waste streams to be discharged or transported to the SWWS, RLWTF, and/or HEWTF. They are typically prepared by the generator with the assistance of a Waste Management Coordinator (WMC) who then enters the WPF information into the Waste Compliance and Tracking System (WCATS). The WCATS system automatically routes the WPF for approval by the appropriate organizations/personnel and allows for the generator to attach characterization data, acceptable knowledge data and other information necessary to properly document the waste stream. The WMCs serve as the primary contact between the waste generator and the treatment/disposal facility and are generally responsible for ensuring the following:

- Wastewater discharged/transported to the SWWS, RLWTF, or HEWTF is acceptable under the current NPDES Permit requirements.
- Operating personnel are familiar with the pertinent administrative requirements and waste management regulations.
- Wastewater discharged/transported to the SWWS, RLWTF, or HEWTF meets the requirements of the respective WAC for each facility.
- RCRA-Listed hazardous wastewater is not discharged/transported to the SWWS, RLWTF, or HEWTF.

- The operations personnel at the SWWS, RLWTF, or HEWTF are notified of any unusual or accident discharge that may violate the waste management requirements/regulations.

6.0 2012 NPDES RE-APPLICATION PROJECT

The data and information used to prepare this 2012 NPDES Permit Re-Application document was prepared by a project team that consisted of representatives from DOE, ENV-RCRA, Outfall owners, and Facility Operations Directors/Managers. The project team responsibilities and activities were outlined in a project Implementation Plan (Appendix O). The following sections provide a brief discussion of the work activities and the procedures and processes that were utilized by personnel to ensure that the information provided in this re-application document is complete and accurate.

6.1 Outfall Survey

The purpose of the outfall survey was to accumulate records, logs, operating procedures, sampling data, compliance inspection reports, topography maps, chemical inventories, WPFs, MSDSs, Notice of Change/Plans to Change, and previous Laboratory discharge non-compliance records and reports to support completion of the Form 2C for each outfall. The outfall survey included site visits to each of the 11 outfalls and their associated treatment facilities to take photographs, provide confirmation of the sources and processes, verify the outfall location, and collect documentation. The site visits were conducted in accordance with ENV-RCRA-QP-037, *Performing NPDES Reapplication Surveys*.

6.2 Outfall Effluent Sampling and Analysis

The Permittees prepared a project specific Sampling and Analysis Plan (SAP) (Appendix P) to ensure that representative samples were collected, preserved, and managed in accordance with the EPA application Form 2C. All samples were collected in accordance with the project specific SAP, ENV-RCRA-IWD-005, *NPDES Outfall Compliance Sampling*; and ENV-RCRA-QP-005, *Sampling at NPDES Permitted Outfalls*. The samples were shipped by the Sample Management Office (SMO) to a LANL approved analytical laboratory required to use EPA approved methods and follow DOE contract requirements. The analytical laboratory was also required to provide Level 4 Quality Data Packages.

All analytical data, upon receipt from the laboratory, was formally validated by an independent subcontractor prior to its use in the re-application (Level 4). After the data was validated it was forwarded to ENV-RCRA from the Sample Management Office (SMO) and hand entered onto the Form 2C. The accuracy of the hand entered data was independently verified and the review documented, forwarded to the appropriate record series, and a hard copy sent to ENV-RCRA.

6.3 Document Control/Records Management

Effective document control, record keeping, and data management was conducted in accordance with ENV-DO-QP-106, *Document Control*; ENV-DO-QP-110, *Records Management*; and ENV-DO-POL-QAP, *ENV Quality Assurance Plan*.

6.4 Quality Assurance

The quality assurance for the project was performed in accordance with SD330, *Los Alamos National Laboratory Quality Assurance Program*; ENV-DO-POL-QAP, *ENV Quality Assurance Plan*; and ENV-RCRA-QAPP-NPDES IPSP, *Quality Assurance Project Plan for the NPDES Industrial Point Source Permit (IPSP) Self-Monitoring Program*. Quality assurance reviews for

data accuracy were conducted throughout the project to ensure that data collected from the outfall surveys, site visits, and sampling activities were reasonable and adequately documented. These QA reviews were initially be conducted by project personnel as the data was collected and/or received. Questionable or undocumented data initiated additional investigations with outfall owners/operators. To ensure accuracy, all collected or compiled data was compared and evaluated against existing data obtained from other internal and external entities.

Formal reviews were also conducted by subject matter experts, the outfall owners; and the quality assurance specialist assigned to ENV-RCRA. These included formal comment review and response to ensure that all changes were documented.

7.0 NPDES PERMIT RE-APPLICATION FORMS

The NPDES Permit Re-application requires detailed information be provided for each point source outfall. The information required includes the location of the outfall, a detailed description of all sources and processes that contribute to the discharged waste stream, the volume and frequency of the discharge, and analytical data on the waste stream. A "fact sheet" which provides a brief biography of the required information has be created and provided for each Form 2C for each of the 11 outfalls included in the reapplication.

7.1 General Form 1

Form 1 is used to present general information such as the nature of business, name, mailing address, location, and existing permit numbers regarding EPA programs that apply to LANL. The information in the General Form 1 of the 2012 re-application did not vary significantly from that which was provided in the 2004 NPDES Re-Application. The following bullets summarize the deviations and/or considerations (if any) that are applicable to this 2012 NPDES Permit Re-Application:

- EPA deleted four (4) NPDES Outfalls (02A129, 03A021, 03A130 and 03A185) from the DOE/LANS permit on October 11, 2011. Additional outfalls are being evaluated for elimination.
- Appendix G provides a topographic map showing the locations of the 11 Outfalls to be permitted with respect to the Springs located in the area around the Laboratory.
- Appendix I provides a topographic map showing the sanitary waste collection system that delivers wastewater to the SWWS for treatment
- Appendix J provides a topographic map showing the RLWCS that delivers wastewater to the RLWTF for treatment.

Attachment Form 1 provides the completed General Form 1 with its associated footnotes and certifications.

7.2 Standard Form A

Standard Form A is the section of the application used for documenting discharges from a publicly or privately owned activity or wastewater treatment system or facility. The Laboratory does not own or operate a municipal wastewater system or publically owned treatment works. Communication with the EPA Region 6 Permit Writer in May 2011 indicated that the applicant would not be required to submit a Standard Form A with the submitted permit re-application package.

7.3 Form 2C

The Form 2 C is the section of the application used for renewal of expiring NPDES industrial permits. It provides detailed information regarding the location of the outfall, sources of influent water, production levels, and the analytical data for potential contaminants in the effluent discharged from the outfall. The Form 2C for each outfall is as an attachment to this permit re-application that corresponds to the respective outfall ID number. In addition to the Form 2C, the applicant has provided supporting documentation for each of the 11 outfalls. This supporting documentation includes:

- Fact Sheet
- Outfall Summary Discharge Monitoring Report
- Process Flow Diagram
- Outfall Location Map

8.0 REFERENCES

Balice, R. G., K. D. Bennett, and M. A. Wright, 2004, *Burn Severities, Fire Intensities, and Impacts to Major Vegetation Types from the Cerro Grande Fire*, LA-14159, Los Alamos National Laboratory, Los Alamos, New Mexico, December.

Broxton, D. E., and D. T. Vaniman, 2004, "Geologic Framework of a Groundwater System on the Margin of a Rift Basin, Pajarito Plateau, North-Central New Mexico," *Vadose Zone Journal*, Vol. 4, p. 522-550, April 28.

Broxton, D. E., and D. T. Vaniman, 2005, "Geologic Framework of a Groundwater System on the Margin of a Rift Basin, Pajarito Plateau, North-Central New Mexico," *Vadose Zone Journal*, 4:522-550, July 18.

DOE, 1999, "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0238, Albuquerque, NM (01/99).

DOE, 2008, "Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory," DOE/EIS-0380, Albuquerque, NM (05/2008).

ENV-DO-POL-QAP, *ENV Quality Assurance Plan*

ENV-RCRA-QAPP-NPDES IPSP, *Quality Assurance Project Plan for the NPDES Industrial Point Source Permit (IPSP) Self-Monitoring Program*

ENV-DO-QP-106, *Document Control*

ENV-DO-QP-110, *Records Management*

ENV-DO-POL-QAP, *ENV Quality Assurance Plan*

ENV-RCRA-IWD-005, *NPDES Outfall Compliance Sampling*

ENV-RCRA-QP-005, *Sampling at NPDES Permitted Outfalls*

ENV-RCRA-QP-037, *Performing NPDES Reapplication Surveys*

NPDES Permit No. NM0028355, effective August 1, 2007

Gallaher, B. M., and R. J. Koch, 2004, *Cerro Grande Fire Impacts to Water Quality and Stream Flow Near Los Alamos National Laboratory: Results of Four Years of Monitoring*, LA-14177, Los Alamos National Laboratory, Los Alamos, New Mexico, September

Keating, E. H., B. A. Robinson, and V. V. Vesselinov, 2005, "Development and Application of Numerical Models to Estimate Fluxes through the Regional Aquifer beneath the Pajarito Plateau," *Vadose Zone Journal*, 4:653-671, August 16.

LA-UR-07-8312, Los Alamos National Laboratory NPDES Permit Compliance and Outfall Reduction Strategy, December 20, 2007

Robinson, B. A., S. G. McLin, and H. S. Viswanathan, 2005, "Hydrologic Behavior of Unsaturated, Fractured Tuff: Interpretation and Modeling of a Wellbore Injection Test," *Vadose Zone Journal*, 4:694-707, August 16.

SD330, *Los Alamos National Laboratory Quality Assurance Program*

FORM 1 GENERAL		U.S. ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION Consolidated Permits Program <i>(Read the "General Instructions" before starting.)</i>	I. EPA I.D. NUMBER <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:5%; text-align: center;">S</td> <td style="width:85%;"></td> <td style="width:5%; text-align: center;">T/A</td> <td style="width:5%; text-align: center;">C</td> </tr> <tr> <td style="text-align: center;">F</td> <td style="text-align: center;">NM0890010515</td> <td></td> <td style="text-align: center;">D</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">13</td> <td style="text-align: center;">14</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: center;">15</td> </tr> </table>	S		T/A	C	F	NM0890010515		D	1	2	13	14				15
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			15																
LABEL ITEMS	PLEASE PLACE LABEL IN THIS SPACE		GENERAL INSTRUCTIONS If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.																
I. EPA I.D. NUMBER III. FACILITY NAME V. FACILITY MAILING ADDRESS VI. FACILITY LOCATION																			

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	Mark "X"			SPECIFIC QUESTIONS	Mark "X"		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

III. NAME OF FACILITY

c	1	SKIP	LOS ALAMOS NATIONAL LABORATORY	89
	15	16 - 29		30

IV. FACILITY CONTACT

c	2	A. NAME & TITLE (last, first, & title)	TURNER, GENE, Environmental Permitting Manager	B. PHONE (area code & no.)	(505) 667-5794
	15	16	45	46	48 49 51 52- 55

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX			
c	3	U.S. DOE LOS ALAMOS SITE OFFICE	45
	15	16	
B. CITY OR TOWN		C. STATE	D. ZIP CODE
c	4	LOS ALAMOS	NM
	15	18	40 41 42 47 51
		87544	

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER			
c	5	3747 WEST JEMEZ ROAD	45
	15	16	
B. COUNTY NAME			
c	6	LOS ALAMOS	70
	15	16	
C. CITY OR TOWN		D. STATE	E. ZIP CODE
c	6	LOS ALAMOS	NM
	15	16	40 41 42 47 51
		87544	F. COUNTY CODE (if known)
			NA

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)															
A. FIRST							B. SECOND								
C	I	I	I	I			C	I	I	I	I				
7	9	7	1	1			7	9	6	6	1				
(specify) NATIONAL SECURITY							(specify) SPACE RESEARCH & TECHNOLOGY								
15	16	17	18	19	20	21	15	16	17	18	19	20	21	22	
C. THIRD							D. FOURTH								
C	I	I	I	I			C	I	I	I	I				
7	9	9	2	2			7	9	6	1	1				
(specify) SCIENTIFIC RESEARCH							(specify) ENERGY DEVELOPMENT								
15	16	17	18	19	20	21	15	16	17	18	19	20	21	22	

VIII. OPERATOR INFORMATION																									
A. NAME																							B. Is the name listed in Item VIII-A also the owner?		
C																							55	56	
8	LOS ALAMOS NATIONAL SECURITY																						<input type="checkbox"/>	YES <input checked="" type="checkbox"/>	NO
15	16	17	18	19	20	21	22	23	24	25															

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other," specify.)															D. PHONE (area code & no.)									
F = FEDERAL S = STATE P = PRIVATE M = PUBLIC (other than federal or state) O = OTHER (specify)															(specify) P					(specify) A (505) 667-4218				
15	16	17	18	19	20	21	22	23	24	25	15	16	17	18	19	20	21	22	23	24	25			

E. STREET OR P.O. BOX																											
P.O. BOX 1663																											
28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

F. CITY OR TOWN															G. STATE		H. ZIP CODE		IX. INDIAN LAND								
C																			Is the facility located on Indian lands?								
B	LOS ALAMOS														NM		87544		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO								
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

X. EXISTING ENVIRONMENTAL PERMITS																													
A. NPDES (Discharges to Surface Water)										D. PSD (Air Emissions from Proposed Sources)																			
C	T	I													C	T	I												
9	N		NM0028355												9	P		P100R1 (See Footnote B)											
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		

B. UIC (Underground Injection of Fluids)										E. OTHER (specify)																			
C	T	I													C	T	I												
9	U		NA												9			(See Footnotes C - G)											
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		

C. RCRA (Hazardous Wastes)										E. OTHER (specify)																			
C	T	I													C	T	I												
9	R		NM0890010515-1 (A)												9			(See Footnote H)											
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

The Los Alamos National Laboratory is a multidisciplinary/multiprogram laboratory. The Laboratory's central mission is to reduce the nuclear danger through evaluation and stockpile stewardship. It also provides significant programmatic support to many civilian efforts. Because of evolving technologies and changing national and international priorities, the Laboratory increasingly uses its multidisciplinary research and development capabilities to solve civilian problems in the areas of health, national infrastructure, energy, education, aeronautics, and the environment. Extensive basic research programs in physics, chemistry, metallurgy, mathematics and computers, earth sciences, and electronics support these efforts.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)															B. SIGNATURE										C. DATE SIGNED				
Kevin W. Smith, Manager, DOE/Los Alamos Site Office																									1/27/2012				
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		

COMMENTS FOR OFFICIAL USE ONLY																											
C																											
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)			
A. FIRST		B. SECOND	
C	(specify)	C	(specify)
7		7	9661
15	16	15	16
C. THIRD		D. FOURTH	
C	(specify)	C	(specify)
7		7	9611
15	16	15	16

VIII. OPERATOR INFORMATION			
A. NAME			B. Is the name listed in Item VIII-A also the owner? <input type="checkbox"/> YES <input type="checkbox"/> NO
C			55 56
8			
15	16		
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box: if "Other," specify.)			D. PHONE (area code & no.)
F = FEDERAL	M = PUBLIC (other than federal or state)	(specify)	C
S = STATE	O = OTHER (specify)		A
P = PRIVATE			15 16 18 19 21 22 26
E. STREET OR P.O. BOX			
F. CITY OR TOWN			G. STATE
			H. ZIP CODE
			IX. INDIAN LAND
			Is the facility located on Indian lands? <input type="checkbox"/> YES <input type="checkbox"/> NO
			52

X. EXISTING ENVIRONMENTAL PERMITS			
A. NPDES (Discharges to Surface Water)		D. PSD (Air Emissions from Proposed Sources)	
C	T	C	T
9	N	9	P
15	16	15	16
B. UIC (Underground Injection of Fluids)		E. OTHER (specify)	
C	T	(specify)	
9	U		
15	16		
C. RCRA (Hazardous Wastes)		E. OTHER (specify)	
C	T	(specify)	
9	R		
15	16		

XI. MAP
 Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

EXTRA PAGE FOR SIGNATURE

XIII. CERTIFICATION (see instructions)
 I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print) Alison M. Dorries, Division Leader, Environmental Protection Division	B. SIGNATURE 	C. DATE SIGNED 1/27/12
--	--	---------------------------

COMMENTS FOR OFFICIAL USE ONLY	
C	
15	16

Form 1 General Footnotes

- A NM0890010515-1 Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit:** The RCRA permit regulates the management of hazardous wastes based on a combination of the facility's status, the quantities of waste generated, and the types of waste management conducted by the facility. The Laboratory's hazardous waste facility permit was initially granted in 1989 for storage and treatment operations. The current RCRA Hazardous Waste Permit became effective on December 30, 2010. Appendix D provides maps of the Hazardous Waste Management Facilities and a listing of the Hazardous Waste Treatment Process Codes.
- B P100R1 Air Quality Operating Permit:** The Federal Clean Air Act Operating Permit provides the terms and conditions that must be followed in order to operate applicable air emission sources (i.e., boilers, electric generators, power plant, a combustion turbine generator, a data disintegrator, two carpenter shops, a degreaser, and an asphalt plant) at the Laboratory. The Laboratory also reports emissions from chemical use associated with R&D and permitted beryllium activities. The current Air Quality Operating Permit became effective on August 7, 2009.
- C NPDES Construction General Permit:** The Construction General Permit (CGP) regulates storm water discharges from construction activities disturbing one or more acres, including those construction activities that are part of a larger common plan of development collectively disturbing one or more acres. The Laboratory and the general contractor apply individually for NPDES CGP coverage and are co-permittees at most construction sites. Compliance with the NPDES CGP includes developing and implementing a Storm Water Pollution Prevention Plan before soil disturbance can begin and conducting site inspections once soil disturbance has commenced. There are currently 16 Active Construction General Permit Notice of Intent documents at LANL (Appendix C).
- D NPDES Permit No. NM0030759 - Industrial Point Source Permit:** The Individual Permit (IP) authorizes the discharge of storm water associated with industrial activities at the Laboratory from specified solid waste management units (SWMUs) and areas of concern (AOCs). It contains non-numeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program, to minimize pollutants in storm water discharges. It requires the Laboratory to implement site-specific control measures (including best management practices) to address the non-numeric technology-based effluent limits as necessary to minimize pollutants in their storm water discharges. The current NPDES IP Permit, incorporating the latest modifications, became effective on November 1, 2010.
- E NPDES Storm water Multi-Section General Permit (MSGP):** The NPDES Industrial Storm Water Permit Program regulates storm water discharges from identified regulated industrial activities and their associated facilities. These activities include metal fabrication; hazardous waste treatment and storage; vehicle and equipment maintenance; recycling activities; electricity generation; warehousing activities; and asphalt manufacturing. LANS and the DOE are co-permittees under the EPA 2008 NPDES Storm Water MSGP for Industrial Activities (MSGP-2008). The current MSGP was effective September 29, 2008.
- F Septic Tank Permits:** LANL is responsible for requesting septic tank permits and creating and maintaining septic tank designs and installation to comply with the NMED Liquid Waste Disposal Program. Appendix C provides a list of the current septic tank permits at the Laboratory.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
001	TA-3-22	Co-Generation Power and Steam Plant	Tributary to Sandia Canyon

SOURCE OF DISCHARGE

Outfall 001 is located at TA-3 and discharges treated process water (i.e., demineralizer reject, boiler blow down, RO reject, floor drain sumps), treated sanitary wastewater effluent (Reuse Tank), treated cooling tower blow-down, and recycled sanitary effluent from the Sanitary Effluent Reclamation Facility (SERF) to a tributary of Sandia Canyon. The specific sources are identified in Table 1.

**Table 1
 Sources for Discharges to Outfall 001**

TA	Bldg	Description
3	22, 592, 58	Co-Generation Power and Steam Plant - Reverse Osmosis Reject - Cooling Towers - Boiler Blow Down - De-mineralizer Back Flush - Floor Drains/Sumps
3	336	SWWS Effluent (Reuse Tank)
3	1398	SERF Effluent (Tertiary Treated SWWS Effluent)

Figure 1 provides a process schematic that shows how each of the facilities/operations identified in Table 1 are connected to Outfall 001.

WATER TREATMENT PROCESSES

The following bullets provide a description of the facilities and water treatment processes that discharge to Outfall 001:

- Co-Generation Power and Steam Plant:** The Co-Generation Power and Steam Plant provides heating to most of the buildings at TA-3. It also provides steam for process needs and to produce electricity in one 10-megawatt and two 5-megawatt steam turbine/generators. The water used at the facility for steam generation is pre-treated using softeners, de-mineralizers, a Reverse Osmosis (RO) unit, and various corrosion chemicals. The plant also uses cooling towers that support large condensers and the cooling of pumps, bearings, and fans. Figure 2 provides a process flow diagram. RO reject, softener/de-mineralizer backwash, and cooling tower blow-down are discharged from the power plant to Outfall 001.
- Sanitary Waste Water System (SWWS):** The SWWS Plant treats sanitary wastewater, process water, cooling water, storm water, and waste water discharged to the sanitary sewer and/or collected in storage tanks from all technical areas at the Laboratory (Appendix I). All wastewater discharged to the SWWS must comply with the facility's Waste Acceptance Criteria (WAC) and, if it is something other than sanitary waste, must have a completed/approved Waste Profile Form (WPF) (Appendix N). A detailed process description of the SWWS Plant is provided in the Attachment provided for Outfall 13S. Figure 3 provides a process flow diagram. SWWS effluent is pumped to

the Reuse Tank located at TA-3-336 where it receives tertiary treatment at the SERF so that it can be reused/recycled or is de-chlorinated and discharged to Outfall 001.

- Sanitary Effluent Reclamation Facility (SERF):** The SERF facility provides tertiary treatment of SWWS effluent so that it can be reused/recycled as makeup water in the cooling towers at the Laboratory. The facility utilizes chemical precipitation, flocculation, microfiltration, reverse osmosis, and pH adjustment. Figure 4 provides a process flow diagram. The SERF effluent is either reused/recycled or discharged to Outfall 001.

Table 2 identifies the water treatment codes assigned to the facilities that have the capability to discharge to Outfall 001.

Table 2
Water Treatment Codes Assigned to Outfall 001

Source	Treatment Code	Treatment Process	Description
TA-3-22, Co-Generation Power and Steam Plant	4C	Reuse/Recycle of Treated Effluent	The power plant can use recycled SWWS effluent directly from SWWS or from the SERF.
	1S	Reverse Osmosis	RO Unit pre-treats water for the boilers
	2L	Reduction (Corrosion Inhibitors)	Chemicals are added to the boilers and cooling towers to control corrosion.
	2H	Disinfection (other)	Chemicals are added to control Microorganisms
	2E	Dechlorination	Chemicals are added to the Outfall discharge stream to remove halogens (chlorine & bromine).
	2K	Neutralization	Chemicals are added to control pH
	2J	Ion Exchange	Softeners and De-Mineralizers pre-treat water for the boilers
TA-46-333, 431, 334, 336, 335, 337, 338, 375, 340, 477, Sanitary Wastewater System (SWWS)	1T	Screening	Use of Bar Screen to remove solids.
	1M	Grit Removal	Grit Chamber
	1O	Mixing	Grit Chamber with Splitter Box
	3E	Pre-Aeration	Aeration Basins
	3A	Activated Sludge	Activated sludge is used to treat the water.
	1U	Sedimentation (settling)	Sludge is settled in clarifier and digester.
	2F	Disinfection (Chlorine)	Chlorine is added using a MIOX system.
	4C	Reuse/recycle of treated effluent	Effluent is sent to reuse tank.
	5H	Drying beds	Sludge drying beds on site.
	5Q	Landfill	Sludge and solids disposed of at an approved landfill.
	5G	Composting	Pilot project in process
TA-3-1398, Sanitary Effluent Reclamation Facility (SERF)	2C	Chemical Precipitation	Ferric Chloride and Magnesium Chloride are added to precipitate
	1G	Flocculation	Flocculate precipitates into larger particles for settling.
	1U	Sedimentation (settling)	Concentration tank/sludge tanks are used to settle out precipitate from liquid.
	2K	Neutralization	pH is adjusted prior to treatment in the RO unit.
	1S	Reverse Osmosis	RO is used to polish treated water.
	1F	Evaporation	SERF uses evaporation basins for RO reject.
	5R	Pressure Filtration	A filter press is used to dewater sludge.

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control corrosion, biological growth, and treat the water to remove constituents that could be harmful to the equipment. Table 3 provides a list of the chemicals used at the Power Plant, SWWS, and SERF facilities.

Table 3
Treatment Chemicals Used by Process Discharging to Outfall 001

Source	Chemical Name	Reason for Use/Frequency	Hazardous Substances Form 2C, Table 2C-4
Co-Generation Power and Stream Plant	STABREX-ST20	Cooling Tower – Microorganism Control Chemical	Sodium hypochlorite
	TRASAR 23268	Cooling Tower – Corrosion Inhibitor Monitoring	NA
	TG-7356	Cooling Tower – Corrosion Inhibitor	Phosphoric Acid, Zinc Chloride
	PermaTreat PC-510T	Reverse Osmosis Anti-Scalant	NA
	Sulfuric Acid	Demineralizer Operations	Sulfuric Acid
	Caustic Soda	Demineralizer Operations	Sodium Hydroxide
	Sodium Chloride	Water Softener Operations	NA
	NALCO 1720	Boiler- Oxygen Scavenger	Sodium Bisulfite
	TRI-ACT 1820	Boiler – Corrosion Inhibitor	NA
	NALCO(R)-22341	Boiler – Corrosion Inhibitor	Sodium Tripolyphosphate
	NALCO 8735	Boiler – pH Stabilizer	Sodium Hydroxide, Potassium Hydroxide
SWWS	NALCO 7408	Manhole A - Chlorine Scavenger	Sodium Bisulfite
	Clorox Bleach	Disinfectant	Sodium Hypochlorite, Sodium Hydroxide
	Hilex Bleach	Disinfectant at SWWS	Sodium Hypochlorite
	Acetic acid	On-Site Laboratory Reagent	Acetic acid
	Citric acid Monohydrate	On-Site Laboratory Reagent	NA
	Sodium Hydroxide	1-50% Solutions for pH Control and/or Laboratory Reagent	Sodium Hydroxide
	Fresh Tablets	Lily Tabs for Odor Control	NA
	Yellow/Green Liquid Concentrate	Tracing Dye	NA
	Glycerine	Carbon source for microorganisms	NA
	Soda Ash (Na ₂ CO ₃)	Adds alkalinity to the wastewater prior to treatment	NA
	Sodium Chloride (NaCl)	Chlorine source for disinfection using the MIOX system	Chlorine
Polymer	Flocculation Agent	NA	
SERF	Ferric Chloride	37 – 45% Solution used to promote precipitation	Ferric Chloride
	Magnesium Chloride	25 – 35% solution used to promote precipitation	NA
	Hydrochloric Acid 33%	33% solution for pH adjustment	Hydrochloric acid
	Glycerine	Promote flocculation of Precipitate	NA
	Caustic Soda (sodium hydroxide)	pH adjustment	Sodium Hydroxide
	Sodium Hypochlorite	5 – 35% solution used to clean RO unit	Sodium Hypochlorite

The discharge of SWWS effluent and recycled water from the SERF adds the potential for contaminants to be present in the discharge to Outfall 001 due to the influent received at SWWS. Table 4 identifies the contaminants listed on the Waste Profile Forms for the influent received by the Sanitary Waste Water System (SWWS) for treatment.

**Table 4
 Potential Contaminants Due to Reuse and/or Discharge of SWWS Effluent**

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 (Identified on WPFs)	
Process	Wastewater discharged to the sanitary sewer from non-radiological laboratories, process equipment, and areas.	Acetic acid Ammonium chloride Chlorine Copper chloride Cupric sulfite Ferric sulfate	Ferrous sulfate Nitric acid Potassium hydroxide Sodium hydroxide Sodium nitrite Zinc sulfate
ER	Water generated due to groundwater monitoring well drilling and sampling activities.	Ammonia Benzene Chlordane Chlorine Dichlorobenzene[1,3] Dieldrin	Endosulfan Endrin Ethylbenzene Heptachlor Toluene Xylene
Cooling	Blow Down from Cooling Towers and Systems	Ammonia Chlorine Cupric sulfate Phosphoric acid	Potassium hydroxide Sodium hydroxide Sodium nitrite Sulfuric acid
Sanitary	Wastewater from septic tanks at remote locations.	Chlorine Toluene	Xylene

POTENTIAL POLLUTANTS

The treatment chemicals, treated sanitary wastewater, and treated sanitary wastewater effluent from SERF constitute the pollutant load of the discharge to Outfall 001. Table 5 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 constituents identified.

**Table 5
 Potential Pollutants Discharged to Outfall 001**

Source Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
Co-Generation Power Plant and Steam Plant	Sodium Bisulfite, Sodium Tripolyphosphate, Sodium Hypochlorite, Potassium Hydroxide, Phosphoric Acid, Zinc Chloride, Sulfuric Acid, Sodium Hydroxide, Sodium Bisulfite
SERF Effluent (treated SWWS Effluent)	Ferric chloride, Hydrochloric Acid, Sodium Hypochlorite, Sodium Hydroxide, Acetic acid, Ammonia, Ammonium chloride, Benzene, Chlordane, Chlorine, Copper chloride, Cupric sulfate, Dichlorobenzene[1,3], Dieldrin, Endosulfan, Endrin, Ethylbenzene, Ferric sulfate, Ferrous sulfate, Heptachlor, Nitric acid, Phosphoric acid, Potassium hydroxide, Sodium hydroxide, Sodium Hypochlorite, Sodium nitrite, Sulfuric acid, Toluene, Xylene, Zinc sulfate
SWWS Effluent	Acetic acid, Ammonia, Ammonium chloride, Benzene, Chlordane, Chlorine, Copper chloride, Cupric sulfate, Dichlorobenzene[1,3], Dieldrin, Endosulfan, Endrin, Ethylbenzene, Ferric sulfate, Ferrous sulfate, Heptachlor, Nitric acid, Phosphoric acid, Potassium hydroxide, Sodium hydroxide, Sodium Hypochlorite, Sodium nitrite, Sulfuric acid, Toluene, Xylene, Zinc sulfate

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the sources that discharge to Outfall 001 are provided in Table 6.

**Table 6
 Source Flow Rates/Frequencies to Outfall 001**

Operation/Source	Average Flow (Gallon/Day)	Frequency	Treatment Code
Co-Generation Power and Steam Plant	85,950	Continuous	4C, 1S, 2H, 2K, 2E, 2J, 2L
SWWS Effluent – Reuse Tank	169,547	Continuous	1M, 1T, 1U, 2F, 2H, 3A, 4C, 5H, 5Q, 1O, 3E, 5G
SERF Effluent ^a	47,568	Intermittent	1F, 1G, 1S, 1U, 2C, 2K, 5R

a. SERF operational start up expected in the summer of 2012.

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 001 for the Permit Re-Application on August 9, 2011.

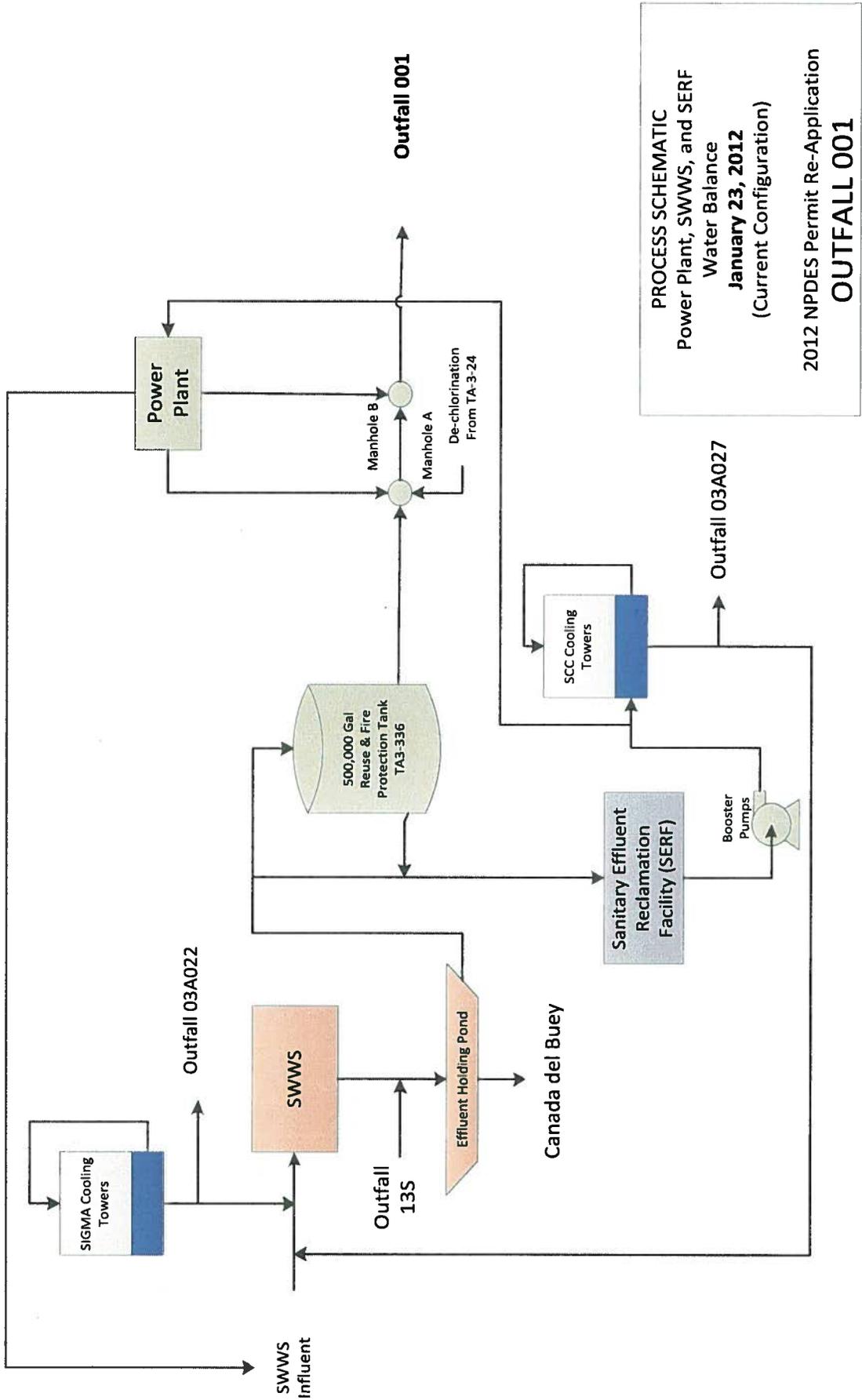
ANALYTICAL RESULTS PROVIDED

- Form 2C analytical data from a grab sample collected on August 9, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

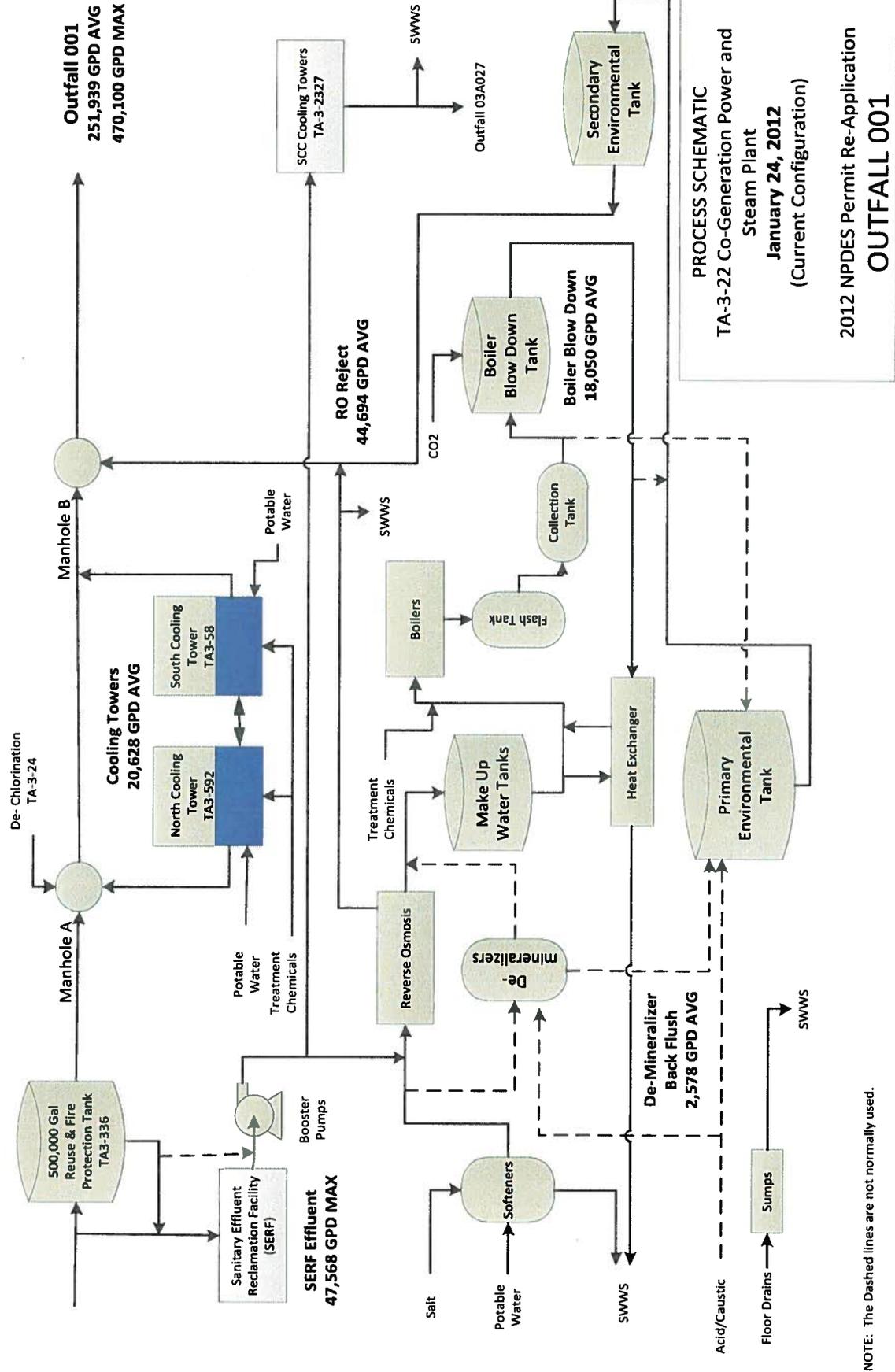
- Latitude – 35°52'26"N
- Longitude – 106°19'09"N
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 78.8 mg/L
- Photographs for the Co-Generation Power and Steam Plant are attached.
- Photographs for the SWWS facility are provided with the documentation for Outfall 13S.
- Photographs and MSDSs for the SERF are provided Appendix L.

Figure 1
Process Schematic for the Power Plant, SWWS, and SERF Connections to Outfall 001
(Current Configuration)



PROCESS SCHEMATIC
 Power Plant, SWWS, and SERF
 Water Balance
January 23, 2012
 (Current Configuration)
 2012 NPDES Permit Re-Application
OUTFALL 001

Figure 2
Process Flow Diagram for the TA-3-22 Co-Generation Power and Steam Plant
(Current Configuration)

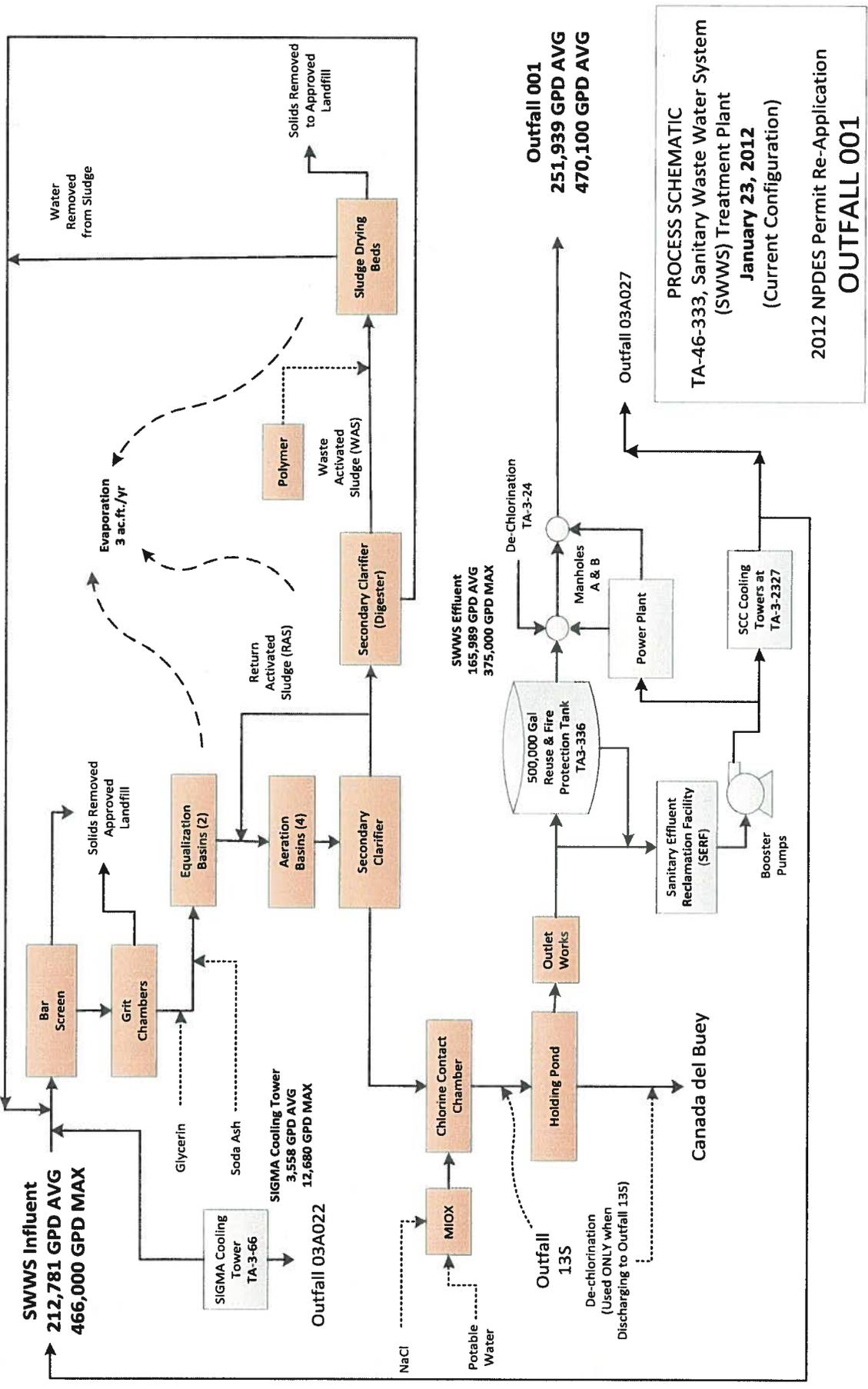


PROCESS SCHEMATIC
 TA-3-22 Co-Generation Power and
 Steam Plant
 January 24, 2012
 (Current Configuration)

2012 NPDES Permit Re-Application
OUTFALL 001

NOTE: The Dashed lines are not normally used.

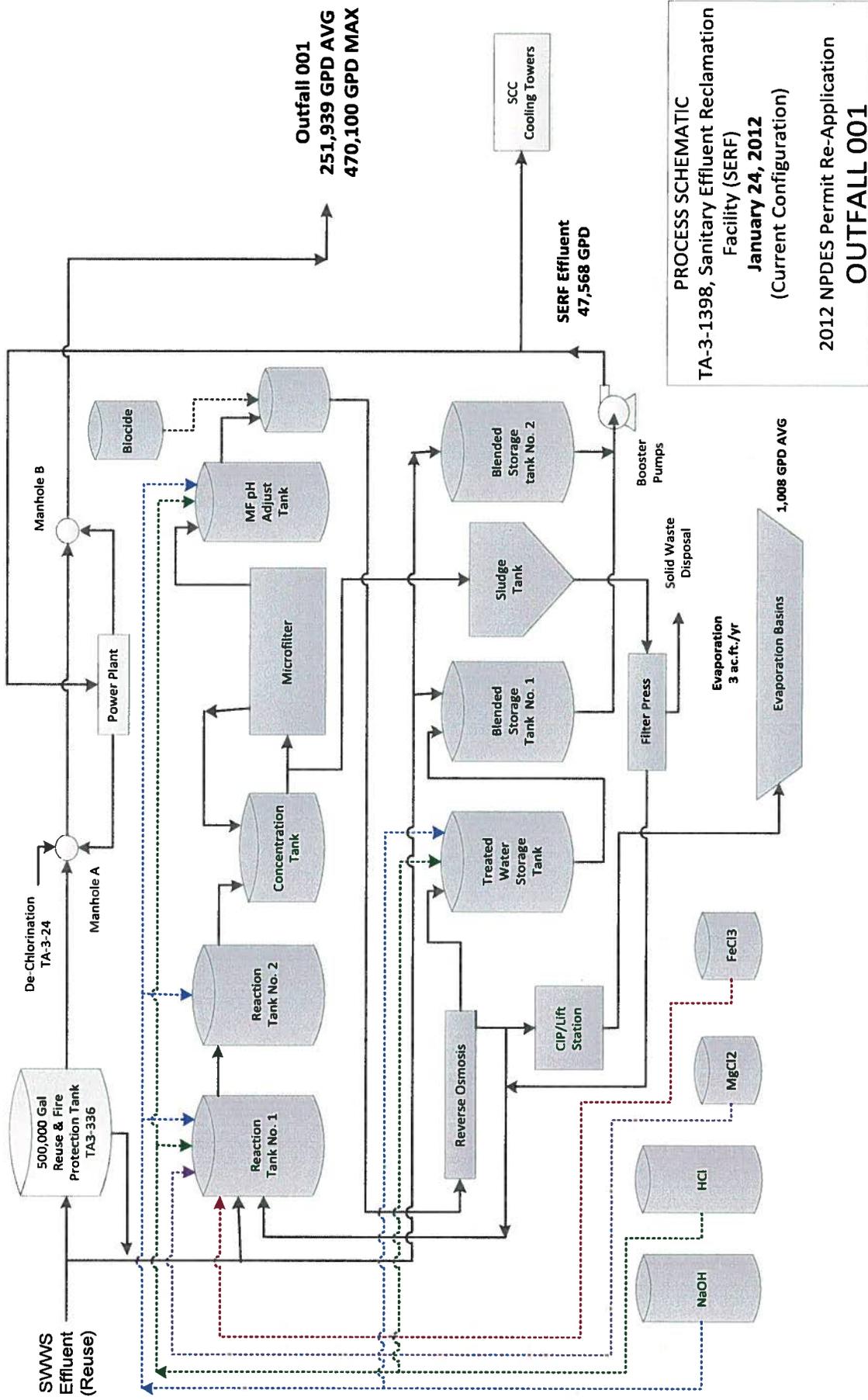
Figure 3
Process Flow Diagram for the TA-46-333, Sanitary Waste Water System (SWWS) Treatment Plant
 (Current Configuration)



PROCESS SCHEMATIC
 TA-46-333, Sanitary Waste Water System
 (SWWS) Treatment Plant
 January 23, 2012
 (Current Configuration)

2012 NPDES Permit Re-Application
OUTFALL 001

Figure 4
Process Flow Diagram for the TA-3-1398, Sanitary Effluent Reclamation Facility (SERF)
(Current Configuration)



PROCESS SCHEMATIC
 Facility (SERF)
 January 24, 2012
 (Current Configuration)

2012 NPDES Permit Re-Application
OUTFALL 001

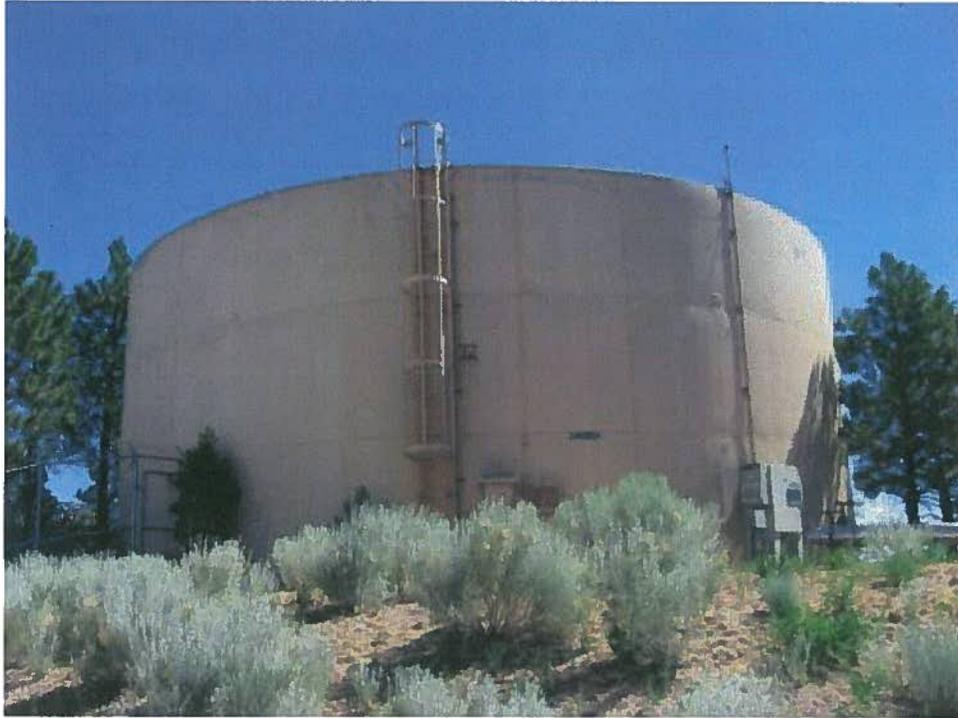
Photographs - TA-3-22, Co Generation Power Plant



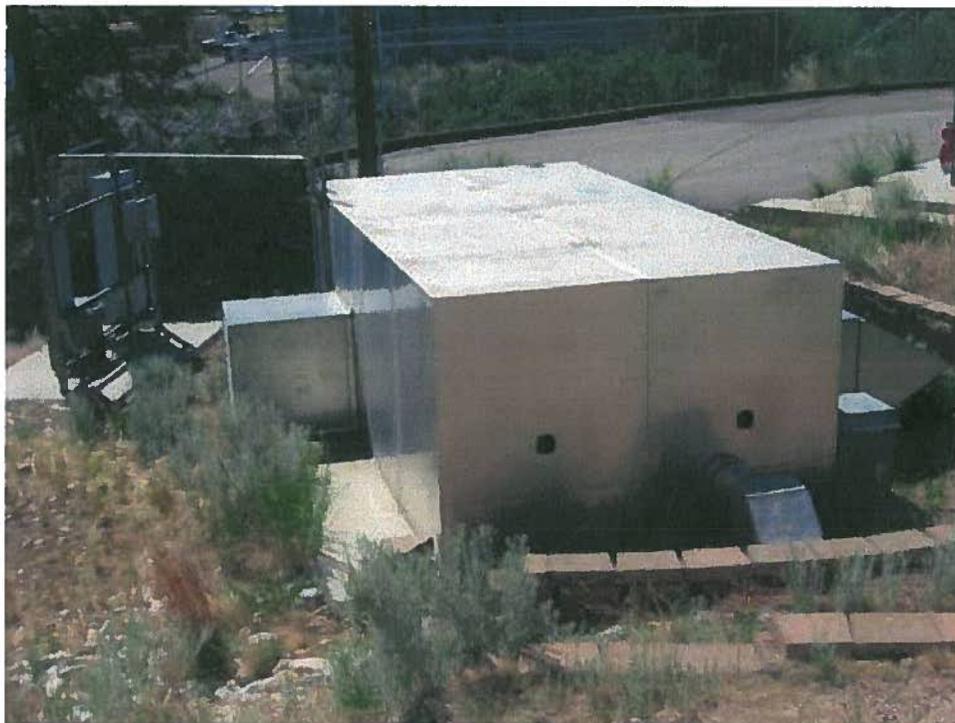
**Photograph 1 – Power Plant Water Usage & Treatment Systems
Outfall 001**



**Photograph 2 – Power Plant Water Usage & Treatment Systems
Outfall 001 Stream Channel**



Photograph 3 – Power Plant Water Usage & Treatment Systems
SWWS Effluent Reuse Tank (TA-3-336)



Photograph 4 – Power Plant Water Usage & Treatment Systems
Booster Pump Station



Photograph 5 – Power Plant Water Usage & Treatment Systems
Manhole A



Photograph 6 – Power Plant Water Usage & Treatment Systems
De-Chlorination Feed System at Manhole A



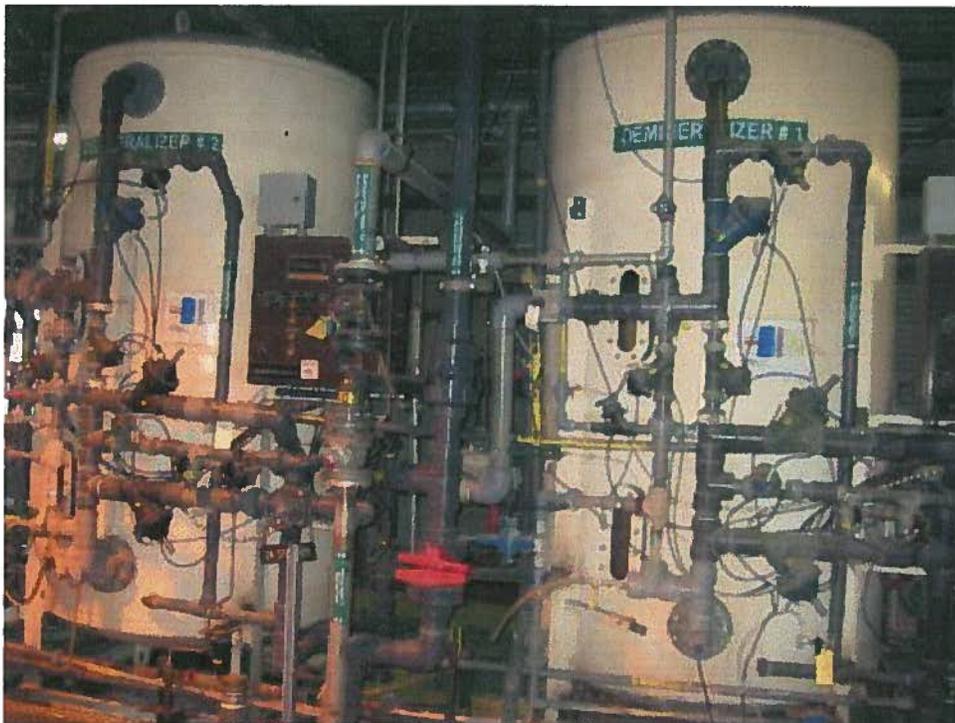
Photograph 7 – Power Plant Water Usage & Treatment Systems
Manhole B



Photograph 8 – Power Plant Water Usage & Treatment Systems
Cooling Towers



Photograph 9 – Power Plant Water Usage & Treatment Systems
Water Softeners



Photograph 10 – Power Plant Water Usage & Treatment Systems
Demineralizers



Photograph 11 – Power Plant Water Usage & Treatment Systems
Reverse Osmosis



Photograph 12 – Power Plant Water Usage & Treatment Systems
Condenser and the Associated Feed/Return Lines



Photograph 13 – Power Plant Water Usage & Treatment Systems
Induced Draft Fan – Bearing Cooled with Tower Water



Photograph 14 – Power Plant Water Usage & Treatment Systems
Circulating Booster Pump

**Form 2C Section IV.A and B - Improvements
 (Near Term – [6 to 18 months])**

The configuration of Outfall 001 is expected to change in the next 6 to 18 months due startup of the SERF facility and routine use of recycled SWWS effluent as makeup water in the SCC Cooling Towers. New piping will be installed to support a reuse/recycle loop between the SCC, SERF, SWWS, and Power Plant. This new configuration will allow for operational flexibility, will reduce the overall quantity of effluent discharged to Outfall 001 (due to the reuse of SWWS effluent), and will eventually eliminate the routine use of Outfall 03A027. Figure 5 provides a process schematic that shows the future configuration. Table 7 provides the wastewater treatment codes, volume, flow type, and potential pollutants associated with the cooling tower blow-down from the SCC Cooling Towers.

**Table 7
 Wastewater Treatment Codes, Volume, Flow Type, and Potential Pollutants Associated with the SCC Cooling Towers Blow-Down**

Source	Water Treatment Codes	Volume Gallons/Day	Flow Type	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
TA-3-2327, Strategic Computing Center (SCC) Cooling Tower Blow Down	2L – Reduction	53,432	Intermittent	Potassium hydroxide, sodium bisulfite, chlorine, sulfuric acid, sodium phosphate (dibasic), EDTA
	2F- Disinfection (chlorine)			
	2H – Disinfection (other)			
	2E - Dechlorination			

The water treatment system associated with the SCC Cooling Towers is controlled by a process logic controller (PLC) that monitors the tower water using a chlorine detection system and a conductivity meter. It is capable of using potable water, recycled water from the SERF, and/or a combination of potable/recycled water as makeup in the cooling towers. The treatment chemicals used in the cooling towers may include corrosion inhibitors, biocides, de-chlorination, and deminimus amounts of tracing agents (Table 8).

**Table 8
 Treatment Chemicals Used at the SCC Cooling Towers**

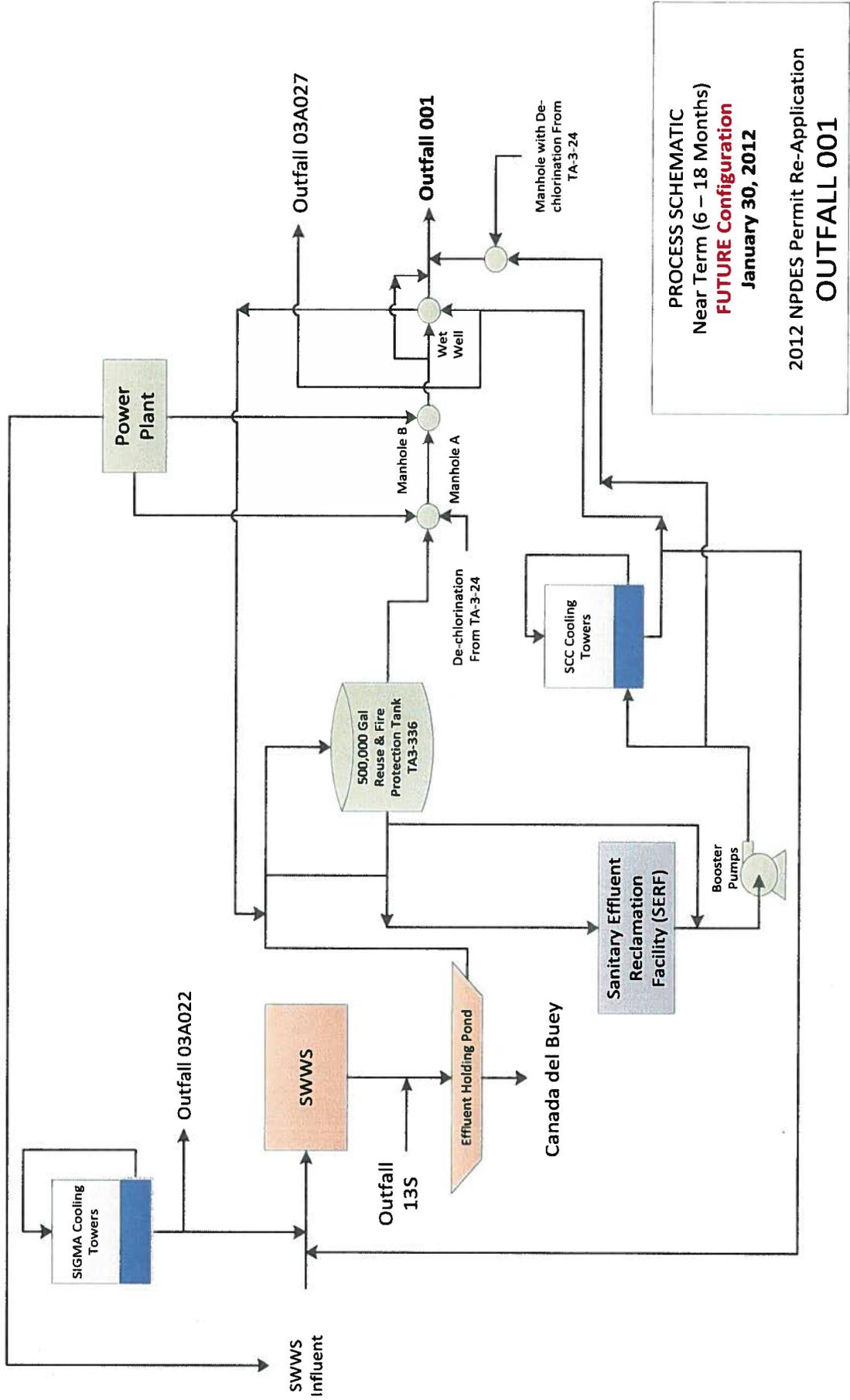
Chemical Name	Reason for Use/Frequency	Hazardous Substances Form 2C, Table 2C-4
WEST C-358P	Corrosion Inhibitor for Well Water	Potassium Hydroxide
WEST C-552	Corrosion Inhibitor/Dispersant for SERF Water	Potassium Hydroxide
WEST C-825	pH Control	Sodium Bisulfite
Purobrom Tablets	Biocide	Chlorine
WEST R-630	De-Chlorination	Sodium Bisulfite
HACH 2263411	Total Chlorine Indicator	Sulfuric Acid
HACH 1406428	DPD Total Chlorine Reagent	Sodium Phosphate (dibasic)
HACH 1407028	DPD Free Chlorine Reagent	Sodium Phosphate (dibasic), EDTA
HACH 2756549	pH Storage Solution	NA
HACH 2076053	Molybdovanadate Reagent	Sulfuric Acid
HACH 203832	Sulfuric Acid Solution 19.2 N	Sulfuric Acid
HACH 2297255	DPD Compound for Free and Total Chlorine Analyzers	NA
HACH 2314011	Free Chlorine Indicator Solution for CL-17 Analyzer	NA
HACH 2314111	Free Chlorine Buffer for CL-117 Analyzer	NA
HACH 2263511	Total Chlorine Buffer Solution	NA

The existing operations at the SCC Cooling Towers discharge treated cooling water blow-down directly to Outfall 03A027 at an average rate of 53,432 GPD and a maximum flow rate of 117,100 GPD. The revised operations at the SCC Cooling Towers will include the operational flexibility to do any or all of the following:

- Discharge cooling tower blow-down directly to the SWWS and/or SERF where it will be retreated and reused (preferred option) as makeup water.
- Discharge cooling tower blow-down to Outfall 03A027.
- Discharge cooling tower blow-down to Outfall 001.

An additional grab sample for all of the Form 2C constituents will be collected and the data submitted to the EPA when/if the SERF and/or SCC Cooling Towers discharge to Outfall 001.

Figure 5
 Near Term (6-18 Months)
FUTURE Configuration of Outfall 001



Form 2C Section IV.A and B - Improvements (Long Term – [2 to 5 years])

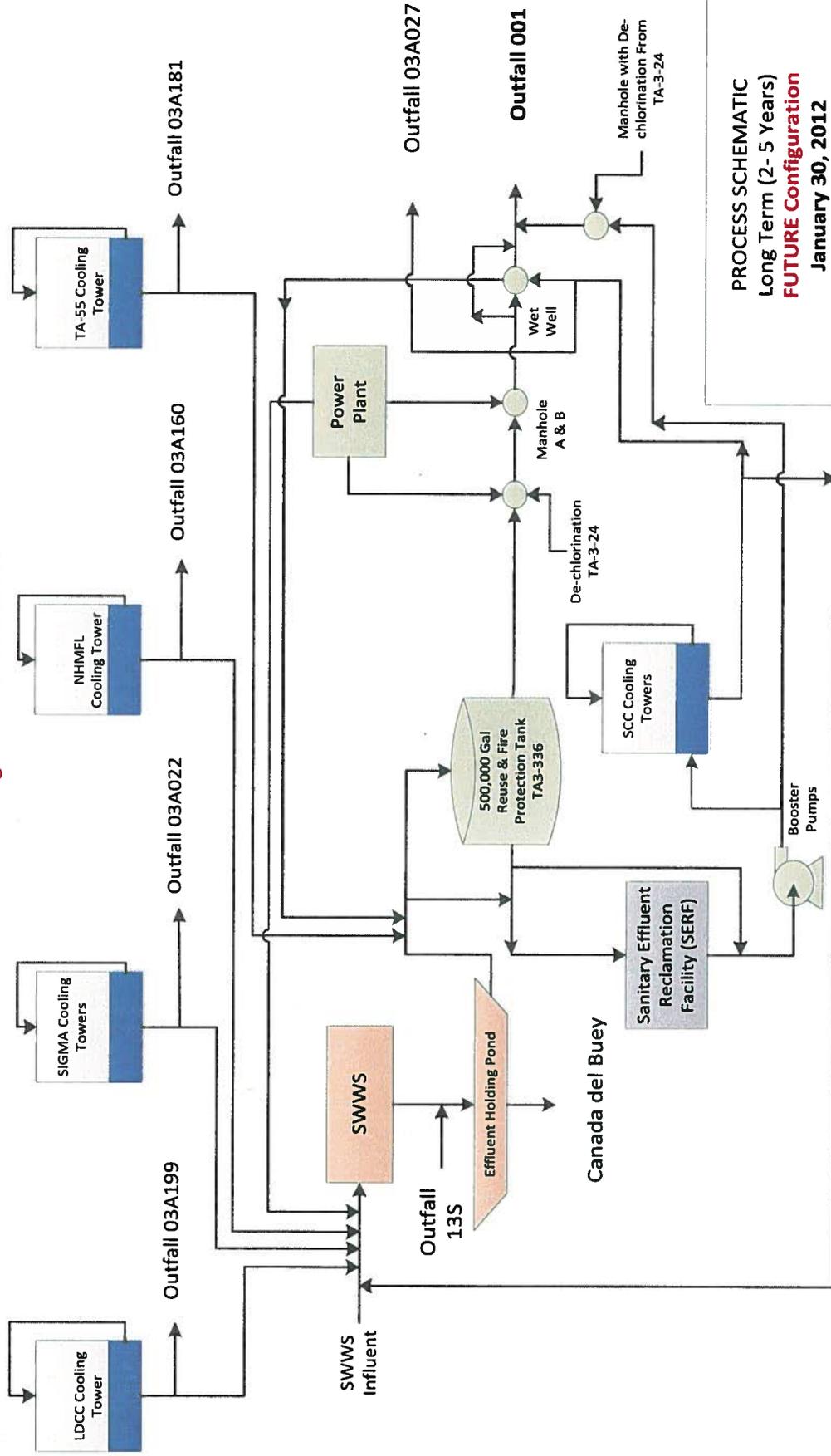
SERF EXPANSION

The existing SERF operations cannot currently provide enough makeup water to support the LANL's cooling towers (e.g. SCC Cooling Towers) when they are operating at full capacity. In the next five years LANS intends to upgrade the SERF facility under at a \$16.1 million congressionally funded line-item project. This project will allow LANL to meet a Department of Energy's requirement for recycling water and reducing the consumption of potable water. The expansion of SERF will provide up to 500 acre feet per year of treated water for reuse (~163,000 gallons of water annually). In addition, completion of the SERF expansion project will allow LANL to reduce the number of permitted outfalls; by routing those permitted discharges to SWWS and/or SERF, therefore reducing the costs of operating and maintaining cooling towers in addition to extending their lifespan due to the improved water quality. The expansion will increase the capacity of the SERF from 98.8 gpm to 300 gpm by adding additional treatment units and storage tanks. Appendix L provides design drawings associated with the expansion.

OUTFALL REDUCTION PROJECTS

In December 2007 the Laboratory completed LA-UR-07-8312, *NPDES Permit Compliance and Outfall Reduction Strategy*, which provides recommendations and options for the treatment, reduction, and/or elimination of the outfalls at LANL. There are three (3) outfalls included in this 2012 Permit Re-Application document that have been identified for possible elimination/reduction over the next 2 – 5 years. Figure 6 provides a process schematic that shows the anticipated future configuration of the outfalls with respect to SWWS, SERF, and Outfall 001. It also provides a projected water balance. The implementation of the elimination/reduction projects for each of these outfalls is subject to funding.

Figure 6
 Long Term (2 - 5 Years)
 FUTURE Configuration of Outfall 001



PROCESS SCHEMATIC
 Long Term (2- 5 Years)
 FUTURE Configuration
 January 30, 2012
 2012 NPDES Permit Re-Application
 Outfall 001

DMR Outfall Data Summary - Outfall 001

Los Alamos National Laboratory
NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR										
				Flow Rate			Analytical Lab Result			DMR Units			MGL			Units				
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples	
01A001	TA-3-22	8/07	Flow (Totalized Est.)	0.20636	0.33681	MGD											0.20636	0.33681	MGD	31
		9/07	Flow (Totalized Est.)	0.23180	0.37046	MGD											0.23180	0.37046	MGD	30
		10/07	Flow (Totalized Est.)	0.29498	0.42750	MGD											0.29498	0.42750	MGD	31
		11/07	Flow (Totalized Est.)	0.28606	0.44257	MGD											0.28606	0.44257	MGD	30
		12/07	Flow (Totalized Est.)	0.34472	0.60434	MGD											0.34472	0.60434	MGD	31
		1/08	Flow (Totalized Est.)	0.36408	0.54903	MGD											0.36408	0.54903	MGD	31
		2/08	Flow (Totalized Est.)	0.37547	0.52455	MGD											0.37547	0.52455	MGD	29
		3/08	Flow (Totalized Est.)	0.38257	0.50067	MGD											0.38257	0.50067	MGD	31
		4/08	Flow (Totalized Est.)	0.31543	0.44627	MGD											0.31543	0.44627	MGD	30
		5/08	Flow (Totalized Est.)	0.29683	0.41543	MGD											0.29683	0.41543	MGD	31
		6/08	Flow (Totalized Est.)	0.29554	0.37938	MGD											0.29554	0.37938	MGD	30
		7/08	Flow (Totalized Est.)	0.33913	0.44163	MGD											0.33913	0.44163	MGD	31
		8/08	Flow (Totalized Est.)	0.35652	0.48398	MGD											0.35652	0.48398	MGD	31
		9/08	Flow (Totalized Est.)	0.29730	0.52680	MGD											0.29730	0.52680	MGD	30
		10/08	Flow (Totalized Est.)	0.23361	0.32410	MGD											0.23361	0.32410	MGD	31
		11/08	Flow (Totalized Est.)	0.28206	0.38453	MGD											0.28206	0.38453	MGD	30
		12/08	Flow (Totalized Est.)	0.26270	0.37110	MGD											0.26270	0.37110	MGD	31
		1/09	Flow (Totalized Est.)	0.29150	0.40827	MGD											0.29150	0.40827	MGD	31
		2/09	Flow (Totalized Est.)	0.26803	0.50416	MGD											0.26803	0.50416	MGD	28
		3/09	Flow (Totalized Est.)	0.26664	0.36282	MGD											0.26664	0.36282	MGD	31
		4/09	Flow (Totalized Est.)	0.23092	0.31509	MGD											0.23092	0.31509	MGD	30
		5/09	Flow (Totalized Est.)	0.27161	0.46773	MGD											0.27161	0.46773	MGD	31
		6/09	Flow (Totalized Est.)	0.23152	0.30497	MGD											0.23152	0.30497	MGD	31
		7/09	Flow (Totalized Est.)	0.23152	0.27705	MGD											0.23152	0.27705	MGD	30
		8/09	Flow (Totalized Est.)	0.16893	0.25222	MGD											0.16893	0.25222	MGD	31
		9/09	Flow (Totalized Est.)	0.20126	0.35180	MGD											0.20126	0.35180	MGD	30
		10/09	Flow (Totalized Est.)	0.21086	0.35283	MGD											0.21086	0.35283	MGD	31
		11/09	Flow (Totalized Est.)	0.20449	0.29751	MGD											0.20449	0.29751	MGD	30
		12/09	Flow (Totalized Est.)	0.23127	0.36968	MGD											0.23127	0.36968	MGD	31
		1/10	Flow (Totalized Est.)	0.23431	0.35126	MGD											0.23431	0.35126	MGD	31
		2/10	Flow (Totalized Est.)	0.22047	0.29904	MGD											0.22047	0.29904	MGD	28
		3/10	Flow (Totalized Est.)	0.27557	0.38575	MGD											0.27557	0.38575	MGD	31
		4/10	Flow (Totalized Est.)	0.27924	0.40951	MGD											0.27924	0.40951	MGD	30
		5/10	Flow (Totalized Est.)	0.28771	0.42027	MGD											0.28771	0.42027	MGD	31
		6/10	Flow (Totalized Est.)	0.23315	0.44732	MGD											0.23315	0.44732	MGD	30
		7/10	Flow (Totalized Est.)	0.24000	0.42910	MGD											0.24000	0.42910	MGD	31
		8/10	Flow (Totalized Est.)	0.22618	0.37060	MGD											0.22618	0.37060	MGD	31
		9/10	Flow (Totalized Est.)	0.24384	0.40110	MGD											0.24384	0.40110	MGD	30
		10/10	Flow (Totalized Est.)	0.29269	0.40720	MGD											0.29269	0.40720	MGD	31
		11/10	Flow (Totalized Est.)	0.31369	0.42050	MGD											0.31369	0.42050	MGD	30
		12/10	Flow (Totalized Est.)	0.28024	0.37240	MGD											0.28024	0.37240	MGD	31
		1/11	Flow (Totalized Est.)	0.34374	0.41020	MGD											0.34374	0.41020	MGD	31
		2/11	Flow (Totalized Est.)	0.35660	0.47010	MGD											0.35660	0.47010	MGD	28
		3/11	Flow (Totalized Est.)	0.33686	0.42910	MGD											0.33686	0.42910	MGD	31
		4/11	Flow (Totalized Est.)	0.26930	0.38220	MGD											0.26930	0.38220	MGD	30
		5/11	Flow (Totalized Est.)	0.26689	0.35550	MGD											0.26689	0.35550	MGD	31
		6/11	Flow (Totalized Est.)	0.21952	0.35950	MGD											0.21952	0.35950	MGD	30
		7/11	Flow (Totalized Est.)	0.26811	0.43530	MGD											0.26811	0.43530	MGD	31
		8/11	Flow (Totalized Est.)	0.39070	0.55930	MGD											0.39070	0.55930	MGD	31
		9/11	Flow (Totalized Est.)	0.32611	0.44100	MGD											0.32611	0.44100	MGD	30
		10/11	Flow (Totalized Est.)	0.29950	0.45340	MGD											0.29950	0.45340	MGD	31
		11/11	Flow (Totalized Est.)	0.28760	0.54160	MGD											0.28760	0.54160	MGD	30

DMR Outfall Data Summary - Outfall 001
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR							
				Flow Rate			Analytical Lab Result			MQL	Units	Permit Limit	Units	Maximum	Average	Minimum	Number of Samples
				Average	Maximum	Units	Result	Units	MQL								
		9/11	pH									7.7	7.9	6.6 - 8.8	su	4	
		10/11	pH									7.7	7.8	6.6 - 8.8	su	4	
		11/11	pH									7.3	7.8	6.6 - 8.8	su	5	
		12/11	pH									7.6	7.7	6.6 - 8.8	su	4	
				Total Minimum						8.3						Total	
				Total Maximum						7.3						230	
													After Implementation of Compliance Schedule (February 2008)				
		8/07	Temperature, deg. C									7.3	8.3		su		
		9/07	Temperature, deg. C										29	30	Report	°C	5
		10/07	Temperature, deg. C										27	32	Report	°C	4
		11/07	Temperature, deg. C										20	22	Report	°C	4
		12/07	Temperature, deg. C										19	24	Report	°C	5
		1/08	Temperature, deg. C										11	12	Report	°C	4
		2/08	Temperature, deg. C										11	13	Report	°C	5
		3/08	Temperature, deg. C										11	12	Report	°C	4
		4/08	Temperature, deg. C										15	20	Report	°C	4
		5/08	Temperature, deg. C										21	23	Report	°C	5
		6/08	Temperature, deg. C										23	30	Report	°C	4
		7/08	Temperature, deg. C										22	23	Report	°C	4
		8/08	Temperature, deg. C										23	24	Report	°C	5
		9/08	Temperature, deg. C										23	24	Report	°C	4
		10/08	Temperature, deg. C										21	22	Report	°C	4
		11/08	Temperature, deg. C										19	23	Report	°C	5
		12/08	Temperature, deg. C										15	20	Report	°C	4
		1/09	Temperature, deg. C										14	17	Report	°C	4
		2/09	Temperature, deg. C										15	25	Report	°C	5
		3/09	Temperature, deg. C										14	18	Report	°C	4
		4/09	Temperature, deg. C										14	18	Report	°C	4
		5/09	Temperature, deg. C										15	18	Report	°C	4
		6/09	Temperature, deg. C										18	21	Report	°C	4
		7/09	Temperature, deg. C										16	19	Report	°C	5
		8/09	Temperature, deg. C										21	25	Report	°C	5
		9/09	Temperature, deg. C										23	24	Report	°C	4
		10/09	Temperature, deg. C										22	23	Report	°C	4
		11/09	Temperature, deg. C										21	24	Report	°C	5
		12/09	Temperature, deg. C										17	19	Report	°C	4
		1/10	Temperature, deg. C										14	17	Report	°C	4
		2/10	Temperature, deg. C										10	13	Report	°C	5
		3/10	Temperature, deg. C										10	11	Report	°C	4
		4/10	Temperature, deg. C										11	15	Report	°C	4
		5/10	Temperature, deg. C										13	14	Report	°C	5
		6/10	Temperature, deg. C										16	16	Report	°C	4
		7/10	Temperature, deg. C										18	19	Report	°C	4
		8/10	Temperature, deg. C										22	23	Report	°C	5
		9/10	Temperature, deg. C										23	24	Report	°C	4
		10/10	Temperature, deg. C										21	21	Report	°C	4
		11/10	Temperature, deg. C										19	24	Report	°C	5
		12/10	Temperature, deg. C										15	17	Report	°C	4
		1/11	Temperature, deg. C										13	17	Report	°C	5
		2/11	Temperature, deg. C										11	12	Report	°C	4

DMR Outfall Data Summary - Outfall 001
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Flow Rate			Analytical Lab Result			DMR Units			Reported on DMR							
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples
		3/11	Temperature, deg. C											14	15	°C	24	°C	5	
		4/11	Temperature, deg. C											15	16	°C	24	°C	4	
		5/11	Temperature, deg. C											17	17	°C	24	°C	4	
		6/11	Temperature, deg. C											20	21	°C	24	°C	4	
		7/11	Temperature, deg. C											19	23	°C	24	°C	5	
		8/11	Temperature, deg. C											20	23	°C	24	°C	5	
		9/11	Temperature, deg. C											20	21	°C	24	°C	4	
		10/11	Temperature, deg. C											18	19	°C	24	°C	4	
		11/11	Temperature, deg. C											15	17	°C	24	°C	5	
		12/11	Temperature, deg. C											12	12	°C	24	°C	4	
				Total Average									NA	NA	°C	20	°C	Total		
				Total Maximum										NA	NA	°C	32	°C	Total	
				Total										NA	NA	°C	18	°C	Total	
				Maximum										NA	NA	°C	23	°C	Total	
		8/07	Total Aluminum					19.9	ug/L	100	0.020	mg/L	0.100	0.021	0.021	mg/L	Report	mg/L	1	
		9/07	Total Aluminum					23.1	ug/L	100	0.023	mg/L	0.100	0.023	0.023	mg/L	Report	mg/L	1	
		10/07	Total Aluminum					16.1	ug/L	100	0.016	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		11/07	Total Aluminum					21.8	ug/L	100	0.022	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		12/07	Total Aluminum					<27.5	ug/L	100	0.028	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		1/08	Total Aluminum					38.1	ug/L	100	0.038	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		2/08	Total Aluminum					17.1	ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		3/08	Total Aluminum					17	ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		4/08	Total Aluminum					19.7	ug/L	100	0.020	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		5/08	Total Aluminum					27.8	ug/L	100	0.028	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		6/08	Total Aluminum					17.1	ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		7/08	Total Aluminum					19.5	ug/L	100	0.020	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		8/08	Total Aluminum					53.5	ug/L	100	0.054	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		9/08	Total Aluminum					22.7	ug/L	100	0.023	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		10/08	Total Aluminum					32.9	ug/L	100	0.033	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		11/08	Total Aluminum					19.6	ug/L	100	0.020	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		12/08	Total Aluminum					35.5	ug/L	100	0.036	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		1/09	Total Aluminum					12.8	ug/L	100	0.013	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		2/09	Total Aluminum					6	ug/L	100	0.006	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		3/09	Total Aluminum					14.3	ug/L	100	0.014	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		4/09	Total Aluminum					27.8	ug/L	100	0.028	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		5/09	Total Aluminum					21	ug/L	100	0.021	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		6/09	Total Aluminum					28.2	ug/L	100	0.028	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		7/09	Total Aluminum					21	ug/L	100	0.021	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		8/09	Total Aluminum					26.9	ug/L	100	0.027	mg/L	0.100	0.000	0.000	mg/L	Report	mg/L	1	
		9/09	Total Aluminum					25	ug/L	100	0.025	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		10/09	Total Aluminum					141	ug/L	100	0.141	mg/L	0.100	0.141	0.141	mg/L	Report	mg/L	1	
		11/09	Total Aluminum					50	ug/L	100	0.050	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		12/09	Total Aluminum					24.6	ug/L	100	0.025	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		1/10	Total Aluminum					22.4	ug/L	100	0.022	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		2/10	Total Aluminum					23.8	ug/L	100	0.024	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		3/10	Total Aluminum					38	ug/L	100	0.038	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		4/10	Total Aluminum					23.4	ug/L	100	0.023	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		5/10	Total Aluminum					38.5	ug/L	100	0.039	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		6/10	Total Aluminum					11.1	ug/L	100	0.011	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		7/10	Total Aluminum					32.6	ug/L	100	0.033	mg/L	0.100	0	0	mg/L	Report	mg/L	1	
		8/10	Total Aluminum					36.6	ug/L	100	0.037	mg/L	0.100	0	0	mg/L	0.058/0.087	mg/L	1	

DMR Outfall Data Summary - Outfall 001

Los Alamos National Laboratory
NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Flow Rate			Outfall Data				Reported on DMR						
				Average	Maximum	Units	Analytical Lab Result		DMR Units		Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples
							Symbol	Result	Units	MQL							
		9/10	Total Aluminum			ug/L	100	0.029	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		10/10	Total Aluminum			ug/L	100	0.024	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		11/10	Total Aluminum			ug/L	100	0.014	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		12/10	Total Aluminum			ug/L	100	0.016	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		1/11	Total Aluminum			ug/L	100	0.023	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		2/11	Total Aluminum			ug/L	100	0.015	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		3/11	Total Aluminum			ug/L	100	0.018	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		4/11	Total Aluminum			ug/L	100	0.026	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		5/11	Total Aluminum			ug/L	100	0.035	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		6/11	Total Aluminum			ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		7/11	Total Aluminum			ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		8/11	Total Aluminum			ug/L	100	0.015	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	2	
						ug/L		0.020									
		9/11	Total Aluminum			ug/L	100	0.015	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		10/11	Total Aluminum			ug/L	100	0.022	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		11/11	Total Aluminum			ug/L	100	0.017	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
		12/11	Total Aluminum			ug/L	100	0.020	mg/L	0.100	0.000	0.000	mg/L	0.058/0.087	mg/L	1	
				Total Average		25.51407	ug/L				N/A	0.00349	mg/L		Total	53	
				Total Maximum		141	ug/L				0.141	0.141	mg/L				
				After Implementation of Compliance Schedule (August 2010)													
				Average		20.02556	ug/L				N/A	0	mg/L		Total	17	
				Maximum		36.6	ug/L				0	0	mg/L				
		8/07	E. Coli								9	11	ctu/100ml	Report	ctu/100ml	5	
		9/07	E. Coli								4	9	ctu/100ml	Report	ctu/100ml	4	
		10/07	E. Coli								7	11	ctu/100ml	Report	ctu/100ml	4	
		11/07	E. Coli								2	4	ctu/100ml	Report	ctu/100ml	5	
		12/07	E. Coli								2	3	ctu/100ml	Report	ctu/100ml	4	
		1/08	E. Coli								< 1	< 1	ctu/100ml	Report	ctu/100ml	5	
		2/08	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	4	
		3/08	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	4	
		4/08	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	5	
		5/08	E. Coli								2	4	ctu/100ml	126/410	ctu/100ml	4	
		6/08	E. Coli								7	282	ctu/100ml	126/410	ctu/100ml	5	
		7/08	E. Coli								18	141	ctu/100ml	126/410	ctu/100ml	5	
		8/08	E. Coli								8	10	ctu/100ml	126/410	ctu/100ml	4	
		9/08	E. Coli								8	15	ctu/100ml	126/410	ctu/100ml	4	
		10/08	E. Coli								< 2	8	ctu/100ml	126/410	ctu/100ml	5	
		11/08	E. Coli								2	3	ctu/100ml	126/410	ctu/100ml	4	
		12/08	E. Coli								2	6	ctu/100ml	126/410	ctu/100ml	5	
		1/09	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	4	
		2/09	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	4	
		3/09	E. Coli								2	12	ctu/100ml	126/410	ctu/100ml	4	
		4/09	E. Coli								2	4	ctu/100ml	126/410	ctu/100ml	4	
		5/09	E. Coli								3	5	ctu/100ml	126/410	ctu/100ml	5	
		6/09	E. Coli								< 3	7	ctu/100ml	126/410	ctu/100ml	5	
		7/09	E. Coli								5	6	ctu/100ml	126/410	ctu/100ml	4	
		8/09	E. Coli								4	13	ctu/100ml	126/410	ctu/100ml	4	
		9/09	E. Coli								< 4	10	ctu/100ml	126/410	ctu/100ml	5	
		10/09	E. Coli								3	8	ctu/100ml	126/410	ctu/100ml	4	
		11/09	E. Coli								< 3	8	ctu/100ml	126/410	ctu/100ml	5	
		12/09	E. Coli								< 1	2	ctu/100ml	126/410	ctu/100ml	5	
		1/10	E. Coli								< 1	< 1	ctu/100ml	126/410	ctu/100ml	4	

DMR Outfall Data Summary - Outfall 001

Biological Testing Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
001	7/31/2006	Composite	Ceriodaphnia dubia Pimephales promelas	3-brood chronic 7-day chronic	100 100	P P
	8/2/2006					
	8/4/2006					
001	3/3/2008	Composite	Ceriodaphnia dubia Pimephales promelas	3-brood chronic 7-day chronic	100 100	P P
	3/5/2008					
	3/7/2008					
001	2/16/2009	Composite	Ceriodaphnia dubia Pimephales promelas	3-brood chronic 7-day chronic	100 100	P P
	2/18/2009					
	2/20/2009					
001	3/8/2010	Composite	Ceriodaphnia dubia Pimephales promelas	3-brood chronic 7-day chronic	100 100	P P
	3/10/2010					
	3/12/2010					
001	4/4/2011	Composite	Ceriodaphnia dubia Pimephales promelas	3-brood chronic 7-day chronic	100 100	P P
	4/6/2011					
	4/8/2011					

Please print or type in the unshaded areas only.

NM0890019515

**FORM
2C
NPDES**



**U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS
Consolidated Permits Program**

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
001	35.00	52.00	26.00	106.00	19.00	9.00	Perennial Reach of Sandia Canyon, (NMAC 20.6.4.126)

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
001	A. TA-3-22, and 592 Co-Generation Power & Steam Plant	85,950 GPD	Reuse/Recycle of Treated Effluent	4	C
	Reverse Osmosis Reject	(44,694 GPD - 52%)	Reverse Osmosis (hyperfiltration)	1	S
	Cooling Tower Blow Down	(20,628 GPD - 24%)	Reduction (corrosion inhibitors)	2	L
			Disinfection (other)	2	H
001			Dechlorination	2	B
	Boiler	(18,050 GPD - 21%)	Reduction (corrosion inhibitors)	2	L
			Neutralization	2	K
			Ion Exchange (softeners, demineralizers)	2	J
001	Demineralizer Back Flush	(2,578 GPD - 3%)	NA	NA	NA
	Floor Drains/Sumps	de minimus	Screening	1	T
	B. TA-3-336, Reuse Tank SWWS Effluent	165,989 GPD	Grit Removal	1	h
001			Mixing	1	O
			Pre-Aeration	3	E
			Activated Sludge	3	A
			Sedimentation (settling)	1	U
001			Disinfection (Chlorine)	2	F
			Reuse/Recycle of Treated Effluent	4	C
		(sludge)	Drying Beds	5	H
		(sludge)	Landfill	5	Q
001		(sludge)	Composting (Currently a Pilot Project)	5	G
			*** See Additional Page 1 of 4 Attached ***		

OFFICIAL USE ONLY (effluent guidelines sub-categories)

Please print or type in the unshaded areas only.

**FORM
2C
NPDES**



**U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS
Consolidated Permits Program**

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
EXTRA PAGE FOR DATA							

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
001	(Continued from Page 1)		*** Additional Page 1 of 4 for Outfall 001 ***		
	C. TA-3-1398, SERF	47,568 GPD	Chemical Precipitation	2	C
	Treated Effluent		Flocculation	1	G
001			Sedimentation (settling)	1	U
			Neutralization	2	K
			Reverse Osmosis (hyperfiltration)	1	S
		(RO Reject)	Evaporation	1	F
	(sludge)	Pressure Filtration	5	R	

OFFICIAL USE ONLY (effluent guidelines sub-categories)

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
001	TA-3-22, Co-Generation Power & Steam Plant (A) RO Reject, Cooling Tower Blowdown, Boiler Blow Down, and De-mineralizer Backflush [CONTINUOUS]	7	12	0.08595 MGD	0.0951 MGD	85,950 Gallons	95,100 Gallons	365
	TA-46, Sanitary Waste Water System (A) Treated Effluent [CONTINUOUS]	7	12	0.165989 MGD	0.375 MGD	165,989 Gallons	375,000 Gallons	365
	TA-3-1398, Sanitary Effluent Reclamation Facility (B) Treated Effluent [INTERMITTENT]	7	12	0.047568 MGD	0.144 MGD	47,568 Gallons	144,000 Gallons	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
Compliance Schedule to meet Effluent Limits for PCBs	001	Co-Generation Power and Steam Plant SWWS SERF	Complete corrective actions so that discharge from Outfall 001 complies with final effluent limits for PCBs (0.00064 ug/L AVG; 0.00064 ug/L MAX) per EPA approved schedule or one(1) day before the expiration date of the permit, whichever comes first.	July 30, 2012	July 30, 2012

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-3 Believed to be Absent.		Sulfuric Acid	De-Mineralizer
Table 2C-4 (C)		Ferric Chloride	SERF Precipitation
Sodium Bisulfite	Boiler (NALCO 1720); Power Plant De-chlorination (NALCO 7408)	Hydrochloric Acid	SERF Precipitation & pH Adjustment
Sodium Tripolyphosphate	Boiler (NALCO(R) 22341)	Sodium Hypochlorite	CT Corrosion Inhibitor (STABREX-ST20); SERF Disinfection; SWWS Disinfection (Clorox, Hilex)
Sodium Hydroxide	Boiler (NALCO 8735); De-mineralizer; CT Corrosion Inhibitor (STABREX-ST20); SERF pH Adjustment & Precipitation; SWWS Disinfectant		
Potassium Hydroxide	Boiler (NALCO 8735)		
Phosphoric Acid, Zinc Chloride	CT Corrosion Inhibitor (TG-7356)		
	[SEE FORM 2C ANALYTICAL DATA]		[SEE FORM 2C ANALYTICAL DATA]
			See Additional Page 3 of 4 Attached*

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?
 YES (list all such pollutants below) NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Whole Effluent Toxicity 7 Day Chronic Toxicity - PASSED
 Ceriodaphnia dubia, 24-hr composite (3 samples, collected ~48 hours apart), Yearly
 Pimephales promelas, 24-hr composite (3 samples, collected ~48 hours apart), Yearly

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

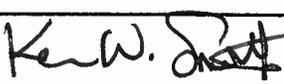
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/29/2012

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

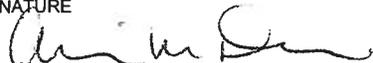
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Alison M. Dorries, Division Leader, ENV Protection Division	B. PHONE NO. (area code & no.) (505) 665-6952
C. SIGNATURE 	D. DATE SIGNED 1/27/12

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
001

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	<1	<3.92	(D)				1	mg/L	1b/D	NA	NA	NA
b. Chemical Oxygen Demand (COD)	12.6	49.4					1	mg/L	1b/D	NA	NA	NA
c. Total Organic Carbon (TOC)	4.25	16.7					1	mg/L	1b/D	NA	NA	NA
d. Total Suspended Solids (TSS)	2	7.8463	2	5.9518	1.0833	2.2777	13	mg/L	1b/D	NA	NA	NA
e. Ammonia (as N)	0.0435	0.171					1	mg/L	1b/D	NA	NA	NA
f. Flow	VALUE 0.4701 (E)		VALUE 0.356593 (F)		VALUE 0.251939 (G)		364	MGD	NA	NA	NA	NA
g. Temperature (winter)	VALUE 15.4 (H)		VALUE 12.8 (I)		VALUE 11.9		13	°C	VALUE NA	VALUE NA	NA	NA
h. Temperature (summer)	VALUE 22.8 (H)		VALUE 20.8 (I)		VALUE 20.3		12	°C	VALUE NA	VALUE NA	NA	NA
i. pH	MINIMUM 7.0 (J)	MAXIMUM 8.2 (J)		MINIMUM 7.5 (K)	MAXIMUM 7.9 (K)		52	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"				3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES		
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS			
a. Bromide (24959-67-9)	X		0.211	0.828						mg/L	1b/D	NA	NA	NA		
b. Chlorine, Total Residual	X		0	0	0	0	0	0	52	mg/L	1b/D	NA	NA	NA		
c. Color	X		10							SU	1b/D	NA	NA	NA		
d. Fecal Coliform	X		116.2/100	(L)	62.2/100	(L)	11.7/100	(L)	52	cfu/mL	NA	NA	NA	NA		
e. Fluoride (16984-48-8)	X		0.352	1.38						mg/L	1b/D	NA	NA	NA		
f. Nitrate-Nitrite (as N)	X		0.449	1.76						mg/L	1b/D	NA	NA	NA		

EPA Form 3510-2C (8-90)

PAGE V-1

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)		X	<0.035	<0.137	(D)		1	mg/L	1b/D	NA	NA	NA	
h. Oil and Grease		X	<1.48	<5.81	(D)		1	mg/L	1b/D	NA	NA	NA	
i. Phosphorus (as P), Total (7723-14-0)	X		1.31	5.14			1	mg/L	1b/D	NA	NA	NA	
j. Radioactivity													
(1) Alpha, Total		X	<2.67	NA			1	pCi/L	NA	NA	NA	NA	
(2) Beta, Total	X		14.3	NA			1	pCi/L	NA	NA	NA	NA	
(3) Radium, Total		X	<0.219	NA			1	pCi/L	NA	NA	NA	NA	
(4) Radium 226, Total		X	<0.0712	NA			1	pCi/L	NA	NA	NA	NA	
k. Sulfate (as SO ₄) (14808-79-8)	X		20.4	80			1	mg/L	1b/D	NA	NA	NA	
l. Sulfide (as S)		X	<0.03	<0.118	(D)		1	mg/L	1b/D	NA	NA	NA	
m. Sulfite (as SO ₃) (14265-45-3)	X		0.3	1.18						NA	NA	NA	
n. Surfactants		X	<0.016	<0.0628	(D)		1	mg/L	1b/D	NA	NA	NA	
o. Aluminum, Total (7429-90-5)	X		0.035	0.1373	0.035	0.1042	0.02	0.042	1b/D	NA	NA	NA	
p. Barium, Total (7440-39-3)	X		0.051	0.2	(M)		1	mg/L	1b/D	NA	NA	NA	
q. Boron, Total (7440-42-8)	X		0.0546	0.214	(N)		1	mg/L	1b/D	NA	NA	NA	
r. Cobalt, Total (7440-48-4)	X		0.00011	0.00043	(O)		1	mg/L	1b/D	NA	NA	NA	
s. Iron, Total (7439-89-6)	X		0.0532	0.209			1	mg/L	1b/D	NA	NA	NA	
t. Magnesium, Total (7439-95-4)	X		6.96	27.3			1	mg/L	1b/D	NA	NA	NA	
u. Molybdenum, Total (7439-98-7)	X		0.0045	0.0177	(P)		1	mg/L	1b/D	NA	NA	NA	
v. Manganese, Total (7439-96-5)	X		0.0106	0.0416			1	mg/L	1b/D	NA	NA	NA	
w. Tin, Total (7440-31-5)		X	<0.001	<0.0039	(D)		1	mg/L	1b/D	NA	NA	NA	
x. Titanium, Total (7440-32-6)	X		0.007	0.0275			1	mg/L	1b/D	NA	NA	NA	

EPA I.D. NUMBER (copy from Item 1 of Form 1) **001**
 OUTFALL NUMBER **001**

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
METALS, CYANIDE, AND TOTAL PHENOLS											
1M. Antimony, Total (7440-36-0)			X	<0.001	<0.004	(Q)	1	mg/L	1b/D	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.0019	0.0075		2	mg/L	1b/D	NA	NA
3M. Beryllium, Total (7440-41-7)			X	<2E-03	<8E-04	(Q)	1	mg/L	1b/D	NA	NA
4M. Cadmium, Total (7440-43-9)			X	<1.1E-04	4E-04	(Q)	1	mg/L	1b/D	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.0027	0.0106	(R)	1	mg/L	1b/D	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0026	0.0102		1	mg/L	1b/D	NA	NA
7M. Lead, Total (7439-92-1)			X	<5E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
8M. Mercury, Total (7439-97-6)		X		2.8E-06	1E-05		1	mg/L	1b/D	NA	NA
9M. Nickel, Total (7440-02-0)		X		8E-04	3E-03		1	mg/L	1b/D	NA	NA
10M. Selenium, Total (7782-49-2)			X	<2.52E-04	<1E-04	(S)	2	mg/L	1b/D	NA	NA
11M. Silver, Total (7440-22-4)			X	<2E-04	<8E-04	(Q)	1	mg/L	1b/D	NA	NA
12M. Thallium, Total (7440-28-0)			X	<4.5E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
13M. Zinc, Total (7440-66-6)		X		0.03	0.118		1	mg/L	1b/D	NA	NA
14M. Cyanide, Total (57-12-5)		X		0.00245	0.0096	(T)	1	mg/L	1b/D	NA	NA
15M. Phenols, Total			X	<0.0016	<6E-03		1	mg/L	1b/D	NA	NA
DIOXIN											

2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6) DESCRIBE RESULTS The result from the analytical laboratory is <1.13E-08 mg/L. This is above the limit of the MOL of 1.0E-08 mg/L but is likely due to discrepancy in the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (U) for additional information.

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'		3. EFFLUENT				4. UNITS		5. INTAKE (optional)						
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE						
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS					
GC/MS FRACTION - VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)			X	<1.25E-03	<5E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<4E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA		(V)									
5V. Bromoform (75-25-2)	X			0.0155	0.0608					1	mg/L	1b/D	NA	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
8V. Chlorodibromomethane (124-48-1)			X	0.04	0.157					1	mg/L	1b/D	NA	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<1E-03	(D)				1	mg/L	1b/D	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	<6E-03	(D)				1	mg/L	1b/D	NA	NA	NA
11V. Chloroform (67-66-3)			X	0.0157	0.0616					1	mg/L	1b/D	NA	NA	NA
12V. Dichlorobromomethane (75-27-4)			X	0.0289	0.113					1	mg/L	1b/D	NA	NA	NA
13V. Dichlorodifluoromethane (75-71-8)				NA		(V)									
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	<1E-03	(D)				1	mg/L	1b/D	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
17V. 1,2-Dichloropropane (78-87-5)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
18V. 1,3-Dichloropropylene (542-75-6)			X	<2.5E-04	<1E-03	(Q, W)				1	mg/L	1b/D	NA	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<1E-03	(D)				1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED (if available)	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION (2) MASS		b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION (2) MASS	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION (2) MASS		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)												
22V. Methylene Chloride (75-09-2)			X	<3E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	<1E-03	(D)	1	mg/L	1b/D	NA	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(V)						
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA	NA
GC/MS FRACTION - ACID COMPOUNDS												
1A. 2-Chlorophenol (95-57-8)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5.38E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3.23E-03	<1E-02	(D)	1	mg/L	1b/D	NA	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3.23E-03	<1E-02	(D)	1	mg/L	1b/D	NA	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X	<3.23E-03	<1E-02	(D)	1	mg/L	1b/D	NA	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
10A. Phenol (108-95-2)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3.23E-03	<1E-02	(Q)	1	mg/L	1b/D	NA	NA	NA

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3.23E-04	<1E-03	(D)				1	mg/L	1b/D	NA	NA	NA
3B. Anthracene (120-12-7)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
4B. Benzidine (92-87-5)			X	<3.23E-03	<1E-02	(Q)				1	mg/L	1b/D	NA	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3.23E-04	<1E-03	(D)				1	mg/L	1b/D	NA	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3.23E-03	<1E-02	(D)				1	mg/L	1b/D	NA	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<3.23E-03	<1E-02	(Q)				1	mg/L	1b/D	NA	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3.23E-03	<1E-02	(Q)				1	mg/L	1b/D	NA	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3.23E-03	<1E-02	(Q)				1	mg/L	1b/D	NA	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3.23E-03	<1E-02	(D)				1	mg/L	1b/D	NA	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3.23E-03	<1E-02	(Q)				1	mg/L	1b/D	NA	NA	NA
16B. 2-Chloro-naphthalene (91-58-7)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	<3.23E-03	<1E-02	(D)				1	mg/L	1b/D	NA	NA	NA
18B. Chrysene (218-01-9)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3.23E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA
21B. 1,3-Di-chlorobenzene (641-73-1)			X	<2.5E-04	<1E-03	(Q)				1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)												
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	<1E-03	(Q)		1	mg/L	1b/D	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<3.23E-03	<1E-02	(D)		1	mg/L	1b/D	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3.23E-03	<1E-02	(D)		1	mg/L	1b/D	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
31B. Fluoranthene (206-44-0)			X	<3.23E-04	<1E-03	(Q)		1	mg/L	1b/D	NA	NA
32B. Fluorene (86-73-7)			X	<3.23E-04	<1E-03	(Q)		1	mg/L	1b/D	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
36B. Hexachloroethane (67-72-1)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	<3.23E-04	<1E-03	(Q)		1	mg/L	1b/D	NA	NA
38B. Isophorone (78-59-1)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
39B. Naphthalene (91-20-3)			X	<3.23E-04	<1E-03	(D)		1	mg/L	1b/D	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	1b/D	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)		b. MAXIMUM 30 DAY VALUE (if available)	c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE			
				CONCENTRATION	(2) MASS				CONCENTRATION	(1)	CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)												
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3.23E-03	<1E-02	(Q, X)				NA	NA	NA
44B. Phenanthrene (85-01-8)			X	<3.23E-04	<1E-03	(D)		1	mg/L	NA	NA	NA
45B. Pyrene (129-00-0)			X	<3.23E-04	<1E-03	(Q)		1	mg/L	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3.23E-03	<1E-02	(Q)		1	mg/L	NA	NA	NA
GC/MS FRACTION - PESTICIDES												
1P. Aldrin (509-00-2)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
2P. α-BHC (319-84-6)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
3P. β-BHC (319-85-7)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
4P. γ-BHC (66-89-9)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<7.39E-06	<3E-05	(D)		1	mg/L	NA	NA	NA
6P. Chlordane (57-74-9)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
11P. α-Ersoulfan (115-29-7)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
12P. β-Ersoulfan (115-29-7)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
14P. Endrin (72-20-6)			X	<1.11E-05	<4E-05	(Q)		1	mg/L	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<7.39E-06	<3E-05	(Q)		1	mg/L	NA	NA	NA

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CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1) NM0890019515

OUTFALL NUMBER 001

CONTINUED FROM PAGE V-8

1. POLLUTANT AND GAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT		4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
GC/MS FRACTION - PESTICIDES (continued)									
17P. Heptachlor Epoxide (1024-57-3)			X	<7.39E-06	<3E-05	(Q)	1	NA	NA
18P. PCB-1242 (53469-21-9)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
19P. PCB-1254 (11097-69-1)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
20P. PCB-1221 (11104-28-2)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
21P. PCB-1232 (11141-16-5)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
22P. PCB-1248 (12672-29-6)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
23P. PCB-1260 (11096-82-5)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
24P. PCB-1016 (12674-11-2)		X		<3.66E-05	<1E-04	(Q, Y)	1	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.67E-04	<7E-04	(Q)	1	NA	NA

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EPA Form 3510-2C (8-90)

FOOTNOTES

2012 NPDES Permit Application Form 2C

Outfall 001

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from July 2010 to June 2011. Discharges from the Co-Generation Power and Steam Plant are routine and, therefore, are considered continuous.
- B. The flow rates and volumes for the Sanitary Effluent Reclamation Facility (SERF) were estimated based upon the design flow rates for the current facility (99.1 gpm) during an 8 hour and 24 hours shift, respectively. Discharges from the SERF are not routine and, therefore, are considered intermittent.
- C. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified because they are components of the chemicals used to treat the water at the facilities associated with Outfall 001 and, therefore, may be present in the effluent discharged to the outfall.
- D. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- E. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from July 2010 to June 2011. It is the highest daily value recorded during that period of time. Please note that this flow rate does not include the discharges from the facilities being added to Outfall 001 (i.e., SERF, SCC Cooling Towers) with this re-application. These additional facilities are not currently discharging to the outfall and the analytical data presented in this Form 2C does not assess the potential contaminants that they may contribute.
- F. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between July 2010 and June 2011. It is the highest average flow rate for that period of time. Please note that this flow rate does not include the discharges from the facilities being added to Outfall 001 (i.e., SERF, SCC Cooling Towers) with this re-application. These additional facilities are not currently discharging to the outfall and the analytical data presented in this Form 2C does not assess the potential contaminants that they may contribute.
- G. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from July 2010 to June 2011. It is the average of those values within that period of time. Please note that this flow rate does not include the discharges from the facilities being added to Outfall 001 (i.e., SERF, SCC Cooling Towers) with this re-application. These additional facilities are not currently discharging to the outfall and the analytical data presented in this Form 2C does not assess the potential contaminants that they may contribute.
- H. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- I. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- J. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- K. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- L. The results for E. Coli from samples collected between June 2010 and May 2011 are used as the indicator for Fecal Coliform.
- M. Barium was detected at a value less than the MQL of 0.1 mg/L.
- N. Boron was detected at a value less than the MQL of 0.1 mg/L.
- O. Cobalt was detected at a value less than the MQL of 0.05 mg/L.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 001

- P. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- Q. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- R. Chromium was detected a value less than the MQL of 0.01 mg/L.
- S. Selenium was detected at a value less than the MQL of 0.005 mg/L.
- T. Cyanide was detected at a value less than the MQL of 0.01 mg/L.
- U. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- V. EPA remanded the parameter.
- W. Result is for cis- and trans-1,3-dichloropropylene.
- X. The result provided is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).
- Y. The result provided was determine using the appropriate Aroclor method(s) and are below the MQL. The current LANL NPDES permit for this outfall requires that EPA Method 1668 Revision A (Congener Method) be used for total PCB analysis. The results using this method are provided in the attached DMR Summary.

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)

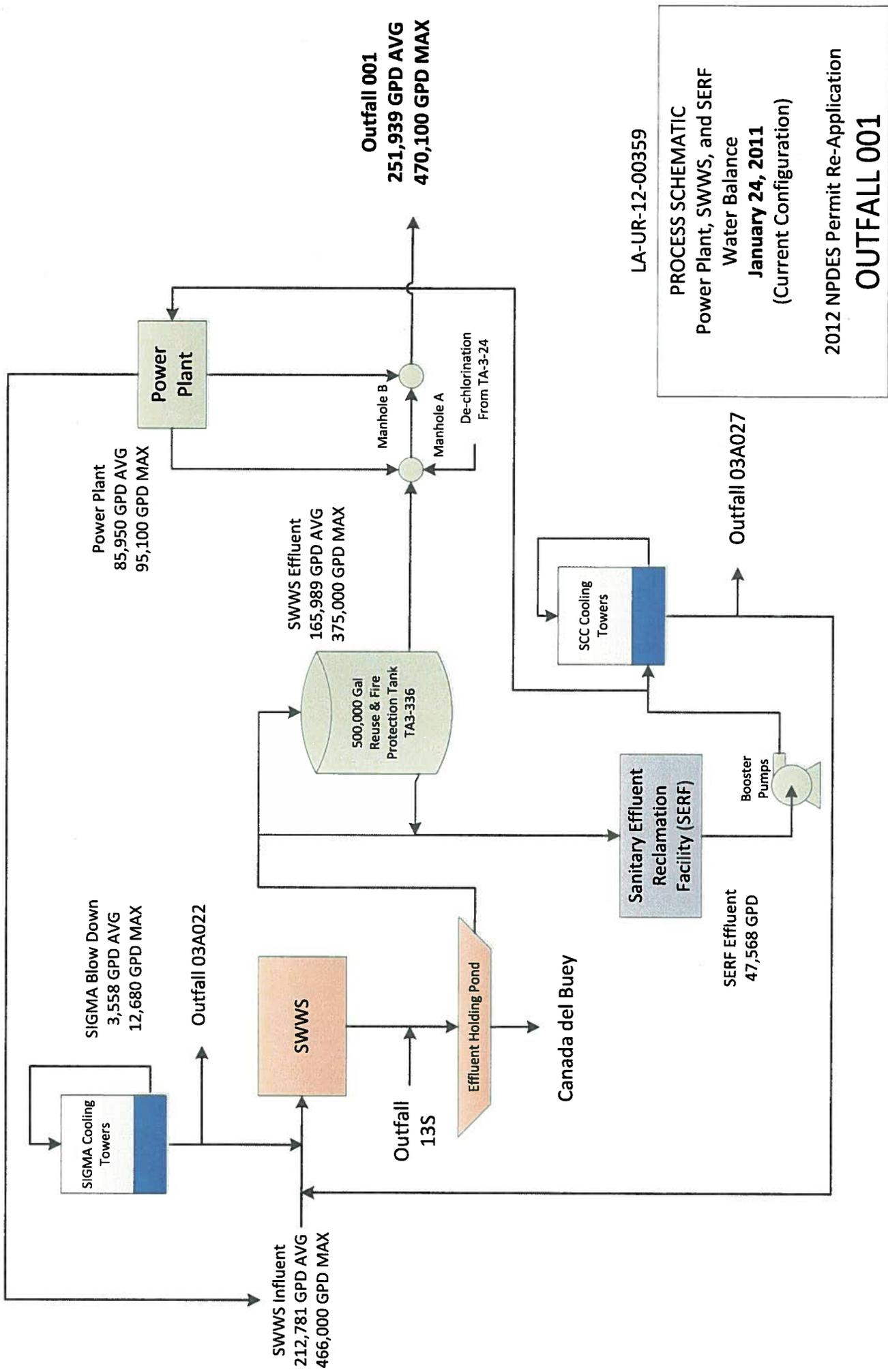
METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE			
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
2012 NPDES Permit Application Form 2C
Process Schematic and Water Balance for the Power Plant, SWWS, SERF, and Outfall 001
(Current Configuration)



LA-UR-12-00359

PROCESS SCHEMATIC
Power Plant, SWWS, and SERF
Water Balance
January 24, 2011
(Current Configuration)

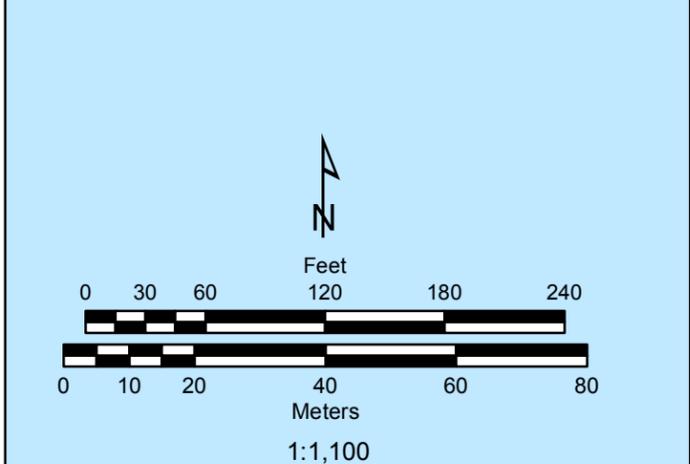
2012 NPDES Permit Re-Application
OUTFALL 001

NPDES Permit Re-Application Project TA-03 Building 22, 1398, 592, 336, and the SWWS Outfall #001



Legend

● NPDES Outfall	Paved Roads
▲ Springs	Source Structures
Drainages	Building Served by Source
100ft Contours	Structures
20ft Contours	LANL Boundary
10ft Contours	Technical Areas
Fences	
Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-10 27 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Orthophotography, 2011 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, APRIL 2011.
Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO 1720

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATIONPRODUCT NAME : **NALCO 1720**

APPLICATION : OXYGEN SCAVENGER

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1/2 FLAMMABILITY : 0/0 INSTABILITY : 0/0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

	Hazardous Substance(s)	CAS NO	% (w/w)
	Sodium Bisulfite	7631-90-5	10.0 - 30.0
	Potassium Bisulfite	7773-03-7	1.0 - 5.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******WARNING**

Harmful if swallowed. Contains Sulfite. Causes asthmatic signs and symptoms in hyper-reactive individuals. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Wear suitable protective clothing. May evolve oxides of sulfur (SO_x) under fire conditions. May evolve hydrogen sulfide (H₂S) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild irritation.SKIN CONTACT :
Can cause mild irritation.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1720

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

INGESTION :

Not a likely route of exposure. May cause asthmatic-like attack.

INHALATION :

Irritant to respiratory system. Causes asthmatic signs and symptoms in hyper-reactive individuals.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

Ingestion of sulfite can cause a severe allergic reaction in asthmatics and some sulfite sensitive individuals. The resulting symptoms can include difficulty in breathing, flushed skin and a rash. Chronic exposure to sulfites may cause symptoms of upper respiratory disease and affect sense of taste and smell.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If breathing is difficult, administer oxygen. Get medical attention.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire. Keep containers cool by spraying with water.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1720

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

FIRE AND EXPLOSION HAZARD :

May evolve oxides of sulfur (SOx) under fire conditions. May evolve hydrogen sulfide (H₂S) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ensure adequate ventilation. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labelled containers. Store separately from acids. Store separately from oxidizers. Amine and sulphite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

SUITABLE CONSTRUCTION MATERIAL :

Polypropylene, Buna-N, EPDM, Polyethylene, Polyurethane, PVC, Neoprene, Hypalon, Viton

UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Mild steel, Stainless Steel 304, Stainless Steel 316L, 100% phenolic resin liner, Epoxy phenolic resin



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 1720

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below. Exposure limits are listed for sulfur dioxide (SO₂) since this product evolves SO₂ when open to the atmosphere.

ACGIH/TLV :

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³

Sulfur Dioxide TWA: 2 ppm , 5.2 mg/m³
STEL: 5 ppm , 13 mg/m³

OSHA/PEL :

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³

Sulfur Dioxide TWA: 2 ppm , 5 mg/m³
STEL: 5 ppm , 13 mg/m³

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. An acid gas cartridge may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO 1720

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Pink
ODOR	Pungent
SPECIFIC GRAVITY	1.22 - 1.28 @ 60 °F / 15.6 °C
DENSITY	10.1 - 10.7 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	3.5 - 4.1
VISCOSITY	5 cps @ 60 °F / 15 °C
FREEZING POINT	11 °F / -11 °C
BOILING POINT	205 °F / 96 °C
VOC CONTENT	0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. SO₂ may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of sulfur, Hydrogen sulfide (H₂S)

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	4,112 mg/kg	Similar Product
Rating :	Non-Hazardous	



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ACUTE DERMAL TOXICITY :

Species LD50 Test Descriptor
Rabbit > 3,000 mg/kg Similar Product
Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score Test Descriptor
1.0 / 8.0 Similar Product
Rating : Minimally irritating

PRIMARY EYE IRRITATION :

Draize Score Test Descriptor
9.4 / 110.0 Similar Product
Rating : Minimally irritating

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	382 mg/l	Product
Inland Silverside	96 hrs	> 5,000 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	728 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	> 5,000 mg/l		Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of



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the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

The product will not bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name(s) :	SODIUM BISULFITE
UN/ID No :	UN 3082
Hazard Class - Primary :	9
Packing Group :	III
Flash Point :	None

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**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO 1720****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

DOT Reportable Quantity (per package) : 18,350 lbs
DOT RQ Component : SODIUM BISULFITE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name(s) : SODIUM BISULFITE
UN/ID No : UN 3082
Hazard Class - Primary : 9
Packing Group : III
IATA Cargo Packing Instructions : 914
IATA Cargo Aircraft Limit : NO LIMIT (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION**NATIONAL REGULATIONS, USA :****OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Bisulfite : Respiratory irritant
Potassium Bisulfite : Irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

<u>RQ Substance</u>	<u>RQ</u>
Sodium Bisulfite	18,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :**SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard



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- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

Limitations: no more than required to produce intended technical effect.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Bisulfite	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Bisulfite

7631-90-5

NATIONAL REGULATIONS, CANADA :

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This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS**AUSTRALIA**

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

This product's trade name is registered with the Chemical Registration Center (CRC) , Beijing.

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

This product's trade name is registered with the Korean Ministry of Environment (KMOE).

NEW ZEALAND

This product complies with Parts XI - XV of the HSNO Act (1996).

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

F100777

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:



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* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

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Date issued : 04/25/2006

Version Number : 4.0

**MATERIAL SAFETY DATA SHEET**

PRODUCT

TRI-ACT® 1820

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : TRI-ACT® 1820

APPLICATION : CORROSION INHIBITOR

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 FLAMMABILITY : 2 / 2 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Cyclohexylamine	108-91-8	10.0 - 30.0
Diethylethanolamine	100-37-8	5.0 - 10.0
Morpholine	110-91-8	5.0 - 10.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******DANGER**

Corrosive. Combustible. May cause tissue damage. Harmful if absorbed through skin. Vapors may have a strong offensive odor which may cause sensory response including headache, nausea and vomiting.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep away from sources of ignition - No smoking. Keep away from heat. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Protect product from freezing.

Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.

Combustible Liquid; may form combustible mixtures at or above the flash point. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin, Inhalation

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MATERIAL SAFETY DATA SHEET

PRODUCT

TRI-ACT® 1820

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HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Corrosive. Will cause eye burns and permanent tissue damage. Exposure to low vapor concentrations can result in foggy or blurred vision, objects appearing bluish and appearance of a halo around lights. These symptoms are temporary.

SKIN CONTACT :

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Harmful if absorbed through skin.

INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :

Irritating, in high concentrations, to the eyes, nose, throat and lungs. Vapors may have a strong offensive odor which may cause sensory response including headache, nausea and vomiting.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :

PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

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5. FIRE FIGHTING MEASURES

FLASH POINT : 131 °F / 55 °C (PMCC)

EXTINGUISHING MEDIA :

Dry powder, Carbon dioxide, Foam, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.

Keep containers cool by spraying with water.

FIRE AND EXPLOSION HAZARD :

Combustible Liquid; may form combustible mixtures at or above the flash point. May evolve oxides of carbon (CO_x) under fire conditions. May evolve oxides of nitrogen (NO_x) under fire conditions. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Remove sources of ignition. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Do not breathe vapors/gases/dust. Use with adequate ventilation. Avoid generating aerosols and mists. Keep away from acids and oxidizing agents. Do not use, store, spill or pour near heat, sparks or open flame. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.



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STORAGE CONDITIONS :

Store the containers tightly closed. Store away from heat and sources of ignition. Use proper grounding procedures. Store separately from acids. Store separately from oxidizers. Amine and sulphite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)

Cyclohexylamine	TWA: 10 ppm , 41 mg/m ³
Diethylethanolamine	TWA: 2 ppm , 9.6 mg/m ³ (Skin)
Morpholine	TWA: 20 ppm , 71 mg/m ³ (Skin)

OSHA/PEL :

Substance(s)

Cyclohexylamine	TWA: 10 ppm , 40 mg/m ³
Diethylethanolamine	TWA: 10 ppm , 50 mg/m ³ (Skin)
Morpholine	TWA: 20 ppm , 70 mg/m ³ (Skin) STEL: 30 ppm , 105 mg/m ³ (Skin)

* A skin notation refers to the potential significant contribution to overall exposure by the cutaneous route, including mucous membranes and the eyes.

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

Butyl gloves, Most glove materials are of low chemical resistance. Replace gloves regularly.

SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

**MATERIAL SAFETY DATA SHEET****PRODUCT****TRI-ACT® 1820****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****EYE PROTECTION :**

Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	Amine
SPECIFIC GRAVITY	0.98 - 0.99 @ 77 °F / 25 °C
DENSITY	8.1 - 8.2 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	12.0 - 13.0
VISCOSITY	5 cps @ 77 °F / 25 °C
FREEZING POINT	27 °F / -3 °C
VAPOR PRESSURE	6 mm Hg @ 68 °F / 20 °C
VOC CONTENT	40 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY**STABILITY :**

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Heat and sources of ignition including static discharges.

MATERIALS TO AVOID :Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Avoid contact with SO₂ or acidic bisulfite products, which may react to form visible airborne amine salt particles. Certain amines in contact with nitrous acid, organic or inorganic nitrites or atmospheres with high nitrous oxide concentrations may produce N-nitrosamines, many of which are cancer-causing agents to laboratory animals.

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HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	779 mg/kg	Similar Product
Rating : Non-Hazardous		

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	2,055 mg/kg	Similar Product
Rating : Non-Hazardous		

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	> 12000 PPM (8 hrs)	Similar Product
Rating : Non-Hazardous		

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
8.0 / 8.0	Similar Product
Rating : Extremely irritating (Corrosive)	

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
110.0 / 110.0	Similar Product
Rating : Extremely irritating (Corrosive)	

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

**MATERIAL SAFETY DATA SHEET**

PRODUCT

TRI-ACT® 1820

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	130 mg/l	Product
Fathead Minnow	96 hrs	75 mg/l	Product
Sheepshead Minnow	96 hrs	454 mg/l	Product
Fish		650 mg/l	Product
Inland Silverside	96 hrs	500.0 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	190 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	131 mg/l		Product

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Algae		5,000 mg/l	Product

AQUATIC MICROORGANISM RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Pseudomonas putida		7,500 mg/l	Product

PERSISTENCY AND DEGRADATION :

Chemical Oxygen Demand (COD) : 563,000 mg/l

The organic portion of this preparation is expected to be readily biodegradable.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

**MATERIAL SAFETY DATA SHEET****PRODUCT****TRI-ACT® 1820****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001, D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	CYCLOHEXYLAMINE, DIETHYLAMINOETHANOL, MORPHOLINE
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II
Flash Point :	55 °C / 131 °F

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	CYCLOHEXYLAMINE, DIETHYLAMINOETHANOL, MORPHOLINE
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)



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PRODUCT

TRI-ACT® 1820

EMERGENCY TELEPHONE NUMBER(S)

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MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	CYCLOHEXYLAMINE, MORPHOLINE
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Cyclohexylamine : Corrosive, Flammable
Diethylethanolamine : Combustible., Corrosive
Morpholine : Corrosive, Flammable

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required. Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product contains the following substance(s) which is listed in Appendix A and B as an Extremely Hazardous Substance. Listed below are the statutory Threshold Planning Quantity (TPQ) for the substance(s) and the Reportable Quantity (RQ) of the product. If a reportable quantity of product is released, it requires notification to your State Emergency Response Commission. You may also be required to notify the National Response Center - See CERCLA/SUPERFUND, above.

Extremely Hazardous Substance

Cyclohexylamine

TPQ

10,000 lbs

RQ

40,000 lbs

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard



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Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710) The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

The following limitations apply:

Maximum dosage

45 PPM

Limitation

as product in the steam

This product can not be used where the steam produced will contact milk or milk products.

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 062362

This product is acceptable for use in meat, poultry, and other food processing areas as a Boiler Treatment Product (G6), for treating boiler and steam lines where the steam produced may contact edible products. Acceptable usage shall be in accordance with the dosage limitations specified on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Morpholine	Sec. 111
• Cyclohexylamine	Sec. 111

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.



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MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Cyclohexylamine	108-91-8
Morpholine	110-91-8
Diethylethanolamine	100-37-8

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

B3 - Combustible Liquids, E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's

**MATERIAL SAFETY DATA SHEET****PRODUCT****TRI-ACT® 1820****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.



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PRODUCT

TRI-ACT® 1820

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Prepared By : Product Safety Department
Date issued : 05/03/2006
Version Number : 1.12



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO(R) 22341

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 22341**

APPLICATION : BOILER WATER INTERNAL TREATMENT

Corrosion inhibitor

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1/1 FLAMMABILITY : 0/0 INSTABILITY : 0/0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Tripolyphosphate	7758-29-4	5.0 - 10.0
Anionic Polymer	Proprietary	1.0 - 5.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION

May cause irritation with prolonged contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

Not flammable or combustible.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

May cause irritation with prolonged contact.

SKIN CONTACT :

There may be irritation and redness.

**MATERIAL SAFETY DATA SHEET**

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(800) 424-9300 (24 Hours) CHEMTREC**INGESTION :**

Not a likely route of exposure. No adverse effects expected.

INHALATION :

Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :**Acute :**

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES**EYE CONTACT :**

Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES**FLASH POINT :** > 200 F / > 93.3 C**EXTINGUISHING MEDIA :**

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Not flammable or combustible.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

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6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Viton, Neoprene, Buna-N, EPDM, Polyurethane, Polyethylene (rigid), Polypropylene (rigid), CPVC (rigid), Plasite 4300, Plasite 7122, 100% phenolic resin liner, HDPE (high density polyethylene), Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :

Brass, Hypalon

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

Use general ventilation with local exhaust ventilation.

RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.



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HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended., The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from, PVC, Gloves should be replaced immediately if signs of degradation are observed., Breakthrough time not determined as preparation, consult PPE manufacturers.

SKIN PROTECTION :

See general advice.

EYE PROTECTION :

Wear safety glasses with side-shields.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Amber Clear
ODOR	None
SPECIFIC GRAVITY	1.0 - 1.1 @ 77.0 °F / 25.0 °C
SOLUBILITY IN WATER	Complete
pH (100 %)	8.1 - 10.0
VISCOSITY	5.0 cps @ 77.0 °F / 25.0 °C
VOC CONTENT	0.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Extremes of temperature

MATERIALS TO AVOID :

Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Strong oxidizing agents

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO(R) 22341****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,394 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs		1,768 mg/l	Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO(R) 22341

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC**ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION**NATIONAL REGULATIONS, USA :****OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Tripolyphosphate : Non-Hazardous

Anionic Polymer : Irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.

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NALCO(R) 22341

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SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

The tracer must not exceed 900 parts per billion (ppb) in boiler water.

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 137499

This product is acceptable for use in meat, poultry, and other food processing areas as a Boiler Treatment Product (G6), for treating boiler and steam lines where the steam produced may contact edible products. Acceptable usage shall be in accordance with the dosage limitations specified on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Tripolyphosphate	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO(R) 22341

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC**CALIFORNIA PROPOSITION 65 :**

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Tripolyphosphate

7758-29-4

NATIONAL REGULATIONS, CANADA :**WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

INTERNATIONAL CHEMICAL CONTROL LAWS**EUROPE**

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO(R) 22341****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 07/03/2007

Version Number : 1.5



SAFETY DATA SHEET

PRODUCT

NALCO® 8735

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO® 8735**

APPLICATION : pH STABILIZER

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 1 / 1 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hydroxide	1310-73-2	30.0 - 60.0
Potassium Hydroxide	1310-58-3	10.0 - 30.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

Corrosive. May cause tissue damage.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.

Not flammable or combustible. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Corrosive. Will cause eye burns and permanent tissue damage.

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PRODUCT

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SKIN CONTACT :

Corrosive; causes permanent skin damage.

INGESTION :

Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :

Elevated temperatures or mechanical action may form vapors, mists or fumes which may be irritating to the eyes, nose, throat and lungs.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. Use a mild soap if available. For a large splash, flood body under a shower. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

Get immediate medical attention. DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink.

INHALATION :

Remove to fresh air, treat symptomatically. Get immediate medical attention.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Not flammable or combustible. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.



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SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not mix with acids.

STORAGE CONDITIONS :

Store the containers tightly closed. Store separately from acids. Store in suitable labeled containers.

SUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, Buna-N, Nylon, Polyethylene, Polypropylene, PVC, HDPE (high density polyethylene), Plexiglass, PTFE, Perfluoroelastomer, Polytetrafluoroethylene/polypropylene copolymer, Chlorosulfonated polyethylene rubber, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :

Aluminum, Mild steel, Natural rubber, Brass, Copper, Ethylene propylene, Neoprene, Polyurethane, Fluoroelastomer

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Sodium Hydroxide

ACGIH/Ceiling

2

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Potassium Hydroxide	OSHA Z1/PEL	2
	ACGIH/Ceiling	2

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :

Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Colorless
ODOR	None
SPECIFIC GRAVITY	1.50 - 1.53 @ 60 °F / 15.6 °C
DENSITY	12.5 - 12.7 lb/gal
SOLUBILITY IN WATER	Complete



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pH (5 %)	14
FREEZING POINT	-10 °F / -23 °C
BOILING POINT	293 °F / 145 °C
VAPOR PRESSURE	0.5 mm Hg @ 100 °F / 37.7 °C
VOC CONTENT	0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Extremes of temperature

MATERIALS TO AVOID :

Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Gives off hydrogen by reaction with metals.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: None known

11. TOXICOLOGICAL INFORMATION

The following results are for the hazardous components.

ACUTE ORAL TOXICITY :

Species: Rat
LD50: 205 mg/kg
Test Descriptor: Potassium Hydroxide

ACUTE DERMAL TOXICITY :

Species: Rabbit
LD50: 1,260 mg/kg
Test Descriptor: Potassium Hydroxide

SENSITIZATION :

This product is not expected to be a sensitizer.

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CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product, unless otherwise indicated.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	102 mg/l	Similar Product
Mosquito Fish (Gambusia spp.)	96 hrs	125 mg/l	Active Substance

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	180 mg/l		Similar Product
Daphnia magna	48 hrs	156 mg/l		Active Substance

PERSISTENCY AND DEGRADATION :**Biological Oxygen Demand (BOD) :**

Incubation Period	Value	Test Descriptor
5 d	0 mg/l	Product

The product does not contain any organic substances.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

**SAFETY DATA SHEET****PRODUCT****NALCO® 8735****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, POTASSIUM HYDROXIDE
UN/ID No :	UN 1719
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	None
Reportable Quantity (per package) :	3,000 lbs
RQ Component :	SODIUM HYDROXIDE

AIR TRANSPORT (ICAO/IATA) :

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.



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EMERGENCY TELEPHONE NUMBER(S)

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Proper Shipping Name :	CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, POTASSIUM HYDROXIDE
UN/ID No :	UN 1719
Hazard Class - Primary :	8
Packing Group :	II
Reportable Quantity (per package) :	3,000 lbs
RQ Component :	SODIUM HYDROXIDE

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CAUSTIC ALKALI LIQUID, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, POTASSIUM HYDROXIDE
UN/ID No :	UN 1719
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive
Potassium Hydroxide : Corrosive, HARMFUL

CERCLA/SUPERFUND, 40 CFR 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

<u>RQ Substance</u>	<u>RQ</u>
Sodium Hydroxide	3,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:



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- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives

Limitations: no more than required to produce intended technical effect.

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 062440

This product is acceptable as a compound for the treatment of entire potable water systems (G1) in official establishments in and around food processing areas. This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas. This product is acceptable for use in meat, poultry, and other food processing areas as a Boiler Treatment Product (G6), for treating boiler and steam lines where the steam produced may contact edible products. Acceptable usage shall be in accordance with the dosage limitations specified on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
<ul style="list-style-type: none">• Sodium Hydroxide• Potassium Hydroxide	Sec. 311



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CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :

Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Potassium Hydroxide	1310-58-3
Sodium Hydroxide	1310-73-2

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

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PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.



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Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 01/21/2011
Version Number : 1.16



MATERIAL SAFETY DATA SHEET

PRODUCT

STABREX® ST20

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : STABREX® ST20

APPLICATION : MICROORGANISM CONTROL CHEMICAL

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH: 3/3 FLAMMABILITY: 0/0 INSTABILITY: 0/0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hydroxide	1310-73-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

CORROSIVE. CAUSES SEVERE EYE AND SKIN INJURY. HARMFUL IF INHALED. HARMFUL IF SWALLOWED.

Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.

May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Corrosive. Will cause eye burns and permanent tissue damage.



MATERIAL SAFETY DATA SHEET

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SKIN CONTACT :

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :

Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Get immediate medical attention. **PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT.** Immediately flush eye with water for at least 15 minutes while holding eyelids open.

SKIN CONTACT :

Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

Get immediate medical attention. **DO NOT INDUCE VOMITING.** If conscious, washout mouth and give water to drink.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Call a physician.

IF ON SKIN: Immediately wash with soap and plenty of water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.

IF SWALLOWED: Drink large quantities of water. Do not induce vomiting. Call a physician or poison control immediately.



MATERIAL SAFETY DATA SHEET

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NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies. **LARGE SPILLS:** Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Apply this pesticide only as specified on the label.



MATERIAL SAFETY DATA SHEET

PRODUCT

STABREX® ST20

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :

Store the containers tightly closed. Store separately from acids. Store in a cool well ventilated area away from direct sunlight.

SUITABLE CONSTRUCTION MATERIAL :

Polyethylene, Polypropylene, Teflon, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :

This product is corrosive to mild steel., Brass, Stainless steel, Buna-N, EPDM

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)

Sodium Hydroxide CEILING: 2 mg/m³

OSHA/PEL :

Substance(s)

Sodium Hydroxide CEILING: 2 mg/m³

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. A particulate cartridge may be used.

HAND PROTECTION :

PVC gloves, Rubber gloves, Neoprene gloves, Nitrile gloves, Butyl gloves, Viton# gloves

SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.



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EYE PROTECTION :

Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Light yellow
ODOR	None
SPECIFIC GRAVITY	1.32 - 1.36 @ 77 °F / 25 °C
DENSITY	11.0 - 11.3 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	13
FREEZING POINT	17 °F / -8.3 °C
VAPOR PRESSURE	7.7 mm Hg @ 77 °F / 25 °C 115 mm Hg @ 115 °F / 46 °C
VOC CONTENT	0.00 %

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

High temperatures Direct sunlight

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent

**MATERIAL SAFETY DATA SHEET****PRODUCT****STABREX® ST20****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Chlorine gas, HCl, Bromine, Hydrogen bromide, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5,000 mg/kg	Similar Product
Rating :	Non-Hazardous	

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
7.9 / 8.0	Similar Product
Rating :	Extremely irritating (Corrosive)

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	4.5 mg/l	Product
Sheepshead Minnow	96 hrs	16 mg/l	Product
Fathead Minnow	96 hrs	8.3 mg/l	Product

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	4.2 mg/l	4.2 mg/l	Product
Mysid Shrimp (Mysidopsis)	96 hrs	27 mg/l		Product



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bahia)				
Ceriodaphnia dubia	48 hrs	1.6 mg/l		Product

Rating : Toxic

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Selenastrum capricornutum)	72 hrs	3.66 mg/l	Product

Rating :

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	IC25	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	15.6 mg/l	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

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Hazardous Waste: D002

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

METAL CONTAINERS: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. ^PLASTIC CONTAINERS: Do not reuse empty container. Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	None
DOT Reportable Quantity (per package) :	35,000 lbs
DOT RQ Component :	SODIUM HYDROXIDE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266



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Hazard Class - Primary :

8

Packing Group :

II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance

Sodium Hydroxide

RQ

35,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- | | |
|---|-----------------------------------|
| X | Immediate (Acute) Health Hazard |
| - | Delayed (Chronic) Health Hazard |
| - | Fire Hazard |
| - | Sudden Release of Pressure Hazard |
| - | Reactive Hazard |

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :

EPA Reg. No. 1706-179

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198

(630)305-1000

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In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Hydroxide	Sec. 311

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

Sodium Hydroxide	1310-73-2
Sodium Hypochlorite	7681-52-9

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).



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CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Nalco: EHS2818, F105047/104688

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 09/13/2004
Version Number : 1.10



SAFETY DATA SHEET

PRODUCT

TRASAR® 23268

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : TRASAR® 23268

APPLICATION : COOLING WATER TREATMENT

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

corrosion inhibitor

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 2/2 FLAMMABILITY : 1/1 INSTABILITY : 0/0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Tolyltriazole	64665-57-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING

Irritating to eyes and skin.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause moderate irritation.



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SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

Not a likely route of exposure. No adverse effects expected.

INHALATION :

Not a likely route of exposure. Aerosols or product mist may irritate the upper respiratory tract.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT :

None

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.



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FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :

Protect product from freezing. Store the containers tightly closed. Store in suitable labeled containers.

SUITABLE CONSTRUCTION MATERIAL :

Brass, Stainless Steel 316L, PVC, Buna-N, HDPE (high density polyethylene), Neoprene, Mild steel, Polypropylene, Polyethylene, Stainless Steel 304, Hypalon, Epoxy phenolic resin

UNSUITABLE CONSTRUCTION MATERIAL :

Polyurethane, Viton, EPDM, 100% phenolic resin liner

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.



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ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

HAND PROTECTION :

Neoprene gloves Nitrile gloves Butyl gloves PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Yellow
ODOR	Slight
SPECIFIC GRAVITY	1.0927 - 1.1327 @ 77 °F / 25 °C
DENSITY	9.3 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	13.2
pH (1 %)	11.4
VISCOSITY	7 cps @ 74 °F / 23.3 °C
FREEZING POINT	21 °F / -6.1 °C
VAPOR PRESSURE	Same as water
EVAPORATION RATE	Same as water
VOC CONTENT	0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.



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PRODUCT

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10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

None known

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of sulfur, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species: Rat
LD50: > 5,000 mg/kg
Test Descriptor: Product

PRIMARY SKIN IRRITATION :

Species: Rabbit
Draize Score: 1.3 /8.0
Test Descriptor: Product

PRIMARY EYE IRRITATION :

Species: Rabbit
Draize Score: 23 /110.0
Test Descriptor: Product

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**SAFETY DATA SHEET****PRODUCT****TRASAR® 23268****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: Moderate

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	> 1,000 mg/l	Product
Fathead Minnow	96 hrs	418 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 1,000 mg/l		Product
Ceriodaphnia dubia	48 hrs	> 1,000 mg/l		Product

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 85,000 mg/l

Chemical Oxygen Demand (COD) : 260,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	6,600 mg/l	Product

The organic portion of this preparation is expected to be poorly biodegradable.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.



SAFETY DATA SHEET

PRODUCT

TRASAR® 23268

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
Technical Name(s) :	POTASSIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
Technical Name(s) :	POTASSIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, N.O.S.
------------------------	--------------------------

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



SAFETY DATA SHEET

PRODUCT

TRASAR® 23268

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Technical Name(s) :	POTASSIUM HYDROXIDE, SODIUM TOLYLTRIAZOLE
UN/ID No :	UN 1760
Hazard Class - Primary :	8
Packing Group :	III

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Tolyltriazole : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**SAFETY DATA SHEET****PRODUCT****TRASAR® 23268****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 140506

This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas. This product is acceptable for treating boilers, steam lines, and/or cooling systems (G7) where neither the treated water nor the steam produced may contact edible products in and around food processing areas.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :

Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).



SAFETY DATA SHEET

PRODUCT

TRASAR® 23268

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

F102575

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Moderate

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES



SAFETY DATA SHEET

PRODUCT

TRASAR® 23268

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/31/2009
Version Number : 1.14

**MATERIAL SAFETY DATA SHEET**

PRODUCT

TG-7356

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATIONPRODUCT NAME : **TG-7356**COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Phosphoric Acid	7664-38-2	5.0 - 10.0
Zinc Chloride	7646-85-7	1.0 - 5.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******CAUTION**

May cause skin and eye irritation.

Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. Flush affected area with water. Protect product from freezing.

Wear suitable protective clothing, gloves and eye/face protection.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause moderate irritation.

SKIN CONTACT :

Can cause mild to moderate irritation.

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MATERIAL SAFETY DATA SHEET

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INGESTION :

Not a likely route of exposure. May be harmful if swallowed.

INHALATION :

Not a likely route of exposure. Aerosols or product mist may irritate the upper respiratory tract.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.



MATERIAL SAFETY DATA SHEET

PRODUCT

TG-7356

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

OSHA/PEL :

Substance(s)

Phosphoric Acid

TWA: 1 mg/m³

STEL: 3 mg/m³

Zinc Chloride Fume

TWA: 1 mg/m³

STEL: 2 mg/m³

ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless Light yellow
ODOR	None
SPECIFIC GRAVITY	1.1 - 1.13
DENSITY	9.1 - 9.4 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	0.2 - 1.5
VISCOSITY	4 cps
FREEZING POINT	20 °F / -6.6 °C
BOILING POINT	210 °F / 98.8 °C
VAPOR PRESSURE	0.5 mm Hg @ 100 °F /

Note: These physical properties are typical values for this product and are subject to change.

**MATERIAL SAFETY DATA SHEET****PRODUCT****TG-7356****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****10. STABILITY AND REACTIVITY****STABILITY :**

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas. Contact with strong alkalis (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of phosphorus, HCl

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
1.6 / 8.0	Product
Rating : Slightly irritating	

PRIMARY EYE IRRITATION :

Draize Score	Test Descriptor
13 / 110.0	Product
Rating : Practically non-irritating	

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

**MATERIAL SAFETY DATA SHEET****PRODUCT****TG-7356****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Bluegill Sunfish	96 hrs	700 mg/l	Product
Rainbow Trout	96 hrs	8.7 mg/l	Product

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Mysid Shrimp (Mysidopsis bahia)	96 hrs	26.9 mg/l		Product

Rating : Slightly toxic

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 14,000 mg/l

Chemical Oxygen Demand (COD) : 34,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
	305 mg/l	

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**MATERIAL SAFETY DATA SHEET****PRODUCT****TG-7356****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****LAND TRANSPORT :**

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) : PHOSPHORIC ACID, ZINC CHLORIDE
UN/ID No : UN 3264
Hazard Class - Primary : 8
Packing Group : III

Flash Point : None

DOT Reportable Quantity (per package) : 24,000 lbs
DOT RQ Component : ZINC CHLORIDE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) : PHOSPHORIC ACID, ZINC CHLORIDE
UN/ID No : UN 3264
Hazard Class - Primary : 8
Packing Group : III
IATA Cargo Packing Instructions : 820
IATA Cargo Aircraft Limit : 60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) : PHOSPHORIC ACID, ZINC CHLORIDE
UN/ID No : UN 3264
Hazard Class - Primary : 8
Packing Group : III

15. REGULATORY INFORMATION**NATIONAL REGULATIONS, USA :**

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Phosphoric Acid : Corrosive
Zinc Chloride : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance
Zinc Chloride

RQ
24,000 lbs



MATERIAL SAFETY DATA SHEET

PRODUCT

TG-7356

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Zinc Chloride	7646-85-7	1.0 - 5.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Phosphoric Acid	Sec. 311
• Zinc Chloride	Sec. 307, Sec. 311

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.



MATERIAL SAFETY DATA SHEET

PRODUCT

TG-7356

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

MICHIGAN CRITICAL MATERIALS :

This product contains the following substances listed in the regulation:

Zinc Chloride

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Phosphoric Acid

7664-38-2

Zinc Chloride

7646-85-7

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.



MATERIAL SAFETY DATA SHEET

PRODUCT

TG-7356

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 02/25/2004

Version Number : 1.2



SAFETY DATA SHEET

PRODUCT

PermaTreat® PC-510T

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : PermaTreat® PC-510T
APPLICATION : REVERSE OSMOSIS ANTISCALANT
COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 0 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION

May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear suitable protective clothing, gloves and eye/face protection.
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

May cause irritation with prolonged contact.

SKIN CONTACT :

May cause irritation with prolonged contact.

INGESTION :

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract with nausea and vomiting.

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For additional copies of an MSDS visit www.nalco.com and request access.



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INHALATION :

Not a likely route of exposure. Repeated or prolonged exposure may irritate the respiratory tract.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

SKIN CONTACT :

Flush with large amounts of water. Use soap if available. If symptoms develop, seek medical advice.

INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93.3 °C (Closed Cup)

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



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6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from acids. Store separately from oxidizers.

UNSUITABLE CONSTRUCTION MATERIAL :

Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency or planned entry into unknown concentrations a positive pressure,



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full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear safety glasses with side-shields.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Dark Amber
ODOR	Slight
SPECIFIC GRAVITY	1.225 @ 77 °F / 25 °C
DENSITY	10.2 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	9.5

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.



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MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.



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13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

CERCLA/SUPERFUND, 40 CFR 302 :

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :



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SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

NSF INTERNATIONAL :

This product has received NSF/International certification under NSF/ANSI Standard 60 in the reverse osmosis antiscalant category. The official name is "Miscellaneous Water Supply Products." Maximum product application dosage is : 10 mg/l.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :

Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.



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INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.



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IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 03/09/2011
Version Number : 2.3

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO® 7408****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME : **NALCO® 7408**APPLICATION : **CHLORINE SCAVENGER**COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198**EMERGENCY TELEPHONE NUMBER(S) :** (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Bisulfite	7631-90-5	30.0 - 60.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******WARNING**

Harmful if swallowed. Contains Sulfite. Causes asthmatic signs and symptoms in hyper-reactive individuals. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Skin, Eye, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause mild irritation.

SKIN CONTACT :

Can cause mild irritation.



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INGESTION :

Not a likely route of exposure. May cause asthmatic-like attack.

INHALATION :

Irritant to respiratory system. Causes asthmatic signs and symptoms in hyper-reactive individuals.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

Ingestion of sulfite can cause a severe allergic reaction in asthmatics and some sulfite sensitive individuals. The resulting symptoms can include difficulty in breathing, flushed skin and a rash. Chronic exposure to sulfites may cause symptoms of upper respiratory disease and affect sense of taste and smell.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Induce vomiting if the patient is fully conscious. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If breathing is difficult, administer oxygen. Get medical attention.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.



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FIRE AND EXPLOSION HAZARD :

May evolve oxides of sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ensure adequate ventilation. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :

Protect product from freezing. Store the containers tightly closed. Store separately from acids. Store in suitable labelled containers. Amine and sulphite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., Brass, Neoprene, Polyurethane, Viton, Hypalon, EPDM, Polypropylene, Polyethylene, PVC

UNSUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Buna-N, Epoxy phenolic resin, 100% phenolic resin liner

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION**OCCUPATIONAL EXPOSURE LIMITS :**

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below. Exposure limits are listed for sulfur dioxide (SO₂) since this product evolves SO₂ when open to the atmosphere.

ACGIH/TLV :

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³Sulfur Dioxide TWA: 2 ppm , 5.2 mg/m³
STEL: 5 ppm , 13 mg/m³**OSHA/PEL :**

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³Sulfur Dioxide TWA: 2 ppm , 5 mg/m³
STEL: 5 ppm , 13 mg/m³**ENGINEERING MEASURES :**

General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded.

HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

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9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Yellow
ODOR	Pungent
SPECIFIC GRAVITY	1.37 @ 77 °F / 25 °C
DENSITY	11.4 lb/gal
BULK DENSITY	11.4 lb/ft ³
SOLUBILITY IN WATER	Complete
pH (1 %)	4.1
VISCOSITY	2.8 cps @ 77 °F / 25 °C
FREEZING POINT	34 °F / 1.1 °C
BOILING POINT	219 °F / 104 °C
VAPOR PRESSURE	32 mm Hg @ 77 °F / 25 °C 76 mm Hg @ 99.9 °F / 37.7 °C
VAPOR DENSITY	2.2 (Air = 1)
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. SO₂ may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO® 7408****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****ACUTE ORAL TOXICITY :**

Species LD50 Test Descriptor
Rat 4.1 g/kg Similar Product
Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species LD50 Test Descriptor
Rabbit 3 g/kg Similar Product
Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score Test Descriptor
1.0 / 8.0 Similar Product
Rating : Slightly irritating

PRIMARY EYE IRRITATION :

Draize Score Test Descriptor
9.4 / 110.0 Similar Product
Rating : Practically non-irritating

SENSITIZATION :

Sulfites can cause an allergic reaction in sensitive individuals.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	> 100 mg/l	Product
Fathead Minnow	96 hrs	382 mg/l	Similar Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	275 mg/l		Product
Daphnia magna	48 hrs	728 mg/l		Similar Product



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CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	250 mg/l / 500 mg/l	Growth	Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	250 mg/l / 500 mg/l	Reproduction	Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO® 7408

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

LAND TRANSPORT :

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III

Flash Point : None

DOT Reportable Quantity (per package) : 12,500 lbs
DOT RQ Component : SODIUM BISULFITE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III
IATA Cargo Packing Instructions : 820
IATA Cargo Aircraft Limit : 60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Bisulfite : Respiratory irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance
Sodium Bisulfite

RQ
12,000 lbs



MATERIAL SAFETY DATA SHEET

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SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives, 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

Limitations: no more than required to produce intended technical effect.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Bisulfite	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

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(800) 424-9300 (24 Hours) CHEMTREC

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Bisulfite
Water

7631-90-5
7732-18-5

NATIONAL REGULATIONS, CANADA :**WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS**AUSTRALIA**

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

This product complies with Parts XI - XV of the HSNO Act (1996).



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO® 7408

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO® 7408

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

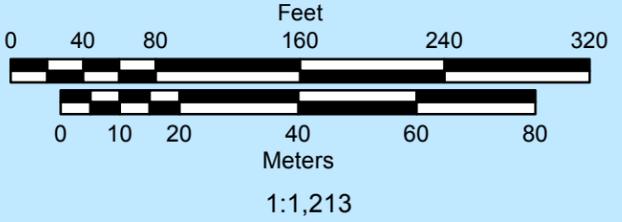
The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 05/03/2006
Version Number : 1.13

**NPDES Permit Re-Application Project
TA-03 Building 66, 2274
Outfall #03A022**

Legend

- | | |
|--|---|
|  NPDES Outfall |  Paved Roads |
|  Springs |  Source Structures |
|  Drainages |  Building Served by Source |
|  100ft Contours |  Structures |
|  20ft Contours |  LANL Boundary |
|  10ft Contours |  Technical Areas |
|  Fences | |
|  Dirt Roads | |

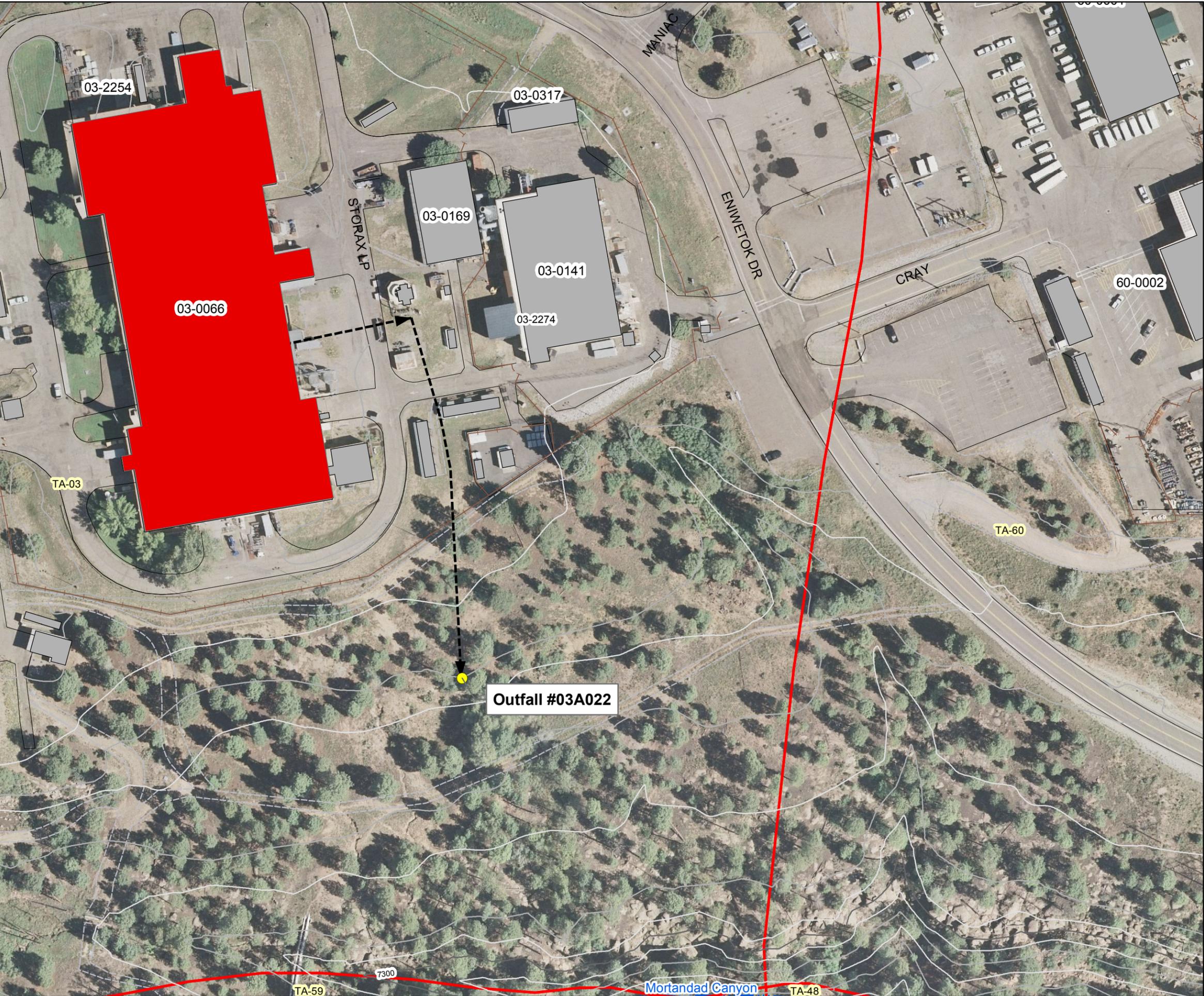


Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-06 01 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.
Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.



GARRATT-CALLAHAN COMPANY -- FORMULA 159 -- 6810-00N019716

=====
Product Identification
=====

Product ID:FORMULA 159
MSDS Date:11/15/1990
FSC:6810
NIIN:00N019716
MSDS Number: BLVHW
=== Responsible Party ===
Company Name:GARRATT-CALLAHAN COMPANY
Address:111 ROLLINS ROAD
City:MILLBRAE
State:CA
ZIP:94038
Country:US
Info Phone Num:415-697-5811
Emergency Phone Num:415-697-5811 OR 303-623-5716
CAGE:56733

=====
Contractor Identification
=====

Company Name:GARRATT-CALLAHAN CO
Address:111 ROLLINS RD
Box:City:MILBRAE
State:CA
ZIP:94038
Country:US
Phone:415-697-5811
CAGE:56733

=====
Composition/Information on Ingredients
=====

Ingrid Name:SODIUM BISULFITE
CAS:7631-90-5
RTECS #:VZ2000000
Fraction by Wt: <48%
OSHA PEL:5 MG/M3
ACGIH TLV:5 MG/M3
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

=====
Hazards Identification
=====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:NO Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:SKIN:MAY IRRITATE. EYE:MAY IRRITATE.
INGEST: MAY CAUSAE SEVERE ALLERGIC REACTION (RESPIRATORY PROBLEMS)
IF SWALLOWED.
Explanation of Carcinogenicity:NOT RELEVANT.
Effects of Overexposure:SEE HEALTH HAZARDS.
Medical Cond Aggravated by Exposure:NONE KNOWN.

=====
First Aid Measures
=====

First Aid:INHAL:REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE
O2/ARTIFICIAL RESPIRATION) . SKIN:WASH WITH WATER, GET MD IF PAIN,
IRRITATION OR OTHER PROBLEMS PERSIST. EYE:FLUSH IMMEDIATELY WITH
LARGE AMOUN TS OF WATER.FOR AT LEAST 15 MINUTES. GET MD IF PAIN,
IRRITATION, OR OTHER PROBLEMS PERSIST. INGEST:GIVE WATER OR MILK.
INDUCT VOMITING. CALL MD.

=====
Fire Fighting Measures
=====

Flash Point:NONE
Extinguishing Media:ANY MEDIA MAY BE USED.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Unusual Fire/Explosion Hazard:NO SPECIAL HAZARDS.

===== Accidental Release Measures =====

Spill Release Procedures:WEAR PROTECTIVE CLOTHING. SMALL SPILLS OF ONE GALLON OR LESS MAY BE FLUSHED TO DRAIN WITH LARGE AMOUNTS OF WATER. FOR LARGER SPILLS, CONTAIN WITH ABSORBENT MATERIAL. PUT IN PLASTIC BAG.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:KEEP CONTAINER COVERED & SEALED WHEN NOT IN USE. STORE IN A COOL, DRY AREA. DO NOT ADD WATER OR ANY OTHER MATL TO DRUM OF PROD OR OTHERWISE CONTAM IT.
Other Precautions:NONE SPECIFIED BY MANUFACTURER.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE NEEDED UNDER NORMAL CONDITIONS OF USE. NIOSH/ MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:NORMAL ROOM VENTILATION.
Protective Gloves:PLASTIC/RUB GLOVES, ELBOW LENGTH REC.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:PLASTIC OR RUBBER APRON. EYEWASH AND SAFETY SHOWER.
Work Hygienic Practices:REMOVE CONTAM CLOTHING. WASH CONTAMINATED CLOTHING BEFORE REUSE. IF LIQUID IS ABSORBED INTO SHOES OR GLOVES, DISCARD.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

===== Physical/Chemical Properties =====

HCC:B3
Spec Gravity:1.4
pH:6.5-8
Solubility in Water:HIGH
Appearance and Odor:CLEAR STRAW COLORED LIQUID WITH SLIGHT ODOR

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
ACIDS, OXIDIZING AGENTS.
Stability Condition to Avoid:NONE.
Hazardous Decomposition Products:SULFUR DIOXIDE, GAS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN WASTE MANAGEMENT FACILITY OR IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. IF SPILL IS NOT CONTAMINATED YOU MAY BE ABLE TO DISPOSE OF MATERIALS WHERE NORMALLY USED.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this

document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

MATERIAL SAFETY DATA SHEET

Western Environmental Management Corp., Ltd.

P. O. Box 1807

3106 E. Greene St.

Carlsbad, NM 88220

OFFICE: (505) 885-5709

EMERGENCY: CHEMTREC 1/800-424-9300

Product Name: WEMCIDE CW 102

Date: 05/04/2005

Hazard(s) as defined by OSHA Hazard Communication Standard:

Irritating to eyes.

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Based on best available information, this product does not contain any reportabl OSHA hazardous materials.

2. FIRST AID INFORMATION:

Eye exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin exposure: Wash exposed area with plenty of soap and water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately.

Ingestion: DO NOT INDUCE VOMITING. Rinse with copious amounts of water or milk, first. Irrigate the esophagus and dilute stomach contents by slowly giving one (1) or two (2) glasses of water or milk. Avoid giving alcohol or alcohol related products. In cases where the individual is semi-comatose, comatose or convulsing, DO NOT GIVE FLUIDS BY MOUTH. In case of intentional ingestion of the product seek medical assistance immediately; take individual to nearest medical facility.

3. PRIMARY ROUTES OF EXPOSURE:

1. Effects from Acute Exposure:

Eye exposure: Slightly hazardous in case of eye contact (irritant).

Skin exposure: Slightly hazardous in case of skin contact (irritant). Non-sensitizer for skin. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Inhalation: Slightly hazardous in case of inhalation. Effects will depend on concentration and length of time of exposure.

Ingestion: Ingestion is not expected to be a primary route of exposure.

2. Effects from Chronic Exposure:

The effects from chronic exposure to this product have not been fully evaluated.

4. TOXICOLOGICAL INFORMATION:

Acute effects:

Acute Oral (LD50) = 1951 mg/kg/Male rat

Acute Oral (LD50) = 2587 mg/kg/Female rat

Acute Dermal (LD50) = >2000 mg/kg/Rabbit

Acute Inhalation (LC50) = 2.9 ppm (4 hours) Rat

Irritant/Sensitization Effects:

Slightly hazardous in case of eye contact (irritant).

Slightly hazardous in case of skin contact (irritant). Non-Sensitizer for skin. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Slightly hazardous in case of inhalation. Effects will depend on concentration and length of time of exposure.

Carcinogenic Potential:

Not shown as a carcinogen by OSHA, IARC, or NTP. A two year rat carcinogenicity study showed a slight increase in c-cell adenomas in female rats. Studies with male rats and male and female mice did not show any evidence of carcinogenic response. This product is not considered a carcinogen.

Target Organ Effects:

May cause damage to the following organs: upper respiratory tract, skin, eyes.

Other Health Effects:

None known.

5. ENVIRONMENTAL TOXICOLOGICAL INFORMATION:

LC50 = 0.37 mg/l 48 hours Invertebrate
LC50 = 0.26 mg/l 96 hours Fathead minnow
LC50 = 0.21 mg/l 96 hours Bluegill sunfish
LC50 = 0.047 mg/l 96 hours Rainbow trout
LC50 = >600 mg/l 96 hours Sheepshead minnow
LC50 = 13 mg/l 96 hours Mysid shrimp

6. PHYSICAL AND CHEMICAL PROPERTIES:

Boiling Point: > 100 C
Vapor Pressure: Not available
Appearance: Clear, pale yellow liquid
Odor: Mild
Density: 1.15 g/cm³
Solubility: Easily soluble in cold water. Easily soluble in hot water.
o/w Partition Coefficient: Not available
Oxidizing/Reducing Properties: Not available
pH (neat): 7 (neutral)
pH (100 ppm in water): 6-7
Flash Point: Closed Cup: > 100⁰ C (212⁰ F). (Tagliabue)
Freezing Point: <-16⁰ C (3.2⁰ F)
Viscosity: Kinetic: 125 cS
Additional pH Information: pH (neat) = 6.0 – 8.0

7. FIRE AND EXPLOSION INFORMATION:

Flammable limits: Not determined.
Extinguishing media: Water fog, carbon dioxide, foam, dry chemical.
Special firefighting procedures: Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

8. REACTIVITY INFORMATION:

Stability: Stable under normal conditions of use and storage.
Incompatibility: Anionic polymers
Hazardous Decomposition Products: Carbon monoxide may be formed upon burning.

9. HANDLING PRECAUTIONS:

Eye wash fountains in the work place are recommended. Rubber gloves, safety glasses or goggles and body protective clothing and shoes are required. The handling precautions for this product are based on the characteristics of the neat product unless otherwise specified.

10. SATISFACTORY MATERIALS OF CONSTRUCTION:

Buna-N rubber, Butyl rubber, Polypropylene, Plexiglas, Teflon, PVC – rigid, Viton, EPDM rubber, PVC – flexible, Fiberglass, Neoprene, Polyethylene – low density, Tygon, Tyril 880, Gum rubber, Silicone rubber, Hypalon, Polyethylene – high density, Stainless steels 304 and 316, ABS (plastic), Morton test liner (108 T 44LV), 6/6 Nylon, FRP lined mild steel.

11. SPILL, LEAK, AND DISPOSAL PROCEDURES:

Important: Before responding to a spill or leak of this product, review each section of this MSDS. Follow the recommendations given in the Handling Precautions sections. Check the Fire and Explosion Data section to determine if the use of non-sparking tools is merited. Insure that spilled or leaked product does not come into contact with materials listed as incompatible. If irritating fumes are present, consider evacuation of enclosed areas.

Initially minimize area affected by the spill or leak. Block any potential routes to water systems (e.g., sewers, streams, lakes, etc.). Based on the product's toxicological and chemical properties, and on the size and location of the spill or leak, assess the impact on contaminated environments (e.g. water systems, ground, air equipment, etc.). There are no methods available to completely eliminate any toxicity this product may have on aquatic environments. Minimize adverse effects on these environments. Determine if federal, state, and/or local release notification is required (see Regulatory Classifications section of this MSDS). Recover as much of the pure product as possible into appropriate containers. Later, determine if this recovered product can be used for its intended purpose. Address clean-up of contaminated environments. Spill or leak residuals may have to be collected and disposed of. Clay, soil, or commercially available absorbents may be used to recover any material that can not readily be recovered as pure product. Flushing residual material to an industrial sewer, if present at the site of a spill or leak incident, may be acceptable if authorized approval is obtained. If product and/or spill/leak residuals are flushed to an industrial sewer, insure that they do not come into contact with incompatible materials. Contact the person(s) responsible for the operation of your facility's industrial sewer system prior to intentionally flushing or pumping spills or leaks of this product to the industrial sewer.

DISPOSAL GUIDELINES:

Note: Follow federal, state, and local regulations governing the disposal of waste materials.

Contaminated Materials: Determine if waste containing this product can be handled by available industrial effluent system or other on-site waste management unit. If off-site management is required, contact a company experienced in industrial waste management. This product is not specifically listed in 40 CFR 261 as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, spill or leak residuals may meet the criteria of a characteristic hazardous waste under this Act. Check the characteristics of the material to be disposed of and/or the physical and reactivity data given in this MSDS for the neat product.

Container Disposal: Empty containers, as defined by appropriate sections of the RCRA, are not RCRA hazardous wastes. However, insure proper management of any residuals remaining in container.

12. TRANSPORTATION AND SHIPPING INFORMATION:

DOT Proper Shipping Name: Not regulated

IMO/IMDG Shipping Information:

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]), Class 9,
UN 3082, PG III, (EmS No. F-A, S-F, ERG Guide 171, HazMat Code 4960131)

IATA Shipping Information: Not regulated

DOT "RQ": None

Unless otherwise state, the shipping information provided above applies only to non-bulk containers of this product. Proper shipping name and general shipping information may vary depending on packaging and mode of shipment. All products shipped from Western Environmental Management have been properly packaged and labeled according to appropriate hazardous shipping regulations that apply for that particular shipment. If any alteration of packaging, product, or mode of transportation is further intended, different shipping names and labeling may apply. If there are any questions pertaining to hazardous shipping requirements, contact the Western Environmental Management transportation department for further details.

13. REGULATORY INFORMATION:

The following Regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

SARA (Superfund Amendments and Reauthorization Act):

SARA 302 Extremely Hazardous Substances List: No components of this product are listed.

SARA 312 Hazard Category: Immediate (Acute) Health Hazard.

SARA 313 Toxic Chemicals List: No components of this product are present above the de minimu levels.

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act):

No components of this product are present above the de minimus levels.

RCRA (Resource Conservation and Recovery Act) Listed Hazardous Wastes: No components of this product are listed.

CWA (Clean Water Act) Listed Substances: No components of this product are listed.

FDA (Food and Drug Administration): This product is not approved for food contact uses.

National Sanitation Foundation (NSF): This product is listed by NSF under NSF/ANSI Standard 60 for use in potable water applications with the following maximum allowable use rates: Concentrations of 2-5 ppm can be used at the initiation of treatment for up to 21 days. Thereafter, the maximum use rate is 05. ppm for potable water systems.

TSCA (Toxic Substances Control Act) Applicability: Registered pesticides are exempt from the requirements of TSCA. All components may not be listed on TSCA Inventory.

FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act): This product is a registered pesticide. EPA Reg. No. 1448-212-45591

HMIS/NPCA Ratings: Health 1; Flammability 1; Reactivity 0

NFPA Ratings: Health 1; Flammability 1; Reactivity 0

STATE REGULATIONS

Various State Right to Know Acts: Non-proprietary hazardous chemicals are listed in Section 1 of this MSDS. Should you require further information on specific proprietary chemicals or inerts please contact Western Environmental Management Corp., Ltd.

The information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazard Communication regulations.

Western Environmental Management Corp., Ltd. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE.** No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out of or relating to this contract, or breach thereof, shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgement upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

MATERIAL SAFETY DATA SHEET

Western Environmental Management Corp., Ltd.
P. O. Box 1807
3106 E. Greene St.
Carlsbad, NM 88220
OFFICE: (505) 885-5709
EMERGENCY: CHEMTREC 1/800-424-9300

Product Name: WEM CL 4964

Date: 05/27/04

Hazard(s) as defined by OSHA Hazard Communication Standard:

Corrosive to skin and eyes.

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Sodium Hydroxide

CAS #1310-23-2

Percent: 1.4

TLV: 2 mg/m³, Ceiling

PEL: 2 mg/m³, Ceiling

Polymaleic Acid

CAS #: 26099-09-2

Percent: Nil

(3-Methylphenyl)methyl, Butanedioic Acid

CAS #6315-20-4

Percent: Nil

Sodium Tolyltriazole

CAS: #64665-57-2

Percent: Less than 1.0

(4-Methylphenyl)methyl, Butanedioic Acid

CAS #: 6315-21-5

Percent: Nil

Maleic Acid

CAS #: 110-16-7

Percent: Nil

The remainder of the components comprise proprietary information.

2. HAZARD IDENTIFICATION:

Emergency Overview: Corrosive Liquid. Causes burns to skin and eyes.

Health Effects: Mist may cause irritation of eyes, nose, throat and lungs. Product may cause burns to skin and eyes. Contact with eyes may cause permanent eye damage, including blindness.

3. FIRST AID INFORMATION:

Eye exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin exposure: Wash exposed area with plenty of soap and water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately.

Ingestion: DO NOT INDUCE VOMITING. Rinse with copious amounts of water or milk, first. Irrigate the esophagus and dilute stomach contents by slowly giving one (1) or two (2) glasses of water or milk. Avoid giving alcohol or alcohol related products. In cases where the individual is semi-comatose, comatose or convulsing, DO NOT GIVE FLUIDS BY MOUTH. In case of intentional ingestion of the product seek medical assistance immediately; take individual to nearest medical facility.

NOTE TO PHYSICIAN: Not available.

4. PRIMARY ROUTES OF EXPOSURE:

1. Effects from Acute Exposure:

Eye exposure: Corrosive to the eyes with possible permanent damage depending on the length of exposure, solution concentration and first aid measures.

Skin exposure: Corrosive. Effects may vary depending on length of exposure, solution concentration and first aid measures.

Inhalation: May cause irritation or corrosion of mucous membranes and the lungs. Exposed individuals should be monitored for respiratory distress, bronchitis or pneumonia.

Ingestion: Ingestion is not expected to be a primary route of exposure.

2. Effects from Chronic Exposure:

The effects from chronic exposure have not been fully evaluated.

5. TOXICOLOGICAL INFORMATION:

Carcinogenic potential: Not tested. Not shown as a carcinogen by OSHA, IARC, or NTP.

Target Organ Effects: Skin and eyes (burns and corrosion) are expected to be the target organs for this product.

Other health effects: None known.

6. PHYSICAL AND CHEMICAL PROPERTIES:

Melting/Freezing Point: -5 C to -10 C

Boiling Point: 100-101 C

Vapor Pressure: 24 MM HG at 25 C (water)

Vapor Density (Air=1): 0.020 @ 25 C

Room Temperature:

Appearance and State: Amber Liquid

Odor: Slight

Specific Gravity (H₂O=1): 1.3

Solubility in H₂O % by wt.: Soluble in all proportions

% Volatiles: Not Available

Evaporation Rate (Butyl Acetate=1): Equivalent to water

pH (as is): > 8.5

pH (1% solution): >8.5

Odor Threshold: Not Available

Coefficient Water/Oil Dist.: Not Available

Flash Point: Not Applicable

Autoignition Temperature: Not Applicable

Flammable Limits Upper: Not Applicable

(Air) Lower: Not Applicable

Explosive Properties: Not Applicable

7. FIRE AND EXPLOSION INFORMATION:

Flammable limits: Not determined. Keep away from flames and other ignition sources.

Extinguishing media: Water fog, carbon dioxide, foam, dry chemical.

Special firefighting procedures: Fire fighters should wear full protective gear, including self contained breathing apparatus.

8. REACTIVITY INFORMATION:

Stability: Stable under ordinary conditions of use and storage.

Hazardous Polymerization: Will not occur

Conditions to Avoid: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.

8. REACTIVITY INFORMATION – CONTINUED:

Incompatibility: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.

Hazardous Decomposition Products: Thermal decomposition and burning may produce carbon monoxide, carbon dioxide and phosphorus oxide.

9. HANDLING PRECAUTIONS:

Face shields are strongly recommended.

The handling precautions for this product are based on the characteristics of the neat product unless otherwise specified.

Chemical resistant gloves, indirect ventilation goggles, body-protective clothing, and chemical resistant safety shoes are required.

Provide dilution ventilation to control vapor and/or mist level. If misting occurs, a NIOSH/MSHA approved respirator may be required. Use a respirator approved for the material and level of exposure.

Keep container tightly closed when not in use.

10. SPILL, LEAK, AND DISPOSAL PROCEDURES:

Important: Before responding to a spill or leak of this product, review each section of this MSDS. Follow the recommendations given in the Handling Precautions sections. Check the Fire and Explosion Data section to determine if the use of non-sparking tools is merited. Insure that spilled or leaked product does not come into contact with materials listed as incompatible. If irritating fumes are present, consider evacuation of enclosed areas.

Initially minimize area affected by the spill or leak. Block any potential routes to water systems (e.g., sewers, streams, lakes, etc.). Based on the product's toxicological and chemical properties, and on the size and location of the spill or leak, assess the impact on contaminated environments (e.g. water systems, ground, air equipment, etc.). There are no methods available to completely eliminate any toxicity this product may have on aquatic environments. Minimize adverse effects on these environments. Determine if federal, state, and/or local release notification is required (see Regulatory Classifications section of this MSDS). Recover as much of the pure product as possible into appropriate containers. Later, determine if this recovered product can be used for its intended purpose. Address clean-up of contaminated environments. Spill or leak residuals may have to be collected and disposed of. Clay, soil, or commercially available absorbents may be used to recover any material that can not readily be recovered as pure product. Flushing residual material to an industrial sewer, if present at the site of a spill or leak incident, may be acceptable if authorized approval is obtained. If product and/or spill/leak residuals are flushed to an industrial sewer, insure that they do not come into contact with incompatible materials. Contact the person(s) responsible

10. SPILL, LEAK AND DISPOSAL PROCEDURES – CONTINUED:

for the operation of your facility's industrial sewer system prior to intentionally flushing or pumping spills or leaks of this product to the industrial sewer.

DISPOSAL GUIDELINES:

Note: Follow federal, state, and local regulations governing the disposal of waste materials.

Contaminated Materials: Determine if waste containing this product can be handled by available industrial effluent system or other on-site waste management unit. If off-site management is required, contact a company experienced in industrial waste management. This product is not specifically listed in 40 CFR 261 as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, spill or leak residuals may meet the criteria of a characteristic hazardous waste under this Act. Check the characteristics of the material to be disposed of and/or the physical and reactivity data given in this MSDS for the neat product.

Container Disposal: Empty containers, as defined by appropriate sections of the RCRA, are not RCRA hazardous wastes. However, insure proper management of any residuals remaining in container.

11. TRANSPORTATION AND SHIPPING INFORMATION:

DOT Proper Shipping Name: CORROSIVE LIQUID, N.O.S. (Sodium Hydroxide & Sodium Tolytriazole), 8, UN 1760, PG II

IATA: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Sodium Tolytriazole)

IMDG: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Sodium Tolytriazole)

DOT Classification: 8 (Corrosive)

DOT Labels: Corrosive

DOT Markings: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Sodium Tolytriazole) UN 1760

DOT Placard: Corrosive

UN Number: UN 1760

Hazardous Substance/RQ: Not Applicable

49 STCC Number: Not applicable; not shipped via rail cars

Precautions to be Taken in Transportation: Protect against physical damage. Keep container tightly closed.

Other Shipping Information: Packing Group II, Emergency Response Guide Number 60.

12. REGULATORY INFORMATION:

The following Regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

12. REGULATORY INFORMATION – CONTINUED:

SARA (Superfund Amendments and Reauthorization Act):

SARA 302 Extremely Hazardous Substances List: No components of this product are listed.

SARA 312 Hazard Category: Immediate (Acute) Health Hazard.

SARA 313 Toxic Chemicals List: No Section 313 listed substances are present above de minimus levels.

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): No components of this product are listed.

RCRA (Resource Conservation and Recovery Act) Listed Hazardous Wastes: No components of this product are listed.

CWA (Clean Water Act) Listed Substances: No components of this product are listed.

FDA (Food and Drug Administration): This product not approved for food contact uses.

TSCA (Toxic Substances Control Act) Applicability: All components are listed on TSCA Inventory.

FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act): No components of this product are listed.

HMIS/NPCA Ratings: Health 3; Flammability 1; Reactivity 1

NFPA Ratings: Health 3; Flammability 1; Reactivity 1

STATE REGULATIONS

Various State Right to Know Acts: Non-proprietary hazardous chemicals are listed in Section 1 of this MSDS. Should you require further information on specific proprietary chemicals or inerts please contact Western Environmental Management Corp., Ltd.

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Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE.** No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

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MATERIAL SAFETY DATA SHEET

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P. O. Box 1807
3106 E. Greene St.
Carlsbad, NM 88220
OFFICE: (505) 885-5709
EMERGENCY: CHEMTREC 1/800-424-9300

Product Name: WEM MS 4979

Date: 5/27/04

Hazard(s) as defined by OSHA Hazard Communication Standard:

Corrosive to skin and eyes.

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Sodium Bisulfite
CAS #7631-90-5
Percent: 40.0%

The remainder of the components comprise proprietary information.

2. FIRST AID INFORMATION:

Eye exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin exposure: Wash exposed area with plenty of soap and water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately. Inhalation may cause allergic reactions including asthma in sulfite sensitive individuals.

Ingestion: Immediately drink large quantities of water. Induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.
OTHER: May precipitate asthma in sulfite-sensitive individuals or other allergic-type reactions.

3. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

Do not take internally. Avoid contact with skin, eyes and clothing. Upon contact with skin or eyes, wash off with water. Avoid breathing mist or vapor.

3. PRECAUTIONS FOR SAFE HANDLING AND STORAGE - Continued

Storage Conditions: Store in a cool, dry, well ventilated place, product releases sulfur dioxide gas slowly at room temperature. Do not store at temperatures above room temperature.

Product Stability and Compatibility:

Shelf life limitations: No Data

Incompatible Materials for Storage or Transport: Acids, oxidizing agents.

4. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance: Light yellow liquid

Odor: Pungent sulfur dioxide odor

Specific Gravity: 1.19

Bulk Density: 1.3-1.4 g/cc

Freezing Point: 1 Deg.C (34 Deg.F) - approximately

Boiling Point: 104 Deg. C (220 Deg.F) – approximately

Decomposition Temperature: Decomposed slowly at room temperature

Solubility: Complete in water

pH: @ 25 Deg.C: 3.5-6.0

Vapor Pressure @ 25 Deg.C: Estimated 14 mm Hg of sulfur dioxide

Volatiles, Percent by Volume: 46-64%

Evaporation Rate: <1 (water=1)

Vapor Density: No Data

Molecular Weight: 104

Coefficient of Oil/Water Distribution: No Data

5. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS:

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION:

Respirator protection not normally needed. If vapors, mists, or aerosols are generated, wear a NIOSH/MSHA approved respirator.

VENTILATION:

Local exhaust ventilation is recommended if vapors, mists or aerosols are generated. Otherwise, use general exhaust ventilation.

SKIN AND EYE PROTECTIVE EQUIPMENT:

Use chemical goggles and impermeable gloves.

EQUIPMENT SPECIFICATIONS (WHEN APPLICABLE):

Respirator Type: NIOSH/MSHA approved dust/mist filter respirator

Protective Clothing Type: (This includes: gloves, boots, apron, protective suite): Impervious

6. FIRE AND EXPLOSION INFORMATION:

FLAMMABILITY DATA:

Explosive: No

Flammable: No

Combustible: No

Pyrophoric: No

Flash Point: Not Flammable

Autoignition Temperature: Not Flammable

Flammable Limits at Normal Atmospheric Temperature and Pressure:

(Percent Volume in Air): LEL – Not Applicable

UEL – Not Applicable

NFPA Ratings:

Not Established

HMIS Ratings:

Health: 2

Flammability: 0

Reactivity: 0

EXTINGUISHING MEDIA: Not Applicable – Choose extinguishing media suitable for surrounding materials.

FIRE FIGHTING TECHNIQUES AND COMMENTS:

Use water to cool containers exposed to fire.

See Section 9 for protective equipment for fire fighting.

7. REACTIVITY INFORMATION:

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:

Temperatures above: Decomposes slowly at room temperature, more rapidly at higher temperatures, with evolution of toxic and corrosive sulfur dioxide gas.

Mechanical Shock or Impact: No

Electrical (Static) Discharge: No

Other: Contact with acids will liberate sulfur dioxide gas.

Hazardous Polymerization: Will not occur

Incompatible Materials: Acids, oxidizing agents

Hazardous Decomposition Products: Sulfur dioxide

SUMMARY OF REACTIVITY:

Explosive: No

Oxidizer: No

Pyrophoric: No

Organic Peroxide: No

Water Reactive: No

8. TOXICOLOGY AND HAZARD INFORMATION:

ROUTES OF ABSORPTION:

Inhalation, ingestion, skin and eye contact

WARNING STATEMENTS AND WARNING PROPERTIES:

May cause eye, skin and respiratory tract irritation. May cause allergic skin or respiratory reaction. May cause an allergic-type reaction.

HUMAN THRESHOLD RESPONSE DATA:

Odor Threshold: No Data

Irritation Threshold: No Data

Immediately Dangerous To Life or Health: The IDLH concentration has not been established for this product.

SIGNS, SYMPTOMS, AND EFFECTS FOR EXPOSURE:

INHALATION:

Acute: If inhaled, may cause irritation to the throat, mucous membranes, upper respiratory tract, and lungs. Any irritation would be expected to be transient with no permanent damage expected.

Chronic: Repeated exposure may cause an allergic sensitization of the respiratory tract. This is characterized by an asthma-like response upon reexposure to the chemical. The symptoms may include coughing, wheezing, shortness of breath, chest tightness, severe sneezing, swelling of the throat and generalized itching.

SKIN:

Acute: Skin contact would be expected to cause an irritation consisting of transient redness. This irritant effect would not result in permanent damage.

Chronic: Repeated or prolonged skin contact may cause dermatitis and may also cause some individuals to develop skin rash and other skin complications due to allergic skin sensitization.

EYE:

Contact with the eyes would be expected to cause moderate to severe irritation consisting of reversible redness, swelling and mucous membrane discharge to the conjunctiva. Any corneal damage or visual impairment would be expected to clear within several days.

INGESTION:

Acute: Ingestion may cause gastrointestinal discomfort with any or all of the following symptoms: nausea, vomiting, lethargy or diarrhea. It has been reported that some individuals are sensitive to sulfites. This sensitivity may be manifested in an allergic-type reaction.

Chronic: There are no known or reported effects from chronic exposure except for effects similar to those experienced from single exposure.

8. TOXICOLOGY AND HAZARD INFORMATION: CONTINUED

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Asthmatics and sulfite-sensitive individuals may have an asthmatic reaction from ingestion or inhalation of this product. May aggravate an existing dermatitis.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:

None known or reported.

ANIMAL TOXICOLOGY:

ACUTE TOXICITY:

Inhalation LC 50: No Data

Dermal LD 50: No Data

Oral LD 50: Approximately 4-5 g/kg. (rat)

Irritation: May cause eye, skin, and respiratory irritation.

ACUTE TARGET ORGAN TOXICITY:

No organs known to be damaged from exposure to this product.

An allergic-type of sensitivity reaction can occur from ingestion of this product in individuals who are sensitive to sulfites.

In animal studies using rats, it was found that ingestion of very large doses of sulfites causes effects on the gastrointestinal tract, cardiovascular system and central nervous system.

CHRONIC TARGET ORGAN TOXICITY:

Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated inhalation or skin contact may cause allergic sensitization reactions.

REPRODUCTIVE AND DEVELOPMENTAL TOXICITY:

There are no known or reported effects on reproductive function or fetal development.

CARCINOGENICITY:

This product is not known or reported to be carcinogenic by any reference source including LARC, OSHA, NTP, or EPA.

LARC has classified sodium bisulfite as having inadequate evidence for carcinogenicity to humans and animals. LARC therefore considers sodium bisulfite to be not classifiable as to its carcinogenicity to humans.

MUTAGENICITY:

Sodium bisulfite has been tested in a battery of mutagenicity and genotoxicity assays.

It has been shown to be a mutagen in specific bacterial strains under certain experimental conditions. It has been shown, however, to be non-mutagenic in several mammalian cell systems and in in-vivo genotoxicity assays. The weight of evidence therefore would indicate that sodium bisulfite is not a mutagenic or genotoxic hazard.

AQUATIC TOXICITY:

The toxicity threshold of sodium bisulfite (100 hr at 23 degrees Celsius) to *Daphnia magna* has been reported to be 102 mg/l. In the presence of additional sodium salts, this threshold may be lower. For minnows, exposed for 6 hours to sodium bisulfite solution in distilled water at 19 degrees Celsius, the minimum lethal dose was 60-65 mg/l, and in hard water at 18 degrees Celsius it was 80-85 mg/l. The 24, 48, and 96 hour LC50 value was 240 mg/l for the mosquito-fish (*Gambusia affinis*) in turbid water at 17-22 degrees Celsius.

9. SPILL, LEAK, AND DISPOSAL PROCEDURES:

REPORTABLE QUANTITY: (Per 40 CFR 302.4) as Sodium Bisulfite 5000 lbs.

SPILL MITIGATION PROCEDURES:

Evacuation procedures must be placed into effect. Evacuate all non-essential personnel. hazardous concentrations in air may be found in local spill area and immediately downwind. utilize emergency response personal protective equipment prior to the start of any response. Stop source of spill as soon as possible and notify appropriate personnel.

AIR RELEASE:

Vapors may be suppressed by the use of water fog. Contain all liquid for treatment and/or disposal as a (potential) hazardous waste.

WATER RELEASE:

This material is heavier than and soluble in water. Notify all downstream users of possible contamination. Divert water flow around spill if possible and safe to do so. Continue to handle as described in land spill.

LAND SPILL:

Create a dike or trench to contain materials. Spill materials any absorbed using sand, clay pads, or commercial absorbent. Do not place spill materials back in their original containers. Containerize and label all spill materials properly. Decontaminate all clothing and the spill area using a soap solution and flush with large amounts of water.

SPILL RESIDUES:

Dispose of per guidelines under Section 10, Waste Disposal.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:

In case of fire, use normal fire fighting equipment, including self-contained breathing apparatus (SCBA). Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots, gloves and splash-proof goggles.

10. WASTE DISPOSAL:

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

As a nonhazardous liquid waste, it should be disposed of in accordance with local, state and federal regulations by treatment in a wastewater treatment system.

10. WASTE DISPOSAL - Continued

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

11. TRANSPORTATION AND SHIPPING INFORMATION:

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT DESCRIPTION FROM THE HAZARDOUS MATERIALS TABLE 49 CFR 172.101:
Bisulfites, Aqueous Solutions, N.O.S., 8, UN 2693, PG III

Hazard Label/Placard: Corrosive

Reportable Quantity: 5000 lbs. (per 49 CFR 172.101, Appendix)

Emergency Guide No.: 154

12. REGULATORY INFORMATION:

TOXIC SUBSTANCES CONTROL ACT:

The components of this product are listed on the Toxic Substance Control Act Inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE III: HAZARD CATEGORIES, PER 40 CFR 370.2:

Health:

Immediate (Acute)

Delayed (Chronic)

Physical:

None

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:

Extremely Hazardous Substance – Threshold Planning Quantity:

None Established

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:

None Established.

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Western Environmental Management Corp., Ltd. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE.** No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out of or relating to this contract, or breach thereof, shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgement upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

MATERIAL SAFETY DATA SHEET

Western Environmental Management Corp., Ltd.
P. O. Box 1807
3106 E. Greene St.
Carlsbad, NM 88220
OFFICE: (505) 885-5709
EMERGENCY: CHEMTREC 1/800-424-9300

Product Name: WEM CW 3511

Date: 4/22/07

Hazard(s) as defined by OSHA Hazard Communication Standard:
Corrosive to skin and eyes.

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Polymaleic Acid
CAS #: 26099-09-02
Percent: Less than 2.0

2 phosphono-1,2,4-butanetricarboxylic acid
CAS #: 37971-36-1
Percent: Less than 1.0

(3-Methylphenyl)methyl, Butanedioic Acid
CAS #6315-20-4
Percent: Less than 1.0

Maleic Acid
CAS: #110-16-7
Percent: Less than 1.0

(4-Methylphenyl)methyl, Butanedioic Acid
CAS #: 6315-21-5
Percent: Less than 1.0

The remainder of the components comprise proprietary information.

2. HAZARD IDENTIFICATION:

Emergency Overview: Corrosive Liquid. Causes burns to skin and eyes.

Health Effects: Mist may cause irritation of eyes, nose, throat and lungs. Product may cause burns to skin and eyes. Contact with eyes may cause permanent eye damage, including blindness.

3. FIRST AID INFORMATION:

Eye exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin exposure: Wash exposed area with plenty of soap and water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately.

Ingestion: DO NOT INDUCE VOMITING. Rinse with copious amounts of water or milk, first. Irrigate the esophagus and dilute stomach contents by slowly giving one (1) or two (2) glasses of water or milk. Avoid giving alcohol or alcohol related products. In cases where the individual is semi-comatose, comatose or convulsing, DO NOT GIVE FLUIDS BY MOUTH. In case of intentional ingestion of the product seek medical assistance immediately; take individual to nearest medical facility.

NOTE TO PHYSICIAN: Not available.

4. PRIMARY ROUTES OF EXPOSURE:

1. Effects from Acute Exposure:

Eye exposure: Corrosive to the eyes with possible permanent damage depending on the length of exposure, solution concentration and first aid measures.

Skin exposure: Corrosive. Effects may vary depending on length of exposure, solution concentration and first aid measures.

Inhalation: May cause irritation or corrosion of mucous membranes and the lungs. Exposed individuals should be monitored for respiratory distress, bronchitis or pneumonia.

Ingestion: Ingestion is not expected to be a primary route of exposure.

2. Effects from Chronic Exposure:

The effects from chronic exposure have not been fully evaluated.

5. TOXICOLOGICAL INFORMATION:

Carcinogenic potential: Not tested. Not shown as a carcinogen by OSHA, IARC, or NTP.

Target Organ Effects: Skin and eyes (burns and corrosion) are expected to be the target organs for this product.

Other health effects: None known.

6. PHYSICAL AND CHEMICAL PROPERTIES:

Boiling Point: Greater than 212 F
Vapor Pressure: 24 MM HG at 25 C (water)
Vaport Density (Air=1): 0.020 @ 25 C
Room Temperature:
Appearance and State: Yellowish/Bronw, Hazy Liquid
Odor: Slight
Specific Gravity (H2O=1): 1.02
Solubility in H2O % by wt.: Soluble in all proportions
% Volatiles: Not Available
Evaporation Rate (Butyl Acetate=1): Equivalent to water
pH (as is): >8.5
pH (1% solution): >8.5
Odor Threshold: Not Available
Coefficient Water/Oil Dist.: Not Availalbe
Flash Point: None below 212 F
Autoignition Temperature: Not Applicable
Flammable Limits Upper: Not Applicable
(Air) Lower: Not Applicable
Explosive Properties: Not Applicable

7. FIRE AND EXPLOSION INFORMATION:

Flammable limits: None below 212 F. Keep away from flames and other ignition sources.
Extinguishing media: Water fog, carbon dioxide, foam, dry chemical.
Special firefighting procedures: Fire fighters should wear full protective gear, including self contained breathing apparatus.

8. REACTIVITY INFORMATION:

Stability: Stable under ordinary conditions of use and storage.
Hazardous Polymerization: Will not occur
Conditions to Avoid: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.
Incompatibility: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.
Hazardous Decomposition Products: Thermal decomposition and burning may produce carbon monoxide, carbon dioxide and phosphorus oxide.

9. HANDLING PRECAUTIONS:

Face shields are strongly recommended.

The handling precautions for this product are based on the characteristics of the neat product unless otherwise specified.

Chemical resistant gloves, indirect ventilation goggles, body-protective clothing, and chemical resistant safety shoes are required.

Provide dilution ventilation to control vapor and/or mist level. If misting occurs, a NIOSH/MSHA approved respirator may be required. Use a respirator approved for the material and level of exposure.

Keep container tightly closed when not in use.

10. SPILL, LEAK, AND DISPOSAL PROCEDURES:

Important: Before responding to a spill or leak of this product, review each section of this MSDS. Follow the recommendations given in the Handling Precautions sections. Check the Fire and Explosion Data section to determine if the use of non-sparking tools is merited. Insure that spilled or leaked product does not come into contact with materials listed as incompatible. If irritating fumes are present, consider evacuation of enclosed areas.

Initially minimize area affected by the spill or leak. Block any potential routes to water systems (e.g., sewers, streams, lakes, etc.). Based on the product's toxicological and chemical properties, and on the size and location of the spill or leak, assess the impact on contaminated environments (e.g. water systems, ground, air equipment, etc.). There are no methods available to completely eliminate any toxicity this product may have on aquatic environments. Minimize adverse effects on these environments. Determine if federal, state, and/or local release notification is required (see Regulatory Classifications section of this MSDS). Recover as much of the pure product as possible into appropriate containers. Later, determine if this recovered product can be used for its intended purpose. Address clean-up of contaminated environments. Spill or leak residuals may have to be collected and disposed of. Clay, soil, or commercially available absorbents may be used to recover any material that can not readily be recovered as pure product. Flushing residual material to an industrial sewer, if present at the site of a spill or leak incident, may be acceptable if authorized approval is obtained. If product and/or spill/leak residuals are flushed to an industrial sewer, insure that they do not come into contact with incompatible materials. Contact the person(s) responsible for the operation of your facility's industrial sewer system prior to intentionally flushing or pumping spills or leaks of this product to the industrial sewer.

DISPOSAL GUIDELINES:

Note: Follow federal, state, and local regulations governing the disposal of waste materials.

Contaminated Materials: Determine if waste containing this product can be handled by available industrial effluent system or other on-site waste management unit. If off-site

10. SPILL, LEAK, AND DISPOSAL PROCEDURES – Continued:

management is required, contact a company experienced in industrial waste management. This product is not specifically listed in 40 CFR 261 as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, spill or leak residuals may meet the criteria of a characteristic hazardous waste under this Act. Check the characteristics of the material to be disposed of and/or the physical and reactivity data given in this MSDS for the neat product.

Container Disposal: Empty containers, as defined by appropriate sections of the RCRA, are not RCRA hazardous wastes. However, insure proper management of any residuals remaining in container.

11. TRANSPORTATION AND SHIPPING INFORMATION:

DOT Proper Shipping Name: CORROSIVE LIQUID, N.O.S. (Poly(Maleic Acid)), 8, UN 1760, PG II

IATA: Corrosive Liquid, N.O.S. (Poly(Maleic Acid))

IMDG: Corrosive Liquid, N.O.S. (Poly(Maleic Acid))

DOT Classification: 8 (Corrosive)

DOT Labels: Corrosive

DOT Markings: Corrosive Liquid, N.O.S. (Poly(Maleic Acid)) UN 1760

DOT Placard: Corrosive

UN Number: UN 1760

Hazardous Substance/RQ: Not Applicable

49 STCC Number: Not applicable; not shipped via rail cars

Precautions to be Taken in Transportation: Protect against physical damage. Keep container tightly closed.

Other Shipping Information: Packing Group II, Emergency Response Guide Number 60.

12. REGULATORY INFORMATION:

The following Regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

SARA (Superfund Amendments and Reauthorization Act):

SARA 302 Extremely Hazardous Substances List: No components of this product are listed.

SARA 312 Hazard Category: Immediate (Acute) Health Hazard.

SARA 313 Toxic Chemicals List: No Section 313 listed substances are present above de minimus levels.

12. REGULATORY INFORMATION – Continued:

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): No components of this product are listed.

RCRA (Resource Conservation and Recovery Act) Listed Hazardous Wastes: No components of this product are listed.

CWA (Clean Water Act) Listed Substances: No components of this product are listed.

FDA (Food and Drug Administration): This product not approved for food contact uses.

TSCA (Toxic Substances Control Act) Applicability: All components are listed on TSCA Inventory.

FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act): No components of this product are listed.

HMIS/NPCA Ratings: Health 3; Flammability 1; Reactivity 1

NFPA Ratings: Health 3; Flammability 1; Reactivity 1

STATE REGULATIONS

Various State Right to Know Acts: Non-proprietary hazardous chemicals are listed in Section 1 of this MSDS. Should you require further information on specific proprietary chemicals or inerts please contact Western Environmental Management Corp., Ltd.

The information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazard Communication regulations.

Western Environmental Management Corp., Ltd. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE**. No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out of or relating to this contract, or breach thereof, shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgement upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

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2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

7647-15-6 Sodium bromide (NaBr)

EXPOSURE LIMITS

PEL: Not Established
 TLV: Not Established
 PELZ2: Not Established

PERCENTAGE

VOL	ND
WT	7-8

COMMON NAMES:

Listed On(List Legend Below):
 00 19 22 23 51

LIST LEGEND

00 TSCA INVENTORY	12 PA HAZARDOUS SUBSTANCE
16 NJ WORKPLACE HAZ SUBSTANCE LST	19 PA REQUIREMENT- 3% OR GREATER
22 CANADIAN DOMESTIC SUB LIST	23 NJ REQUIREMENT- 1% OR GREATER
51 EINECS	

3. HAZARDS IDENTIFICATION

***** EMERGENCY OVERVIEW *****

STRONG OXIDIZING AGENT.

CORROSIVE.

CAUSES IRREVERSIBLE EYE DAMAGE AND SKIN BURNS.

MAY BE FATAL IF SWALLOWED.

HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.

* White tablets with slight bromine odor *

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY:

Inhalation, Ingestion.

TARGET ORGANS:

Eyes, Skin, Respiratory Tract, Gastrointestinal Tract.

IRRITANCY:

Severe, Potentially by all routes of exposure.

SENSITIZING CAPABILITY:

None known.

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3. HAZARDS IDENTIFICATION (Continued)

REPRODUCTIVE EFFECTS:

None known.

CANCER INFORMATION:

Not classified as carcinogenic by NTP, IARC, OSHA, ACGIH, or NIOSH.

SHORT-TERM EXPOSURE (ACUTE)

INHALATION:

Breathing dust or fumes is expected to be a primary route of exposure and may produce throat and respiratory tract irritation.

EYES:

Contact can cause severe damage including burns and blindness.

SKIN:

On contact with moisture, this material readily hydrolyzes to acid which may result in burns if not promptly removed.

INGESTION:

May cause burns to gastrointestinal tract.

REPEATED EXPOSURE (CHRONIC)

No known chronic effects.

Chronic exposure to large amounts of this compound has not been characterized and the irritating properties of the compound make such an exposure highly unlikely.

SYNERGISTIC MATERIALS:

None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing disorders affecting target organs.

4. FIRST AID MEASURES

EYES:

IMMEDIATELY FLUSH EYES WITH A DIRECTED STREAM OF WATER for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

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4. FIRST AID MEASURES (Continued)

SKIN:

Immediately brush off excess chemical and flush with plenty of soap and water. Remove contaminated clothing. Wash clothing before reuse. GET MEDICAL ATTENTION if irritation persists.

INHALATION:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, have a trained person administer artificial respiration. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

NOTES TO PHYSICIAN:

Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

Flash Point: Not applicable

Method: Not applicable

Autoignition Temperature: Not applicable

FLAMMABLE LIMITS IN AIR, BY % VOLUME

Upper: Not applicable

Lower: Not applicable

EXTINGUISHING MEDIA:

In case of fire or smoke call the fire department. Do not attempt to extinguish the fire without a self contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

FIRE FIGHTING PROCEDURES:

Firefighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Using a 10% solution of sodium carbonate, thoroughly decontaminate fire fighting equipment including all fire fighting wearing apparel after the incident.

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5. FIRE FIGHTING MEASURES (Continued)

FIRE AND EXPLOSION HAZARD:

This product, when ignited, will burn with the evolution of noxious chlorine containing gases. Decomposition requires a continuous heat source. Once the heat source is removed, decomposition will not continue. In addition, when in contact with another combustible material, this product will increase the burning rate of the combustible material.

Nitrogen trichloride can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Nitrogen trichloride can present an explosion hazard.

Immediately after a fire has been extinguished, check for wet or damp material. Any spilled material from burned or broken containers should be assumed contaminated. Neutralize to a non-oxidizing material for safe disposal. Do not attempt to re-close broken drums, even for movement to the disposal area. They should be left open to disperse any nitrogen trichloride that may form.

Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the plastic liner of the drum is damaged or the material is damp, the material should be neutralized to a non-oxidizing material for safe disposal.

Bulging containers require extreme care. Contact the fire department.

Material glows on ignition and burns without a visible flame. Contact of molten material with limited amounts of water may result in steam explosion.

SENSITIVITY TO MECHANICAL IMPACT:

Not sensitive.

SENSITIVITY TO STATIC DISCHARGE:

Not sensitive.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Follow protective measures provided under Personal Protection in Section 8.

ENVIRONMENTAL PRECAUTIONS:

Contain spill with dike to prevent entry into sewers or waterways.

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6. ACCIDENTAL RELEASE MEASURES (Continued)

METHODS FOR CLEANING UP:

Contain spilled material. Any spillage should be cleaned up as soon as possible. DO NOT add water to spilled material. Using clean, dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean, dry containers for disposal. DO NOT use floor sweeping compounds to clean up spills. DO NOT close drums containing wet or damp material. They should be left open to disperse any nitrogen trichloride that may form. DO NOT transport wet or damp material.

7. HANDLING AND STORAGE

HANDLING:

Do not get in eyes, on skin or clothing.

Avoid breathing airborne particulates; wear respiratory protection when exposure is possible.

Vapor space in a closed container may contain a slight amount of chlorine and bromine gases and compounds from decomposition of the product.

Wear goggles or face shield and rubber gloves when handling.

Wash thoroughly with soap and water after handling.

Wash contaminated clothing before reuse.

SPECIAL MIXING AND HANDLING INSTRUCTIONS:

Mix only with water. Use clean dry utensils. DO NOT add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter, or other chemicals may start a chemical reaction with generation of heat, liberation of hazardous gases, and possible generation of fire and explosion.

Vapor space in a closed container may contain a slight amount of chlorine gas and other chlorine containing compounds from decomposition of the product. Exposure to chlorine gas may cause burning of the eyes with tearing; burning of the nose and mouth with runny nose; and irritation of the linings of the entire respiratory tract with coughing, a choking sensation, substernal pain, vomiting, nausea, headache, dizziness and fainting. The onset of severe respiratory symptoms following exposure to chlorine, including pulmonary edema and pneumonitis, may be delayed.

DIRECTIONS FOR USE: It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

FOR INDUSTRIAL USE ONLY, FOR REPACKAGING OR FORMULATION AS A DISINFECTANT, SANITIZER, BACTERICIDE, FUNGICIDE OR ALGICIDE. Repackagers or formulators must obtain their own EPA Registration Number to legally market this product for these uses.

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7. HANDLING AND STORAGE (Continued)

STORAGE:

Store in original container and in a dry area where temperatures do not exceed 52°C (125°F) for 24 hours. Retie polyethylene liner after each use and keep container tightly closed. Do not allow water to get into container. Keep container off wet floors. Do not contaminate water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Handle product in a well ventilated area.

If product is handled in an open system, the use of process enclosures, local exhaust ventilation, and/or other engineering controls should be considered to control airborne levels to below recommended exposure limits, or below acceptable levels where there are no limits.

PERSONAL PROTECTION

RESPIRATORY:

A NIOSH approved respirator with an organic vapor acid gas cartridge with dust, fume and mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.

A respiratory protection program that meets 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant use of a respirator.

EYE/FACE:

Wear chemical safety goggles. (ANSI Z87.1)

SKIN:

Wear chemical resistant gloves such as rubber, neoprene or vinyl.

Laundry contaminated clothing and clean protective equipment before reuse.

OTHER:

Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: White tablets with slight bromine odor

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9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

Odor Threshold: Not determined
 Specific Gravity (Water=1): Not determined
 Vapor Pressure: Not determined
 Vapor Density (Air=1): Not determined
 Density: 63-66 lbs/cu.ft. (loose bulk)
 Evaporation Rate: Not determined
 % Volatiles by Wt: Not determined
 Boiling Point: Not determined
 Freezing Point: Not determined
 Melting Point: 225-230°C (437-446°F) (decomposes)
 Solubility in Water (% by wt.): 1.2g/100g @ 25°C
 pH: 3-3.5 (1% solution @ 25°C)
 Octanol/Water Partition Coefficient: Not determined
 Thermal Decomposition Temperature: 225-230°C (437-446°F)
 Other: Not applicable
 VOC (% by wt;g/l): Not determined

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

STABLE UNSTABLE

REACTS WITH:

<input type="checkbox"/> AIR	<input type="checkbox"/> OXIDIZERS	<input type="checkbox"/> METALS
<input checked="" type="checkbox"/> WATER	<input checked="" type="checkbox"/> ACIDS	<input type="checkbox"/> OTHER
<input type="checkbox"/> HEAT	<input checked="" type="checkbox"/> ALKALIS	<input type="checkbox"/> NONE

HAZARDOUS POLYMERIZATION:

OCCURS WILL NOT OCCUR

COMMENTS:

NFPA Oxidizer Classification 1

This material is a strong oxidizing agent. The preparation of concentrated solutions or slurries is not recommended. Avoid contact with water on concentrated material in the container. Also avoid contact with easily oxidizable organic material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; calcium hypochlorite; alkalis.

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10. STABILITY AND REACTIVITY (Continued)

HAZARDOUS DECOMPOSITION PRODUCTS:

Chlorine containing gases can be produced.

Bromine containing gases can be produced.

Revised

11. TOXICOLOGICAL INFORMATION

87-90-1 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tri-

This material contains 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-trichloro- at levels that may produce a biological effect. Minimize contact. This substance is moderately toxic by ingestion. It is extremely irritating to the eyes and skin.

For further information call or write the address shown on page 1 of the MSDS.

Revised

12. ECOLOGICAL INFORMATION

87-90-1 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tri-

TOXICITY: This material has been determined to be highly toxic to freshwater fish and invertebrates in acute toxicity tests.

PERSISTENCE: This material will readily biodegrade.

BIOACCUMULATION: This material is believed to be unlikely to bioaccumulate.

For further information call or write the address shown on page 1 of the MSDS.

13. DISPOSAL CONSIDERATIONS

Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Product disposal: Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction and fire. Do not transport damp or wet material. Neutralize materials to a non-oxidizing state for safe disposal.

CONTAINER DISPOSAL:

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13. DISPOSAL CONSIDERATIONS (Continued)

FIBER DRUM: Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Remove and triple rinse polyethylene liner. Then dispose of liner in a sanitary landfill or by incineration as allowed by State and local authorities. If drum is contaminated and cannot be reused, dispose of in the same manner.

METAL CONTAINER: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

PLASTIC DRUM: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

BULK BAG OR PLASTIC BAG: Completely empty bag into application equipment. Remove and triple rinse polyethylene liner. Dispose of empty bag and liner in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Do not reuse bag.

BULK BIN: Return empty bulk bin for reuse. Do not vacuum, wash, or clean inside of bin.

Revised

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: Trichloroisocyanuric Acid, Dry, Mixture

DOT HAZARD CLASS: 5.1

DOT IDENTIFICATION NO: UN2468

DOT PACKING GROUP: II

DOT HAZARDOUS SUBSTANCE: Not Applicable

DOT MARINE POLLUTANT(S): Not Applicable

ADDITIONAL DESCRIPTION REQUIREMENT: Not Applicable

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

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15. REGULATORY INFORMATION (Continued)

TSCA:

All components of this product that are required to be on the TSCA inventory are listed on the inventory.

SARA/TITLE III HAZARD CATEGORIES:

If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR 370. Please consult those regulations for details.

Immediate(Acute) Health:	<u>YES</u>	Reactive Hazard	<u>YES</u>
Delayed(Chronic) Health:	<u>NO</u>	Sudden Release of Pressure	<u>NO</u>
Fire Hazard:	<u>YES</u>		

HMIS HAZARD RATINGS:

HEALTH HAZARD: 3 FIRE HAZARD: 1 REACTIVITY: 2

STATE REGULATIONS:

See Section 2. COMPOSITION/INFORMATION ON INGREDIENTS list legend for applicable state regulation.

INTERNATIONAL REGULATIONS:

Consult the regulations of the importing country.

CANADA:

WHMIS Hazard Class: C, D2B

16. OTHER INFORMATION

For additional non-emergency health, safety or environmental information telephone (972) 404-2076 or write to:

Occidental Chemical Corporation
Product Stewardship Department
5005 LBJ Freeway
P.O. Box 809050
Dallas, Texas 75380

OCCIDENTAL CHEMICAL CORPORATION
MSDS NUMBER : M3104J
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16. OTHER INFORMATION (Continued)

MSDS LEGEND:

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service Registry Number

CEILING = Ceiling Limit (15 Minutes)

CEL = Corporate Exposure Limit

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit (OSHA)

STEL = Short Term Exposure Limit (15 Minutes)

TDG = Transportation of Dangerous Goods (Canada)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average (8 Hours)

WHMIS = Worker Hazardous Materials Information System (Canada)

* = See Section 3 Hazards Identification - Repeated Exposure(Chronic) Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any federal, state or local laws, rules, regulations or ordinances.

17. WARNING LABEL INFORMATION

This product is registered with the United States Environmental Protection Agency (EPA) as a pesticide, as required under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). It is shipped under a FIFRA approved product label. It is a violation of Federal law to use this product for pesticidal applications in a manner inconsistent with the FIFRA labeling.

Repackers or formulators must obtain their own EPA registration and FIFRA approved label to legally market this product for pesticidal applications.

This product may be used by manufacturers of non-pesticidal products provided no pesticidal claim is made.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A022	TA-3	03A, Treated Cooling Water Discharges	Mortandad Canyon

SOURCE OF DISCHARGE

Outfall 03A022 is located at TA-3-66 and may discharge potable cooling water from the circulating water tank located in the basement of TA-3-66 or storm water from the roof drains located in Areas J and K of TA-3-66. Table 1 identifies the location of each source and provides a description.

**Table 1
 Sources for Discharges to Outfall 03A022**

TA	Bldg	Description
3	66	Emergency Cooling Water, Overflow from Circulating Water Pump Basin
3	66	Storm Water from the Area J and K Roof Drains

Figure 1 provides a process schematic.

WATER TREATMENT PROCESS

The water discharged to Outfall 03A022 consists of emergency cooling water and storm water. Under normal operating conditions, the TA-3-66 cooling loop does not overflow the circulating water tank to the outfall, however, when the emergency cooling system is activated it uses potable water to cool the systems/equipment at TA-3-66 in a single pass cooling loop. The water that is generated by the emergency cooling system overflows from the circulating water tank directly to Outfall 03A022. The roof drains discharge water to the outfall during seasonal precipitation and/or snow melt. There are no water treatment process codes applicable to Outfall 03A022.

POTENTIAL POLLUTANTS

Untreated cooling water and storm water constitute the pollutant load of the discharge to Outfall 03A022. Table 4 identifies the Table 2C-4 constituents by discharge source.

**Table 2
 Potential Pollutants Discharged to Outfall 03A022**

Description	Hazardous Constituents from Table 2C-4
Emergency Cooling Water, Overflow from Cooling System	NA
Storm Water from the TA-3-66 Area J and K Roof Drains	NA

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to 03A022 are provided in Table 3.

Table 3
Source Flow Rates/Frequencies to Outfall 03A022

Table 3 – Discharge Flow Rates of Operations to Outfall 03A022		
Operation/Source	Average Flow (Gallon/Day)	Treatment Code
Emergency Cooling Water, Overflow from Cooling System	153,768 (Emergency Only)	NA
Storm Water from the TA-3-66 Area J and K Roof Drains	622 (Seasonal)	NA

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A022 for the Permit Re-Application on August 16, 2011. The composite sample included the discharge of treated blow down from the cooling tower at TA-3-66. In December 2011, a Notice of Changed Condition letter was submitted to the EPA indicating that the cooling tower will no longer discharge to Outfall 03A022. This cooling tower is now hard piped to the SWWS plant. If there is a discharge from the emergency cooling system, a grab sample will be collected for purposes of the NPDES Re-Application. This information will be forwarded to EPA and NMED for review.

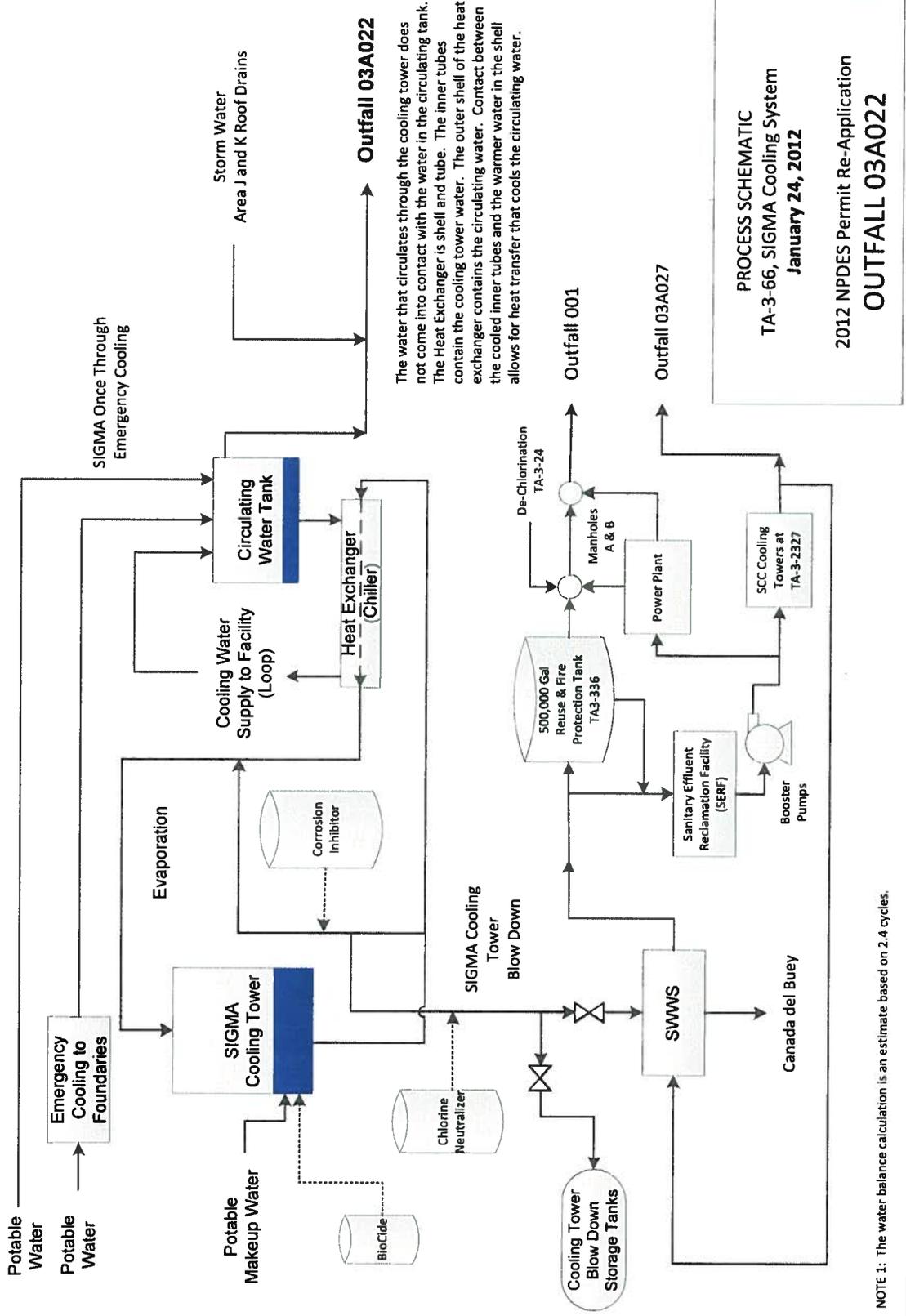
ANALYTICAL RESULTS PROVIDED

- Form 2C Analytes from a grab sample collected August 16, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°52'14"N
- Longitude – 106°19'01"W

Figure 1
 Process Schematic TA-3-66, SIGMA Cooling System and Outfall 03A022



NOTE 1: The water balance calculation is an estimate based on 2.4 cycles.

PROCESS SCHEMATIC
 TA-3-66, SIGMA Cooling System
 January 24, 2012
 2012 NPDES Permit Re-Application
 OUTFALL 03A022

Photographs – TA-3-66, SIGMA and Outfall 03A022



**Photographs 1, 2, and 3 – TA-3-66, SIGMA
Outfall 03A022 and Receiving Stream**



**Photograph 4 – TA-3-66, SIGMA
Heat Exchanger For SIGMA Cooling Loop**

DMR Outfall Data Summary - 03A022
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR									
				Flow Rate			Analytical Lab Result			DMR Units			DMR Units						
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units
03A022	TA-3-66	8/07	Flow (Totalized Est.)	0.00587	0.00949	MGD									0.00587	0.00949	MGD		1
		9/07	Flow (Totalized Est.)	0.00395	0.00863	MGD									0.00395	0.00863	MGD		1
		10/07	Flow (Totalized Est.)	0.01965	0.18243	MGD									0.01965	0.18243	MGD		1
		11/07	Flow (Totalized Est.)	0.00268	0.00529	MGD									0.00268	0.00529	MGD		1
		12/07	Flow (Totalized Est.)	0.00293	0.00942	MGD									0.00293	0.00942	MGD		1
		1/08	Flow (Totalized Est.)	0.00075	0.00308	MGD									0.00075	0.00308	MGD		1
		2/08	Flow (Totalized Est.)			MGD									No Discharge		MGD		
		3/08	Flow (Totalized Est.)			MGD									No Discharge		MGD		
		4/08	Flow (Totalized Est.)			MGD									No Discharge		MGD		
		5/08	Flow (Totalized Est.)			MGD									No Discharge		MGD		
		6/08	Flow (Totalized Est.)	0.00740	0.22500	MGD									0.00740	0.22500	MGD		1
		7/08	Flow (Totalized Est.)			MGD									No Discharge		MGD		
		8/08	Flow (Totalized Est.)	0.01350	0.01350	MGD									0.01350	0.01350	MGD		1
		9/08	Flow (Totalized Est.)	0.00055	0.00074	MGD									0.00055	0.00074	MGD		1
		10/08	Flow (Totalized Est.)	0.00044	0.00083	MGD									0.00044	0.00083	MGD		1
		11/08	Flow (Totalized Est.)	0.00028	0.00055	MGD									0.00028	0.00055	MGD		1
		12/08	Flow (Totalized Est.)	0.00027	0.00048	MGD									0.00027	0.00048	MGD		1
		1/09	Flow (Totalized Est.)	0.00019	0.00091	MGD									0.00019	0.00091	MGD		1
		2/09	Flow (Totalized Est.)	0.00027	0.00061	MGD									0.00027	0.00061	MGD		1
		3/09	Flow (Totalized Est.)	0.00020	0.00034	MGD									0.00020	0.00034	MGD		1
		4/09	Flow (Totalized Est.)	0.00405	0.01383	MGD									0.00405	0.01383	MGD		1
		5/09	Flow (Totalized Est.)	0.00410	0.01129	MGD									0.00410	0.01129	MGD		1
		6/09	Flow (Totalized Est.)	0.00291	0.00972	MGD									0.00291	0.00972	MGD		1
		7/09	Flow (Totalized Est.)	0.00346	0.00770	MGD									0.00346	0.00770	MGD		1
		8/09	Flow (Totalized Est.)	0.00224	0.00677	MGD									0.00224	0.00677	MGD		1
		9/09	Flow (Totalized Est.)	0.00223	0.00712	MGD									0.00223	0.00712	MGD		1
		10/09	Flow (Totalized Est.)	0.00132	0.00414	MGD									0.00132	0.00414	MGD		1
		11/09	Flow (Totalized Est.)	0.00125	0.00235	MGD									0.00125	0.00235	MGD		1
		12/09	Flow (Totalized Est.)	0.00194	0.00402	MGD									0.00194	0.00402	MGD		1
		1/10	Flow (Totalized Est.)	0.00178	0.00333	MGD									0.00178	0.00333	MGD		1
		2/10	Flow (Totalized Est.)	0.00295	0.01094	MGD									0.00295	0.01094	MGD		1
		3/10	Flow (Totalized Est.)	0.00128	0.00284	MGD									0.00128	0.00284	MGD		1
		4/10	Flow (Totalized Est.)	0.00116	0.00189	MGD									0.00116	0.00189	MGD		1
		5/10	Flow (Totalized Est.)	0.00118	0.00227	MGD									0.00118	0.00227	MGD		1
		6/10	Flow (Totalized Est.)	0.00217	0.00370	MGD									0.00217	0.00370	MGD		1
		7/10	Flow (Totalized Est.)	0.00423	0.01126	MGD									0.00423	0.01126	MGD		1
		8/10	Flow (Totalized Est.)	0.00379	0.00746	MGD									0.00379	0.00746	MGD		1
		9/10	Flow (Totalized Est.)	0.00605	0.01174	MGD									0.00605	0.01174	MGD		1
		10/10	Flow (Totalized Est.)	0.00378	0.00945	MGD									0.00378	0.00945	MGD		1
		11/10	Flow (Totalized Est.)	0.00295	0.00612	MGD									0.00295	0.00612	MGD		1
		12/10	Flow (Totalized Est.)	0.00218	0.00325	MGD									0.00218	0.00325	MGD		1
		1/11	Flow (Totalized Est.)	0.00356	0.00521	MGD									0.00356	0.00521	MGD		1
		2/11	Flow (Totalized Est.)	0.00372	0.00793	MGD									0.00372	0.00793	MGD		1
		3/11	Flow (Totalized Est.)	0.00414	0.00677	MGD									0.00414	0.00677	MGD		1
		4/11	Flow (Totalized Est.)	0.00326	0.00533	MGD									0.00326	0.00533	MGD		1
		5/11	Flow (Totalized Est.)	0.00223	0.00352	MGD									0.00223	0.00352	MGD		1
		6/11	Flow (Totalized Est.)	0.00256	0.00413	MGD									0.00256	0.00413	MGD		1
		7/11	Flow (Totalized Est.)	0.00121	0.00241	MGD									0.00121	0.00241	MGD		1
		8/11	Flow (Totalized Est.)	0.00148	0.00239	MGD									0.00148	0.00239	MGD		1

DMR Outfall Data Summary - 03A022

Biological Testing Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
03A022	3/8/2010	Grab	Daphnia pulex	48 hr acute	100	P
	3/9/2010					

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(s) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		C. DURATION (in days)
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A022	Emergency Cooling Water (not routine) (A)	1	1	0.153768 mgal/d	0.225 mgal/d	153,768 Gallons	225,000 Gallons	5
	Stormwater from Area J & K Roof Drains (Seasonal) (B)	7	12	0.000622	0.028344	622 Gallons	28,344 Gallons	67

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.

NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
NA	NA	NA	NA

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Whole Effluent Toxicity 48 Hour Acute Toxicity - PASSED
 Daphnia Pulex, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

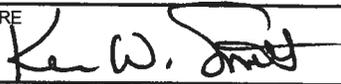
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Espanola, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

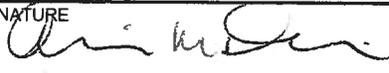
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Alison M. Dorries, Division Leader, ENV Protection Division	B. PHONE NO. (area code & no.) (505) 665-6952
C. SIGNATURE 	D. DATE SIGNED 1/27/12

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A022

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					
a. Biochemical Oxygen Demand (BOD)	<1	<0.106	(C, V)				1	mg/L	1b/D	NA	NA
b. Chemical Oxygen Demand (COD)	<6.5	<0.688	(C, V)				1	mg/L	1b/D	NA	NA
c. Total Organic Carbon (TOC)	<0.33	<0.0349	(C, V)				1	mg/L	1b/D	NA	NA
d. Total Suspended Solids (TSS)	1.0 (V)	0.11	1.0 (V)	0.051	1.0 (V)	0.03	4	mg/L	1b/D	NA	NA
e. Ammonia (as N)	<0.016	<0.0017	(C, V)				1	mg/L	1b/D	NA	NA
f. Flow	VALUE 0.012680 (D, V)	VALUE 0.006052 (E, V)	VALUE 0.003558 (F, V)				303	MGD	NA	VALUE NA	NA
g. Temperature (winter)	VALUE 15.6 (G, V)	VALUE 10.8 (H, V)	VALUE 9.7 (V)				12	°C		VALUE NA	NA
h. Temperature (summer)	VALUE 26.6 (G, V)	VALUE 20.5 (H, V)	VALUE 19.7 (V)				12	°C		VALUE NA	NA
i. pH	MINIMUM 7.5 (I, V)	MAXIMUM 8.8	MINIMUM 8.2 (J, V)	MAXIMUM 8.7			52	STANDARD UNITS			

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"				3. EFFLUENT				4. UNITS				5. INTAKE (optional)	
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES	
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Bromide (24959-67-9)	X		0.173	0.0183	(V)				1	mg/L	1b/D	NA	NA	
b. Chlorine, Total Residual		X	0	0	(V)				52	mg/L	1b/D	NA	NA	
c. Color	X		5	NA	(V)				1	SU	NA	NA	NA	
d. Fecal Coliform		X	42.6/100	NA	(K, V)				1	cfu/mL	NA	NA	NA	
e. Fluoride (16984-48-8)	X		0.722	0.0764	(V)				1	mg/L	1b/D	NA	NA	
f. Nitrate-Nitrite (as N)	X		2.06	0.218	(V)				1	mg/L	1b/D	NA	NA	

EPA Form 3510-2C (8-90)

PAGE V-1

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)		X	<0.035	<0.0037	(C, V)		1	mg/L	1b/D	NA	NA	NA
h. Oil and Grease		X	<1.52	<0.161	(C, V)		1	mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1.0 (V)	0.11	1.0 (V)	0.051	4	mg/L	1b/D	NA	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<1.88	NA	(V)		1	pCi/L	NA	NA	NA	NA
(2) Beta, Total	X		6.91	NA	(V)		1	pCi/L	NA	NA	NA	NA
(3) Radium, Total		X	<0.0357	NA	(V)		1	pCi/L	NA	NA	NA	NA
(4) Radium 226, Total		X	<0.809	NA	(V)		1	pCi/L	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		16	1.69	(V)		1	mg/L	1b/D	NA	NA	NA
l. Sulfide (as S)		X	<0.03	<0.0032	(C, V)		1	mg/L	1b/D	NA	NA	NA
m. Sulfite (as SO ₃) (14285-45-3)		X	NA	NA	(V)			mg/L	1b/D	NA	NA	NA
n. Surfactants		X	<0.016	<0.0017	(C, V)		1	mg/L	1b/D	NA	NA	NA
o. Aluminum, Total (7429-90-5)		X	<0.015	<0.0016	(U, V)		1	mg/L	1b/D	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.0514	0.00544	(L, V)		1	mg/L	1b/D	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.105	0.0111	(V)		1	mg/L	1b/D	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-05	(M, V)		1	mg/L	1b/D	NA	NA	NA
s. Iron, Total (7439-89-6)		X	<0.03	<0.0032	(C, V)		1	mg/L	1b/D	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		16.6	1.76	(V)		1	mg/L	1b/D	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		5.1E-03	5E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
v. Manganese, Total (7439-96-5)		X	<1E-03	<1E-04	(C, V)		1	mg/L	1b/D	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-04	(C, V)		1	mg/L	1b/D	NA	NA	NA
x. Titanium, Total (7440-32-6)	X		3.6E-03	3.8E-04	(V)		1	mg/L	1b/D	NA	NA	NA

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2c for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES		
										(1) CONCENTRATION	(2) MASS		(1) CONCENTRATION	(2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS														
1M. Antimony, Total (7440-36-0)			X	<1E-03	(N, V)		1	mg/L	1b/D	NA	NA	NA		
2M. Arsenic, Total (7440-38-2)		X		5.1E-03	(O, V)		1	mg/L	1b/D	NA	NA	NA		
3M. Beryllium, Total (7440-41-7)		X	X	<2E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
4M. Cadmium, Total (7440-43-9)		X	X	<1.1E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
5M. Chromium, Total (7440-47-3)		X		0.0161	(V)		1	mg/L	1b/D	NA	NA	NA		
6M. Copper, Total (7440-50-8)		X		0.138 (V)	0.138 (V)	0.007	12	mg/L	1b/D	NA	NA	NA		
7M. Lead, Total (7439-92-1)		X	X	<5E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
8M. Mercury, Total (7439-97-6)		X	X	<6.6E-05	(U, V)		1	mg/L	1b/D	NA	NA	NA		
9M. Nickel, Total (7440-02-0)		X	X	<5E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
10M. Selenium, Total (7782-49-2)		X		1.19E-03	(P, V)		1	mg/L	1b/D	NA	NA	NA		
11M. Silver, Total (7440-22-4)		X	X	<2E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
12M. Thallium, Total (7440-28-0)		X	X	<4.5E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA		
13M. Zinc, Total (7440-66-6)		X	X	<3.3E-03	(N, V)		1	mg/L	1b/D	NA	NA	NA		
14M. Cyanide, Total (57-12-5)		X	X	<1.5E-03	(N, V)		1	mg/L	1b/D	NA	NA	NA		
15M. Phenols, Total				NA	(V)			mg/L	1b/D	NA	NA	NA		
DIOXIN														
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X											

DESCRIBE RESULTS. The result from the analytical laboratory is <1.00E-08 mg/L. This is above the limit of the MDL of 1.0E-08 mg/L but is likely due to discrepancies in the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (G, V) for additional information.

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS														
1V. Acrolein (107-02-8)			X	<1.25E-03	(N, V)	<1E-04			1	mg/L	1b/D	NA	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	(N, V)	<1E-04			1	mg/L	1b/D	NA	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA	(R)									
5V. Bromoform (75-25-2)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
8V. Chlorodibromomethane (124-48-1)			X	<3E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	(C, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	(C, V)	<2E-04			1	mg/L	1b/D	NA	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
12V. Dichlorobromomethane (75-27-4)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
13V. Dichlorodifluoromethane (75-71-8)				NA	(R)									
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	(C, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
17V. 1,2-Dichloropropane (78-87-5)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
18V. 1,3-Dichloropropylene (542-75-6)			X	<2.5E-04	(N, S, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	(N, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	(C, V)	<3E-05			1	mg/L	1b/D	NA	NA	NA

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	a. TESTING REQUIRED (if available)	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)										
22V. Methylene Chloride (75-09-2)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	<3E-05	(C, V)	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(R)				
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<5E-05	(N, V)	mg/L	1b/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS										
1A. 2-Chlorophenol (95-57-8)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5E-03	<5E-04	(N, V)	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS										
1B. Acenaphthene (83-32-9)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3E-04	<3E-05	(C, V)	mg/L	1b/D	NA	NA
3B. Anthracene (120-12-7)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3E-04	<3E-05	(C, V)	mg/L	1b/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
10B. Bis (2-Chloroethoxy) Methane (111-91-1)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
11B. Bis (2-Chloroethyl) Ether (111-44-4)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
12B. Bis (2-Chloropropyl) Ether (102-80-1)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
15B. Butyl Benzyl Phthalate (65-68-7)			X	<3E-03	<3E-04	(N, V)	mg/L	1b/D	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	<3E-03	<3E-04	(C, V)	mg/L	1b/D	NA	NA
18B. Chrysene (218-01-9)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA
21B. 1,3-Di-chlorobenzene (541-73-1)			X	<2.5E-04	<3E-05	(N, V)	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)		b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)		b. NO. OF ANALYSES
				CONCENTRATION	(2) MASS	CONCENTRATION	(2) MASS				CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	<3E-05	(N, V)		1	mg/L	1b/D	NA	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<3E-03	<3E-04	(C, V)		1	mg/L	1b/D	NA	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3E-03	<3E-04	(C, V)		1	mg/L	1b/D	NA	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
31B. Fluoranthene (206-44-0)			X	<3E-04	<3E-05	(N, V)		1	mg/L	1b/D	NA	NA	NA
32B. Fluorene (86-73-7)			X	<3E-04	<3E-05	(N, V)		1	mg/L	1b/D	NA	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
36B. Hexachloroethane (67-72-1)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	<3E-04	<3E-05	(N, V)		1	mg/L	1b/D	NA	NA	NA
38B. Isophorone (78-59-1)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
39B. Naphthalene (91-20-3)			X	<3E-04	<3E-05	(C, V)		1	mg/L	1b/D	NA	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<3E-03	<3E-04	(N, V)		1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE			
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS		
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)												
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	<3E-04	(N, T, V)	1	mg/L	1b/D	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	<3E-04	<3E-05	(C, V)	1	mg/L	1b/D	NA	NA	NA
45B. Pyrene (129-00-0)			X	<3E-04	<3E-05	(N, V)	1	mg/L	1b/D	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3E-03	<3E-04	(N, V)	1	mg/L	1b/D	NA	NA	NA
GC/MS FRACTION - PESTICIDES												
1P. Aldrin (309-00-2)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
2P. α-BHC (319-84-6)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
3P. β-BHC (319-85-7)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
4P. γ-BHC (58-89-9)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<7E-06	<7E-07	(C, V)	1	mg/L	1b/D	NA	NA	NA
6P. Chlordane (57-74-9)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
11P. α-Endosulfan (115-29-7)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-9)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
14P. Endrin (72-20-8)			X	<1.1E-05	<1E-06	(N, V)	1	mg/L	1b/D	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<7E-06	<7E-07	(N, V)	1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT			4. UNITS			5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available) (1)	c. LONG TERM AVRG. VALUE (if available) (1)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)		b. NO. OF ANALYSES
										(1) CONCENTRATION	(2) MASS	
GCMS FRACTION - PESTICIDES (continued)												
17P. Heptachlor Epoxide (1024-57-3)			X	< 7E-06	< 7E-07	(N, T)	1	mg/L	1b/D	NA	NA	NA
18P. PCB-1242 (53469-21-9)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
19P. PCB-1254 (11097-69-1)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
20P. PCB-1221 (11104-28-2)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
21P. PCB-1232 (11141-16-5)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
22P. PCB-1248 (12672-29-6)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
23P. PCB-1260 (11096-82-5)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
24P. PCB-1016 (12674-11-2)			X	< 3.6E-05	< 4E-06	(N, T)	1	mg/L	1b/D	NA	NA	NA
25P. Toxaphene (8001-35-2)			X	< 1.6E-04	< 2E-05	(N, T)	1	mg/L	1b/D	NA	NA	NA

EPA Form 3510-2C (8-90)

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FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A022

- A. The flow rates and volumes provided in Section II.C of the form are based upon an estimate of the volume associated with the discharge of emergency cooling water. The flow rate does not include the cooling tower blow down from TA-3-66 that was routed to the sanitary sewer system in November 2011.
- B. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from July 2010 to June 2011 and the measured precipitation at the TA-6 weather station.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- H. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform. Fecal Coliform is not suspected to be present due to the source discharging to the outfall. The positive result is likely due to the presence of wildlife living in the culvert.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- N. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- O. Arsenic was detected at a value less than the MQL of 0.0005 mg/L.
- P. Selenium was detected at a value less than the MQL of 0.005 mg/L.
- Q. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- R. EPA remanded the parameter.
- S. Result is for cis- and trans-1,3-dichloropropylene.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A022

- T. Result is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).
- U. The MDL for this analyte was above the approved EPA Region 6 MQL at the time of testing.
- V. All of the analytical data reported on the Form 2C was obtained while the cooling tower at TA-3-66 was discharging blow down to Outfall 03A022. In December 2011, a Notice of Changed Condition letter was submitted to the EPA indicating that the cooling tower will no longer discharge to the Outfall but will discharge to the SWWS facility.

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)

METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE

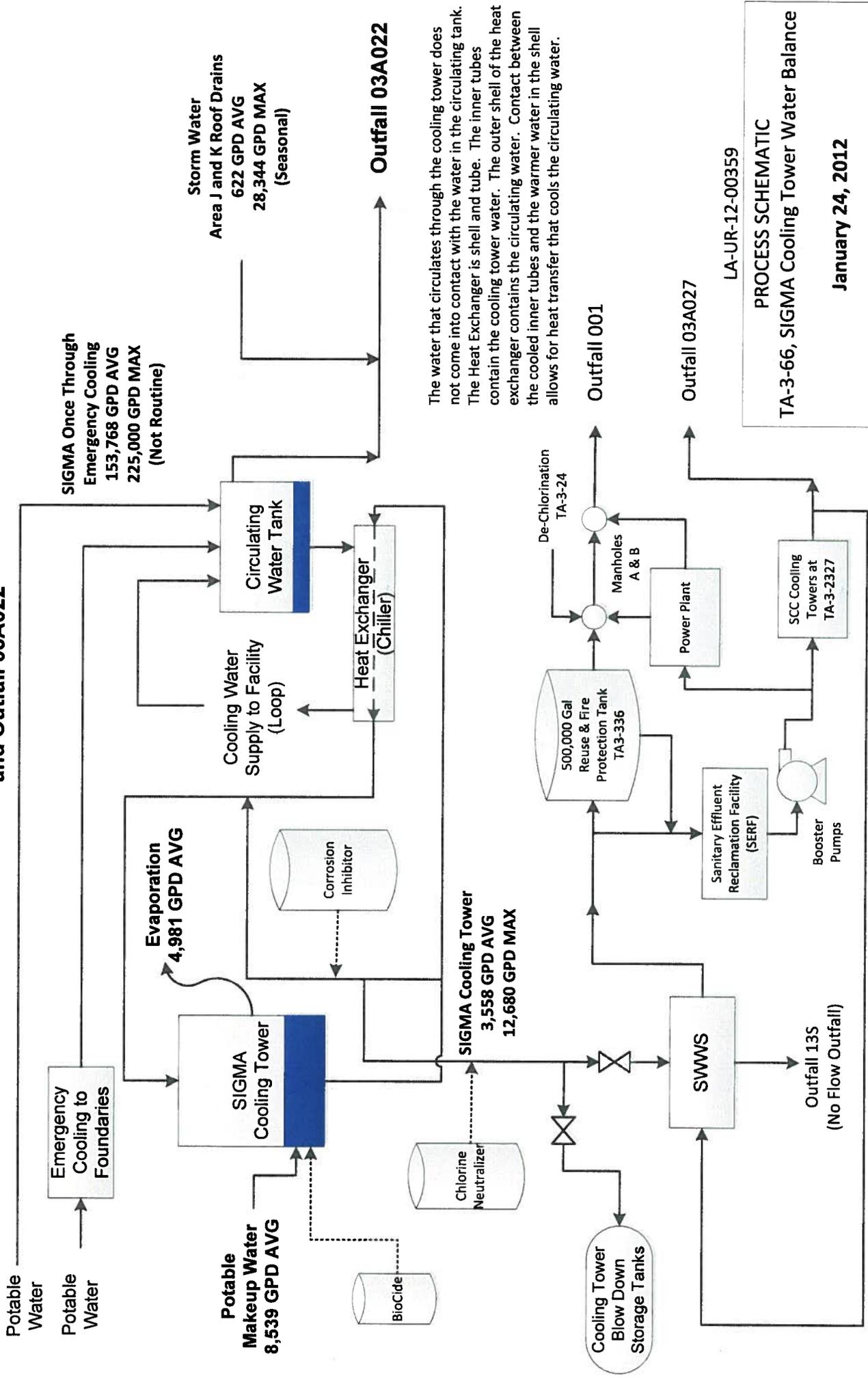
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
Process Schematic and Water Balance for the TA-3-66, SIGMA Cooling Tower
and Outfall 03A022



The water that circulates through the cooling tower does not come into contact with the water in the circulating tank. The Heat Exchanger is shell and tube. The inner tubes contain the cooling tower water. The outer shell of the heat exchanger contains the circulating water. Contact between the cooled inner tubes and the warmer water in the shell allows for heat transfer that cools the circulating water.

LA-UR-12-00359

PROCESS SCHEMATIC
TA-3-66, SIGMA Cooling Tower Water Balance
January 24, 2012
2012 NPDES Permit Re-Application
OUTFALL 03A022

NOTE 1: The water balance calculation is an estimate based on 2.4 cycles.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A027	TA-3-2327	03A, Treated Cooling Water Discharges	Perennial Reach of Sandia Canyon

SOURCE OF DISCHARGE

Outfall 03A027 is located at TA-3 near the Power Plant and approximately 30 feet downstream from Outfall 001. Outfall 03A027 discharges treated cooling water from the Strategic Computing Complex (SCC) facility located at TA-3-2327 to a tributary of Sandia Canyon. The cooling tower blow-down consists of treated circulation water from the potable water system and/or treated SWWS effluent from the Sanitary Effluent Reclamation Facility (SERF) that is used as makeup water in the cooling tower. Table 1 identifies the location of each source and provides a description.

**Table 1
 Sources for Discharges to Outfall 027**

TA	Bldg	Description
3	2327	Strategic Computing Complex (SCC) Cooling Tower Blow-Down (uses Potable Water and/or Treated SWWS Effluent from SERF as makeup water)

Figure 1 provides a process flow diagram.

WATER TREATMENT PROCESS

The water treatment system at the SCC is controlled by a process logic controller (PLC) that monitors the tower water using a chlorine detection system and a conductivity meter. It treats the waters using chemicals that may include a corrosion inhibitor, biocide, de-chlorination, and deminimus amounts of tracing agents. The water treatment system is capable of using potable water, treated SWWS effluent from the SERF, and/or a combination of both as makeup water in the cooling tower. The water treatment codes associated with the SCC cooling towers are identified in Table 2.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A027**

Treatment Code	Treatment Process	Description
2L	Reduction (corrosion inhibitors)	Chemicals are added to the cooling towers to control corrosion.
2F	Disinfection (chlorine)	Chemicals are added to control Microorganisms
2H	Disinfection (other)	Chemicals are added to control Microorganisms
2E	Dechlorination	Chemicals are added to the Outfall discharge stream to remove halogens (i.e., chlorine and bromine).

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control corrosion, limit biological growth and de-chlorinate the water prior to discharge. Table 3 provides a list of the chemicals used in the SCC Water Treatment System.

**Table 3
 Treatment Chemicals Used a the SCC Cooling Towers**

Chemical Name	Reason for Use/Frequency	Hazardous Substances Form 2C, Table 2C-4
WEST C-358P	Corrosion Inhibitor for Well Water	Potassium Hydroxide
WEST C-552	Corrosion Inhibitor/Dispersant for SERF Water	Potassium Hydroxide
WEST C-825	pH Control	Sodium Bisulfite
Purobrom Tablets	Biocide	Chlorine
WEST R-630	De-Chlorination	Sodium Bisulfite
HACH 2263411	Total Chlorine Indicator	Sulfuric Acid
HACH 1406428	DPD Total Chlorine Reagent	Sodium Phosphate (dibasic)
HACH 1407028	DPD Free Chorine Reagent	Sodium Phosphate (dibasic), EDTA
HACH 2756549	pH Storage Solution	NA
HACH 2076053	Molybdovanadate Reagent	Sulfuric Acid
HACH 203832	Sulfuric Acid Solution 19.2 N	Sulfuric Acid
HACH 2297255	DPD Compound for Free and Total Chlorine Analyzers	NA
HACH 2314011	Free Chlorine Indicator Solution for CL-17 Analyzer	NA
HACH 2314111	Free Chlorine Buffer for CL-117 Analyzer	NA
HACH 2263511	Total Chlorine Buffer Solution	NA
*	Treated SWWS Effluent	*See Fact Sheet for Outfall 13S
*	Treated SERF Effluent	*See Fact Sheet for Outfall 001

The use of treated SWWS effluent from the SERF adds the potential for additional residual chemicals to be present in the discharge to the outfall due to contaminants in the SWWS influent, treatment operations at SWWS, and treatment operations at SERF.

POTENTIAL POLLUTANTS

The treatment chemicals associated the SCC Cooling Tower Water Treatment System and the reuse of treated SWWS effluent from SERF, constitute the pollutant load of the discharge to Outfall 03A027. Table 4 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 pollutants identified.

**Table 4
 Potential Pollutants Discharge to Outfall 03A027**

Source Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
SCC Cooling Tower Blow Down - Make Up Water Consisting of Potable Water Only	Potassium hydroxide, 1-bromo-3-chloro-5,5-dimethylhydantoin (chlorine), sodium bisulfite, sulfuric acid, sodium phosphate (dibasic), EDTA
SCC Cooling Tower Blow Down - Make Up Water Consisting of all or some percentage of Recycled SWWS Effluent from the SERF ^a	Ferric chloride, Hydrochloric Acid, Sodium Hypochlorite, Sodium Hydroxide, Acetic acid, Ammonia, Ammonium chloride, Benzene, Chlordane, Chlorine, Copper chloride, Cupric sulfate, Dichlorobenzene[1,3], Dieldrin, Endosulfan, Endrin, Ethylbenzene, Ferric sulfate, Ferrous sulfate, Heptachlor, Nitric acid, Phosphoric acid, Potassium hydroxide, Sodium hydroxide, Sodium Hypochlorite, Sodium

	nitrite, Sulfuric acid, Toluene, Xylene, Zinc sulfate, 1-bromo-3-chloro-5,5-dimethylhydantoin (chlorine), sodium bisulfite, sodium phosphate (dibasic), EDTA
--	--

a. SERF operations are anticipated to startup during in the summer of 2012.

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to 03A027 are provided in Table 5.

Table 5
Source Flow Rates/Frequencies to Outfall 03A027

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
TA-3-2327: SCC Cooling Tower	53,432	2L, 2F, 2H, 2E 1F, 1G, 1S, 1U, 2C, 2K, 5R 1M, 1T, 1U, 2F, 2H, 3A, 4C, 5H, 5Q, 1O, 3E, 5G

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A027 for the Permit Re-Application on November 16, 2011.

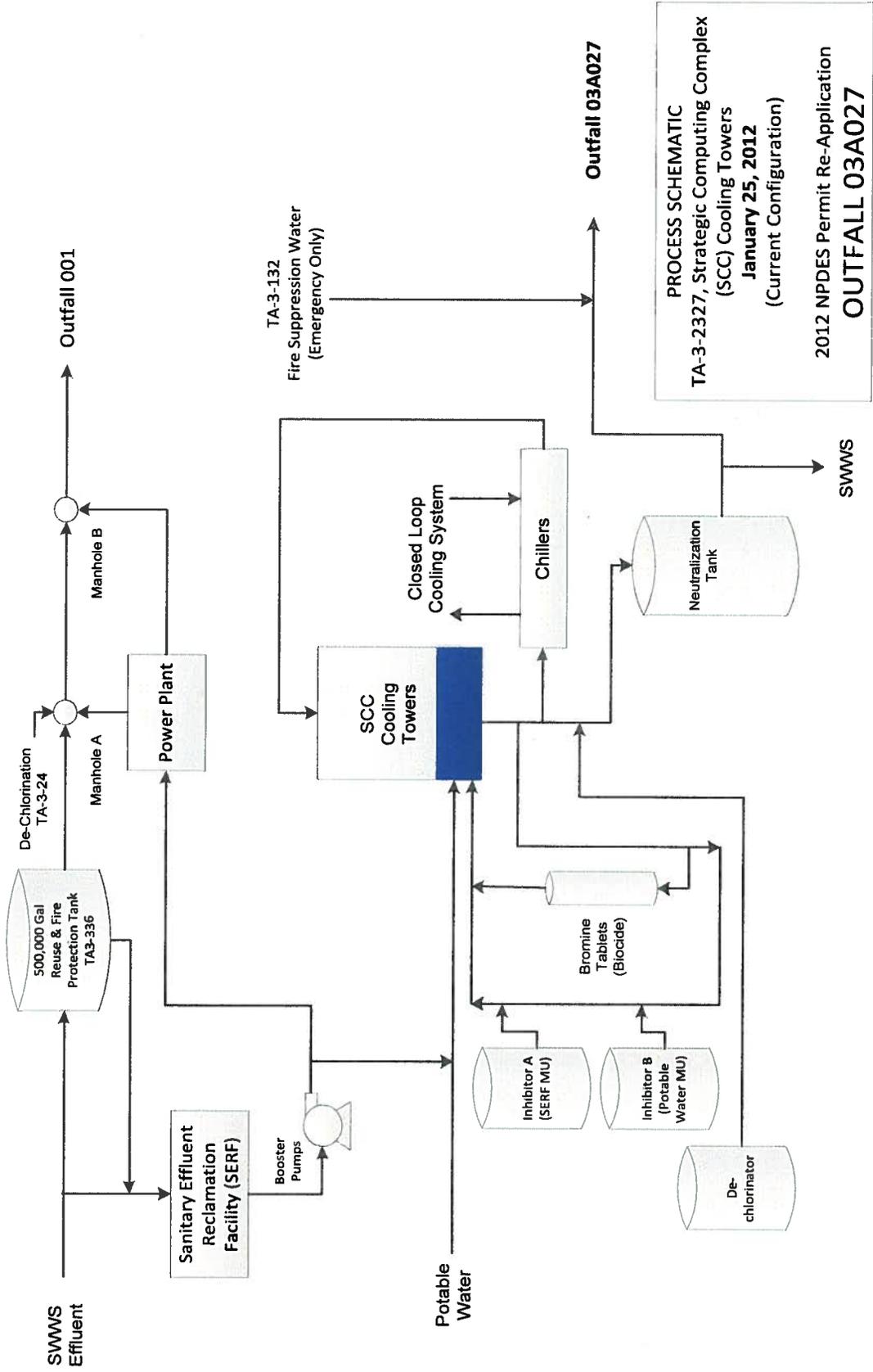
ANALYTICAL RESULTS PROVIDED

- Form 2C analytical data from a grab sample collected on November 16, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°52'26"N
- Longitude – 106°19'09"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 134 mg/L and 152 mg/L.
- Photographs and MSDSs for the SERF are provided in Appendix L.
- Photographs, drawings, and detailed information for the SWWS Plant are provided with the documentation for Outfall 13S.

Figure 1
Process Schematic for the TA-3-2327, Strategic Computing Complex (SCC) Cooling Towers
(Current Configuration)



Photographs – SCC Cooling Towers and Water Treatment System



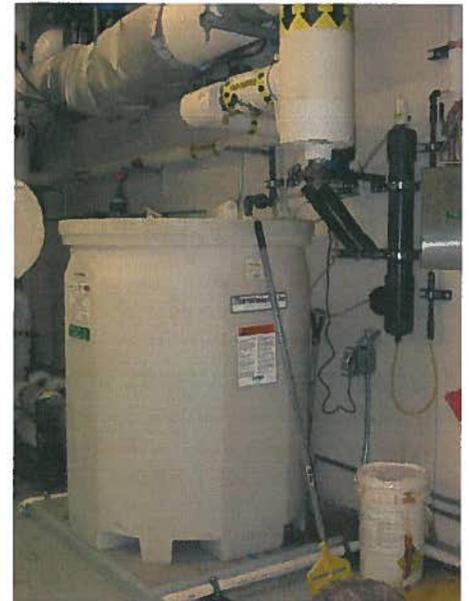
**Photograph #1 – SCC Cooling Towers & Water Treatment System
SCC Discharge Pipe at Outfall 03A027**



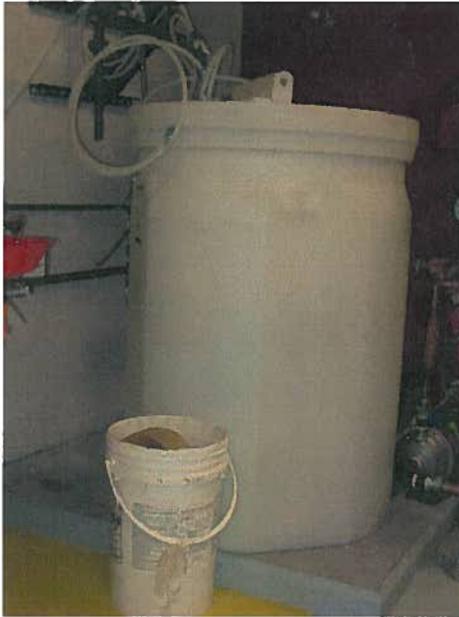
**Photograph #2 & 3 – SCC Cooling Towers & Water Treatment System
Sandia Canyon - Receiving Stream Channel**



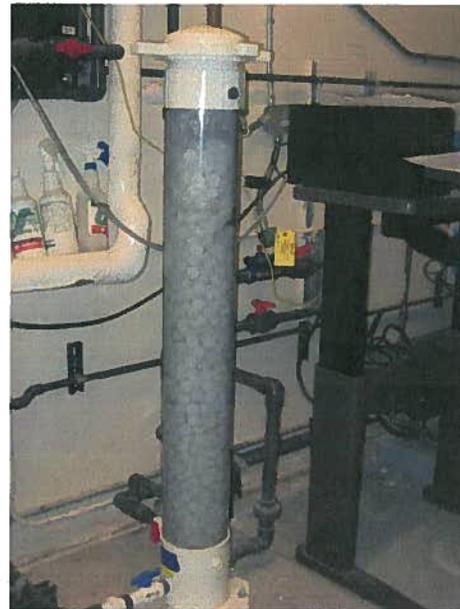
Photograph #4 – SCC Cooling Towers & Water Treatment System
SCC Cooling Towers



Photographs #5 & 6 – SCC Cooling Towers & Water Treatment System
Raw Chemical Feed & Corrosion Inhibitor Feed Tank No. 1



Photographs #7 & 8 – SCC Cooling Towers & Water Treatment System
Corrosion Inhibitor Feed Tank No. 2 & De-Chlorination Chemical Feed Tank



Photographs #9 & 10– SCC Cooling Towers & Water Treatment System
Neutralization Tank & Brominator



Photograph #11 – SCC Cooling Towers & Water Treatment System
Outfall Discharge from Inside Facility



Photograph #12 – SCC Cooling Towers & Water Treatment System
SCC Chillers

Form 2C Section IV.A and B - Improvements (Near Term – [6 to 18 months])

The configuration of Outfall 03A027 is expected to change in the next 6 to 18 months due startup of the SERF facility and routine use of recycled SWWS effluent as makeup water in the SCC Cooling Towers. New piping will be installed to support a reuse/recycle loop between the SCC, SERF, SWWS, and Power Plant. This new configuration will allow for operational flexibility, will reduce the overall quantity of effluent discharged to Outfall 001 (due to the reuse of SWWS effluent), and will eventually eliminate the routine use of Outfall 03A027. Figure 5 provides a process schematic that shows the future configuration. Upon completion of the upgrade the operations at the SCC Cooling Towers will include the operational flexibility to do any or all of the following:

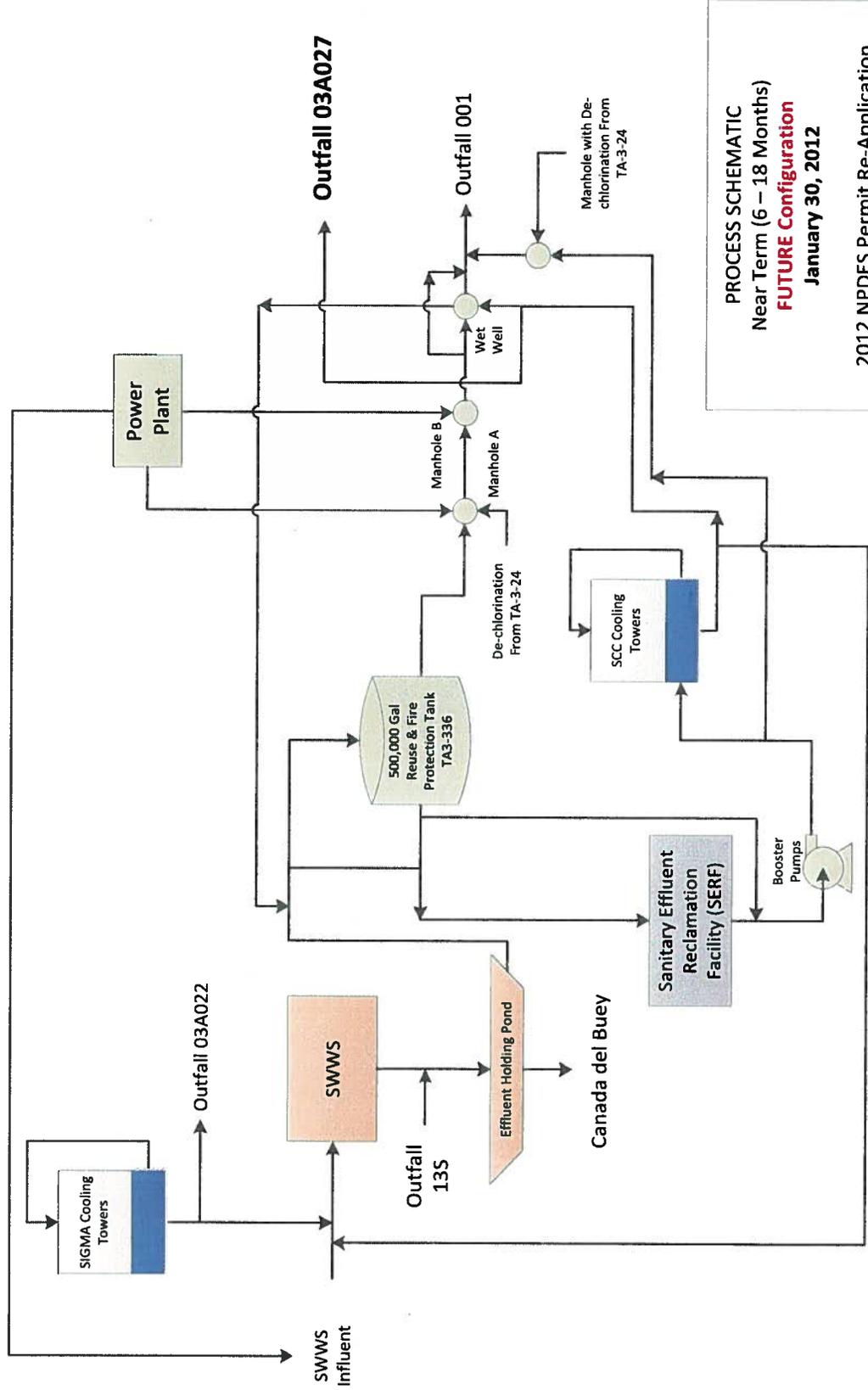
- Discharge cooling tower blow-down directly to the SWWS and/or SERF where it will be retreated and reused (preferred option) as makeup water.
- Discharge cooling tower blow-down to Outfall 03A027.
- Discharge cooling tower blow-down to Outfall 001.

An additional grab sample for all of the Form 2C constituents will be collected at Outfall 03A027 and the data submitted to the EPA when/if the SERF effluent is used at the SCC cooling tower.

Form 2C Section IV.A and B - Improvements (Long Term – [2 to 5 years])

The existing operations at the SERF cannot currently provide enough makeup water to support the LANL's cooling towers (e.g. SCC Cooling Towers) when they are operating at full capacity. In the next five years LANS intends to upgrade the SERF facility under a \$16.1 million congressionally funded line-item project. This project will allow LANL to meet a Department of Energy's requirement for recycling water and reducing the consumption of potable water. The expansion of SERF will provide up to 500 acre feet per year of treated water for reuse (~163,000 gallons of water annually). In addition, completion of the SERF expansion project will allow LANL to reduce the number of permitted outfalls; by routing those permitted discharges to SWWS and/or SERF, therefore reducing the costs of operating and maintaining cooling towers in addition to extending their lifespan due to the improved water quality. The expansion will increase the capacity of the SERF from 98.8 gpm to 300 gpm by adding additional treatment units and storage tanks. Appendix L provides design drawings associated with the expansion.

Figure 2
 Near Term (6-18 Months)
 FUTURE Configuration of Outfall 03A027



PROCESS SCHEMATIC
 Near Term (6 – 18 Months)
 FUTURE Configuration
 January 30, 2012
 2012 NPDES Permit Re-Application
 OUTFALL 03A027

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR										
				Flow Rate			Analytical Lab Result			Result	Units	MOL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples	
				Average	Maximum	Units	Symbol	Result	Units											MOL
03A027	3-2327	8/07	Flow (Totalized Est.)	0.03532	0.04778	MGD									0.03532	0.04778	MGD			1
		9/07	Flow (Totalized Est.)	0.03064	0.04400	MGD									0.03064	0.04400	MGD			1
		10/07	Flow (Totalized Est.)	0.02275	0.02872	MGD									0.02275	0.02872	MGD			1
		11/07	Flow (Totalized Est.)	0.02275	0.03403	MGD									0.02275	0.03403	MGD			1
		12/07	Flow (Totalized Est.)	0.01864	0.02318	MGD									0.01864	0.02318	MGD			1
		1/08	Flow (Totalized Est.)	0.01847	0.02105	MGD									0.01847	0.02105	MGD			1
		2/08	Flow (Totalized Est.)	0.01874	0.02955	MGD									0.01874	0.02955	MGD			1
		3/08	Flow (Totalized Est.)	0.02537	0.03472	MGD									0.02537	0.03472	MGD			1
		4/08	Flow (Totalized Est.)	0.02446	0.03732	MGD									0.02446	0.03732	MGD			1
		5/08	Flow (Totalized Est.)	0.02840	0.03651	MGD									0.02840	0.03651	MGD			1
		6/08	Flow (Totalized Est.)	0.03134	0.03638	MGD									0.03134	0.03638	MGD			1
		7/08	Flow (Totalized Est.)	0.03325	0.04077	MGD									0.03325	0.04077	MGD			1
		8/08	Flow (Totalized Est.)	0.03866	0.04784	MGD									0.03866	0.04784	MGD			1
		9/08	Flow (Totalized Est.)	0.04236	0.04600	MGD									0.04236	0.04600	MGD			1
		10/08	Flow (Totalized Est.)	0.03584	0.09294	MGD									0.03584	0.09294	MGD			1
		11/08	Flow (Totalized Est.)	0.03533	0.04048	MGD									0.03533	0.04048	MGD			1
		12/08	Flow (Totalized Est.)	0.03989	0.04735	MGD									0.03989	0.04735	MGD			1
		1/09	Flow (Totalized Est.)	0.03890	0.04413	MGD									0.03890	0.04413	MGD			1
		2/09	Flow (Totalized Est.)	0.03827	0.04623	MGD									0.03827	0.04623	MGD			1
		3/09	Flow (Totalized Est.)	0.03352	0.03828	MGD									0.03352	0.03828	MGD			1
		4/09	Flow (Totalized Est.)	0.03021	0.03754	MGD									0.03021	0.03754	MGD			1
		5/09	Flow (Totalized Est.)	0.03584	0.09294	MGD									0.03584	0.09294	MGD			1
		6/09	Flow (Totalized Est.)	0.05801	0.06715	MGD									0.05801	0.06715	MGD			1
		7/09	Flow (Totalized Est.)	0.06283	0.07820	MGD									0.06283	0.07820	MGD			1
		8/09	Flow (Totalized Est.)	0.06043	0.07348	MGD									0.06043	0.07348	MGD			1
		9/09	Flow (Totalized Est.)	0.05575	0.06540	MGD									0.05575	0.06540	MGD			1
		10/09	Flow (Totalized Est.)	0.04445	0.08099	MGD									0.04445	0.08099	MGD			1
		11/09	Flow (Totalized Est.)	0.03984	0.05681	MGD									0.03984	0.05681	MGD			1
		12/09	Flow (Totalized Est.)	0.03390	0.04563	MGD									0.03390	0.04563	MGD			1
		1/10	Flow (Totalized Est.)	0.03522	0.04394	MGD									0.03522	0.04394	MGD			1
		2/10	Flow (Totalized Est.)	0.03129	0.05282	MGD									0.03129	0.05282	MGD			1
		3/10	Flow (Totalized Est.)	0.03814	0.05161	MGD									0.03814	0.05161	MGD			1
		4/10	Flow (Totalized Est.)	0.03990	0.04725	MGD									0.03990	0.04725	MGD			1
		5/10	Flow (Totalized Est.)	0.04199	0.05676	MGD									0.04199	0.05676	MGD			1
		6/10	Flow (Totalized Est.)	0.04804	0.05794	MGD									0.04804	0.05794	MGD			1
		7/10	Flow (Totalized Est.)	0.04584	0.05769	MGD									0.04584	0.05769	MGD			1
		8/10	Flow (Totalized Est.)	0.04394	0.05544	MGD									0.04394	0.05544	MGD			1
		9/10	Flow (Totalized Est.)	0.03678	0.04420	MGD									0.03678	0.04420	MGD			1
		10/10	Flow (Totalized Est.)	0.10493	0.11710	MGD									0.10493	0.11710	MGD			1
		11/10	Flow (Totalized Est.)	0.04355	0.05190	MGD									0.04355	0.05190	MGD			1
		12/10	Flow (Totalized Est.)	0.04009	0.04920	MGD									0.04009	0.04920	MGD			1
		1/11	Flow (Totalized Est.)	0.04649	0.05530	MGD									0.04649	0.05530	MGD			1
		2/11	Flow (Totalized Est.)	0.04490	0.05430	MGD									0.04490	0.05430	MGD			1
		3/11	Flow (Totalized Est.)	0.05115	0.06890	MGD									0.05115	0.06890	MGD			1
		4/11	Flow (Totalized Est.)	0.06123	0.06780	MGD									0.06123	0.06780	MGD			1
		5/11	Flow (Totalized Est.)	0.06145	0.07340	MGD									0.06145	0.07340	MGD			1

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR										
				Flow Rate			Analytical Lab Result			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples				
				Average	Maximum	Units	Symbol	Result	Units								MOL	Result	Units	MOL
		6/11	Flow (Totalized Est.)	0.05946	0.07220	MGD						0.05946	0.07220	MGD		1				
		7/11	Flow (Totalized Est.)	0.04599	0.06290	MGD						0.04599	0.06290	MGD		1				
		8/11	Flow (Totalized Est.)	0.05973	0.07270	MGD						0.05973	0.07270	MGD		1				
		9/11	Flow (Totalized Est.)	0	0	MGD						0	0	MGD						
		10/11	Flow (Totalized Est.)	0	0	MGD						0	0	MGD						
		11/11	Flow (Totalized Est.)	0.06000	0.06930	MGD						0.06000	0.06930	MGD		1				
		12/11	Flow (Totalized Est.)	0.07500	0.05499	MGD						0.07500	0.05499	MGD		1				
				Average			Maximum			NA	NA	0.10493	0.11710	MGD		Total				
03A027	3-2327	8/07	pH								8.1				8.4	SU	6.0 - 9.0	SU	4	5
		9/07	pH								8.0				8.4	SU	6.0 - 9.0	SU	4	4
		10/07	pH								7.8				8.4	SU	6.0 - 9.0	SU	4	4
		11/07	pH								8.3				8.5	SU	6.0 - 9.0	SU	5	5
		12/07	pH								8.4				8.5	SU	6.0 - 9.0	SU	4	4
		1/08	pH								8.1				8.5	SU	6.6 - 8.8	SU	5	5
		2/08	pH								8.0				8.5	SU	6.6 - 8.8	SU	4	4
		3/08	pH								7.8				8.4	SU	6.6 - 8.8	SU	4	4
		4/08	pH								8.1				8.3	SU	6.6 - 8.8	SU	5	5
		5/08	pH								8.1				8.2	SU	6.6 - 8.8	SU	4	4
		6/08	pH								8.0				8.2	SU	6.6 - 8.8	SU	4	4
		7/08	pH								8.0				8.2	SU	6.6 - 8.8	SU	5	5
		8/08	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		9/08	pH								8.0				8.3	SU	6.6 - 8.8	SU	4	4
		10/08	pH								8.2				8.5	SU	6.6 - 8.8	SU	4	4
		11/08	pH								8.0				8.4	SU	6.6 - 8.8	SU	4	4
		12/08	pH								8.1				8.5	SU	6.6 - 8.8	SU	4	4
		1/09	pH								8.3				8.7	SU	6.6 - 8.8	SU	4	4
		2/09	pH								8.2				8.5	SU	6.6 - 8.8	SU	4	4
		3/09	pH								8.5				8.6	SU	6.6 - 8.8	SU	4	4
		4/09	pH								8.3				8.6	SU	6.6 - 8.8	SU	5	5
		5/09	pH								8.5				8.7	SU	6.6 - 8.8	SU	4	4
		6/09	pH								8.1				8.3	SU	6.6 - 8.8	SU	5	5
		7/09	pH								8.1				8.5	SU	6.6 - 8.8	SU	4	4
		8/09	pH								8.4				8.4	SU	6.6 - 8.8	SU	4	4
		9/09	pH								8.0				8.4	SU	6.6 - 8.8	SU	5	5
		10/09	pH								7.8				8.5	SU	6.6 - 8.8	SU	4	4
		11/09	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		12/09	pH								8.3				8.7	SU	6.6 - 8.8	SU	5	5
		1/10	pH								8.4				8.6	SU	6.6 - 8.8	SU	4	4
		2/10	pH								8.4				8.7	SU	6.6 - 8.8	SU	4	4
		3/10	pH								8.0				8.3	SU	6.6 - 8.8	SU	5	5
		4/10	pH								8.1				8.3	SU	6.6 - 8.8	SU	4	4
		5/10	pH								8.0				8.2	SU	6.6 - 8.8	SU	4	4
		6/10	pH								8.1				8.4	SU	6.6 - 8.8	SU	5	5
		7/10	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		8/10	pH								8.2				8.6	SU	6.6 - 8.8	SU	4	4

DMR Outfall Discharge Summary - 03A027
 Los Alamos National Laboratory
 NPDES Permit No. NM 0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR												
				Flow Rate			Analytical Lab Result			DMR Units			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples			
				Average	Maximum	Units	Symbol	Result	Units	MOL	Result	Units								MOL		
		1/08-12/08	Total Copper								1.8 ug/L	10				0	mg/L	Report	mg/L	1		
		1/09-12/09	Total Copper								2.24 ug/L	10				0	mg/L	Report	mg/L	1		
		1/10-12/10	Total Copper								2.88 ug/L	10				0	mg/L	Report	mg/L	1		
		1/11-12/11	Total Copper								2.21 ug/L	10				0	mg/L	Report	mg/L	1		
				Average			Average			NA	NA	0.00	mg/L							Total	4	
				Maximum			Maximum			NA	NA	0.00	mg/L									

DMR Outfall Data Summary - 03A027

Biological Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
03A027	5/14/2008	Grab	Ceriodaphnia pulex Pimephales promelas	48 hr acute 96 hr acute	80 80	P P

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A027	TA-3-2327, SCC (A) Cooling Tower Blow Down - Potable (Makeup Water) - SERF (Makeup Water) [INTERMITTENT]	7	12	0.053432 mgal/d	0.117100 mgal/d	53,432 Gallons	117,100 gallons	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding -- Complete one set of tables for each outfall -- Annotate the outfall number in the space provided.
 NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE	
Table 2C-3 Believed to be Absent.	SEE FORM 2C ANALYTICAL DATA]	EDTA	SCC Reagent (HACH1407028)	
Table 2C-4 (B)		Sulfuric Acid	De-Mineralizer; SCC Indicators (HACH 2263411, HACH2076053, HACH203832)	
Sodium Bisulfite		Boiler (NALCO 1720); Power Plant De-chlorination (NALCO 7408); SSC De-chlorination (WEST R-630)	Ferric Chloride	SERF Precipitation
Sodium Tripolyphosphate		Boiler (NALCO (R) 22341)	Hydrochloric Acid	SERF Precipitation & pH Adjustment
Sodium Hydroxide		Boiler (NALCO 8735); De-mineralizer; CT Corrosion Inhibitor (STABREX-ST20); SERF pH Adjustment & Precipitation; SWWS Disinfectant	Sodium Hypochlorite	CT Corrosion Inhibitor (STABREX-ST20); SERF Disinfection; SWWS Disinfection (Clorox, Hilex)
Potassium Hydroxide		Boiler (NALCO 8735); SCC Corrosion Inhibitors (WEST C-358P, C-522)		
Phosphoric Acid, Zinc Chloride		CT Corrosion Inhiitor (TG-7356)		[SEE FORM 2C ANALYTICAL DATA]
Sodium phosphate (dibasic)		SCC Reagents HACH1407028, HACH1406428		
chlorine		SCC Biocide (PuroBrom)		***See Additional Page 3 of 4 Attached*****

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?
 YES (list all such pollutants below) NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below) NO (go to Section VIII)

Whole Effluent Toxicity 48 hr Acute Toxicity - PASSED
 Pimephales promelas, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years
 Cerioddaphnia dubia, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

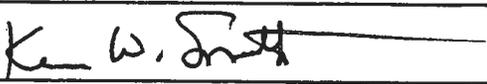
Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below) NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Espanola, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

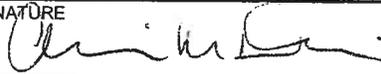
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A027

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)			4. INTAKE (optional)	
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			
a. Biochemical Oxygen Demand (BOD)	<1.0	<0.977	(C)				1	NA	NA
b. Chemical Oxygen Demand (COD)	55.1	53.8					1	NA	NA
c. Total Organic Carbon (TOC)	14.2	13.9					1	NA	NA
d. Total Suspended Solids (TSS)	13.0	12.7	13.0	11.4	6.25	2.79	4	NA	NA
e. Ammonia (as N)	0.0631	0.0617					1	NA	NA
f. Flow	VALUE 0.1171 (D)	VALUE 0.104926 (E)			VALUE 0.053432 (F)		365	VALUE NA	NA
g. Temperature (winter)	VALUE 21.1 (G)	VALUE 19.62 (H)			VALUE 18.1		13	VALUE NA	NA
h. Temperature (summer)	VALUE 25.6 (G)	VALUE 24.6 (H)			VALUE 23.9		12	VALUE NA	NA
i. pH	MINIMUM 7.9 (I)	MAXIMUM 8.8 (J)	MINIMUM 8.2 (J)	MAXIMUM 8.7 (J)			53	STANDARD UNITS	

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					
a. Bromide (24959-67-9)	X		3.54	3.46					1	mg/L	1b/D	NA	NA
b. Chlorine, Total Residual		X	0	0	0	0	0	0	53	mg/L	1b/D	NA	NA
c. Color	X		5	NA					1	SU	NA	NA	NA
d. Fecal Coliform		X	<1.0/100	NA	(K)				1	cfu/mL	NA	NA	NA
e. Fluoride (16984-48-6)	X		0.591	0.578					1	mg/L	1b/D	NA	NA
f. Nitrate-Nitrite (as N)	X		1.21	1.18					1	mg/L	1b/D	NA	NA

EPA Form 3510-2C (8-90)

PAGE V-1

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		b. NO. OF ANALYSES	
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION (2) MASS		b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION (2) MASS		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION		(2) MASS
g. Nitrogen, Total Organic (as N)	X		1.23	1.2			1	mg/L	1b/D	NA	NA	NA
h. Oil and Grease		X	<1.47	<1.44	(C)		1	mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1	0.9772	1	0.8756	4	mg/L	1b/D	NA	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<0.548	NA			1	pCi/L	NA	NA	NA	NA
(2) Beta, Total	X		20.8	NA			1	pCi/L	NA	NA	NA	NA
(3) Radium, Total		X	<0.616	NA			1	pCi/L	NA	NA	NA	NA
(4) Radium 226, Total		X	<0.283	NA			1	pCi/L	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		49.1	48.0			1	mg/L	1b/D	NA	NA	NA
l. Sulfide (as S)		X	<0.03	<0.0293	(C)		1	mg/L	1b/D	NA	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		1.7	1.66								
n. Surfactants		X	<0.016	<0.0156	(C)		1	mg/L	1b/D	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.0511	0.0499			1	mg/L	1b/D	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.0973	0.0951	(L)		1	mg/L	1b/D	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.0846	0.0827	(M)		1	mg/L	1b/D	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-04	(N)		1	mg/L	1b/D	NA	NA	NA
s. Iron, Total (7439-89-6)	X		0.0598	0.0584			1	mg/L	1b/D	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		13.0	12.7			1	mg/L	1b/D	NA	NA	NA
u. Molybdenum, Total (7439-98-7)		X	0.00452	0.00442	(O)		1	mg/L	1b/D	NA	NA	NA
v. Manganese, Total (7439-96-5)	X		0.00191	0.00187			1	mg/L	1b/D	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-03	(C)		1	mg/L	1b/D	NA	NA	NA
x. Titanium, Total (7440-32-6)	X		0.00832	0.00813			1	mg/L	1b/D	NA	NA	NA

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	03A027

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
													(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)			X	<1E-03		(N)				1	mg/L	1b/D	NA	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.0054						1	mg/L	1b/D	NA	NA	NA
3M. Beryllium, Total (7440-41-7)			X	<2E-04		(N)				1	mg/L	1b/D	NA	NA	NA
4M. Cadmium, Total (7440-43-9)			X	<1.1E-04		(N)				1	mg/L	1b/D	NA	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.012						1	mg/L	1b/D	NA	NA	NA
6M. Copper, Total (7440-50-8)		X		0.005		0.0049	0.005	0.0028	0.002	5	mg/L	1b/D	NA	NA	NA
7M. Lead, Total (7439-92-1)			X	<5E-04		<5E-04				1	mg/L	1b/D	NA	NA	NA
8M. Mercury, Total (7439-97-6)		X		4.5E-06		4E-06				1	mg/L	1b/D	NA	NA	NA
9M. Nickel, Total (7440-02-0)		X		0.00112		0.0011				1	mg/L	1b/D	NA	NA	NA
10M. Selenium, Total (7782-49-2)		X		0.0118		0.0115				1	mg/L	1b/D	NA	NA	NA
11M. Silver, Total (7440-22-4)			X	<2E-04		<2E-04	(N)			1	mg/L	1b/D	NA	NA	NA
12M. Thallium, Total (7440-28-0)			X	<4.5E-04		<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
13M. Zinc, Total (7440-66-6)			X	0.00373		0.0037	(P)			1	mg/L	1b/D	NA	NA	NA
14M. Cyanide, Total (57-12-5)			X	<1.5E-03		<2E-03	(N)			1	mg/L	1b/D	NA	NA	NA
15M. Phenols, Total			X	<1.6E-03		<2E-03				1	mg/L	1b/D	NA	NA	NA
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X												

DESCRIBE RESULTS The result provided is <8.31E-10 mg/L, which is less than the MQL of 1E-08 mg/L.

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES	
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					
GC/MS FRACTION - VOLATILE COMPOUNDS												
1V. Acrolein (107-02-8)			X	<1.25E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA		(R)						
5V. Bromoform (75-25-2)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
8V. Chlorodibromomethane (124-48-1)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	<2E-03	(C)		1	mg/L	1b/D	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
12V. Dichlorobromomethane (75-27-4)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
13V. Dichlorodifluoromethane (75-71-8)			X	NA		(R)						
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
17V. 1,2-Dichloropropane (75-87-5)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
18V. 1,3-Dichloropropene (542-75-6)			X	<2.5E-04	<2E-04	(N, S)		1	mg/L	1b/D	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)										
22V. Methylene Chloride (75-09-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	<3E-04	(C)	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(R)				
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<5E-04	(N)	mg/L	1b/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS										
1A. 2-Chlorophenol (95-57-8)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-Cresol (534-52-1)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5E-03	<5E-03	(N)	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
8A. p-Chloro-M-Cresol (59-50-7)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA

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CONTINUE ON REVERSE

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS										
1B. Acenaphthene (83-32-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3E-04	(C)	1	mg/L	1b/D	NA	NA
3B. Anthracene (120-12-7)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
7B. 3,4-Benzofluoranthene (205-99-2)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3E-04	(C)	1	mg/L	1b/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
10B. Bis (2-Chloroethoxy) Methane (111-91-1)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
11B. Bis (2-Chloroethyl) Ether (111-44-4)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
18B. Chrysene (218-01-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	(N)	1	mg/L	1b/D	NA	NA
21B. 1,3-Dichlorobenzene (641-73-1)			X	<2.5E-04	(N)	1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)										
22B. 1,4-Dichlorobenzene (106-46-7)			X	< 2.4E-04	< 2E-04	(N)	mg/L	1b/D	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	< 3E-03	< 3E-03	(C)	mg/L	1b/D	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	< 3E-03	< 3E-03	(C)	mg/L	1b/D	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
31B. Fluoranthene (206-44-0)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
32B. Fluorene (96-73-7)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
36B Hexachloroethane (67-72-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
38B. Isophorone (78-59-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
39B. Naphthalene (91-20-3)			X	< 3E-04	< 3E-04	(C)	mg/L	1b/D	NA	NA
40B. Nitrobenzene (98-95-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GCMS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)										
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	(N, T)		mg/L	1b/D	NA	NA
44B. Phenanthrene (85-01-8)			X	<3E-04	(C)		mg/L	1b/D	NA	NA
45B. Pyrene (129-00-0)			X	<3E-04	(N)		mg/L	1b/D	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3E-03	(N)		mg/L	1b/D	NA	NA
GCMS FRACTION - PESTICIDES										
1P. Aldrin (309-00-2)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
2P. α-BHC (319-84-6)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
3P. β-BHC (319-85-7)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
4P. γ-BHC (58-89-9)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
5P. δ-BHC (319-86-6)			X	<6.65E-06	(C)		mg/L	1b/D	NA	NA
6P. Chlordane (57-74-9)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
10P. Dieldrin (60-57-1)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
11P. α-Endosulfan (115-29-7)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
14P. Endrin (72-20-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
15P. Endrin Alderhyde (7421-93-4)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
16P. Heptachlor (76-44-8)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA

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EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - PESTICIDES (continued)													
17P. Heptachlor Epoxide (1024-57-3)			X	<6.65E-06	<7E-06	(N)				mg/L	1b/D	NA	NA
18P. PCB-1242 (53469-21-9)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
19P. PCB-1254 (11097-69-1)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
20P. PCB-1221 (11104-28-2)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
21P. PCB-1232 (11141-16-5)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
22P. PCB-1248 (12672-29-6)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
23P. PCB-1260 (11096-82-5)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
24P. PCB-1016 (12674-11-2)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.5E-04	<2E-04	(N)				mg/L	1b/D	NA	NA

PAGE V-9

EPA Form 3510-2C (8-90)

FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A027

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from August 2010 to July 2011. The outfall discharged 364 days during the time period but is considered intermittent because it does not discharge 24 hours per day.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified because they are either components of the influent received by the Sanitary Waste Water System (SWWS) Facility or they are chemicals used to treat the water at the SERF and/or SCC Cooling Towers, and therefore, may be present in the effluent discharged to the outfall. There were not any Table 2C-3 hazardous substances identified.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- H. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. Boron was detected at a value less than the MQL of 0.1 mg/L.
- N. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- O. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- P. Zinc was detected at a value less than the MQL of 0.02 mg/L.
- Q. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A027

- R. EPA remanded the parameter.
- S. Result is for cis- and trans-1,3-dichloropropylene.
- T. Result is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

**EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)**

METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		

VOLATILE COMPOUNDS

Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		

ACID COMPOUNDS

2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10

BASE/NEUTRAL

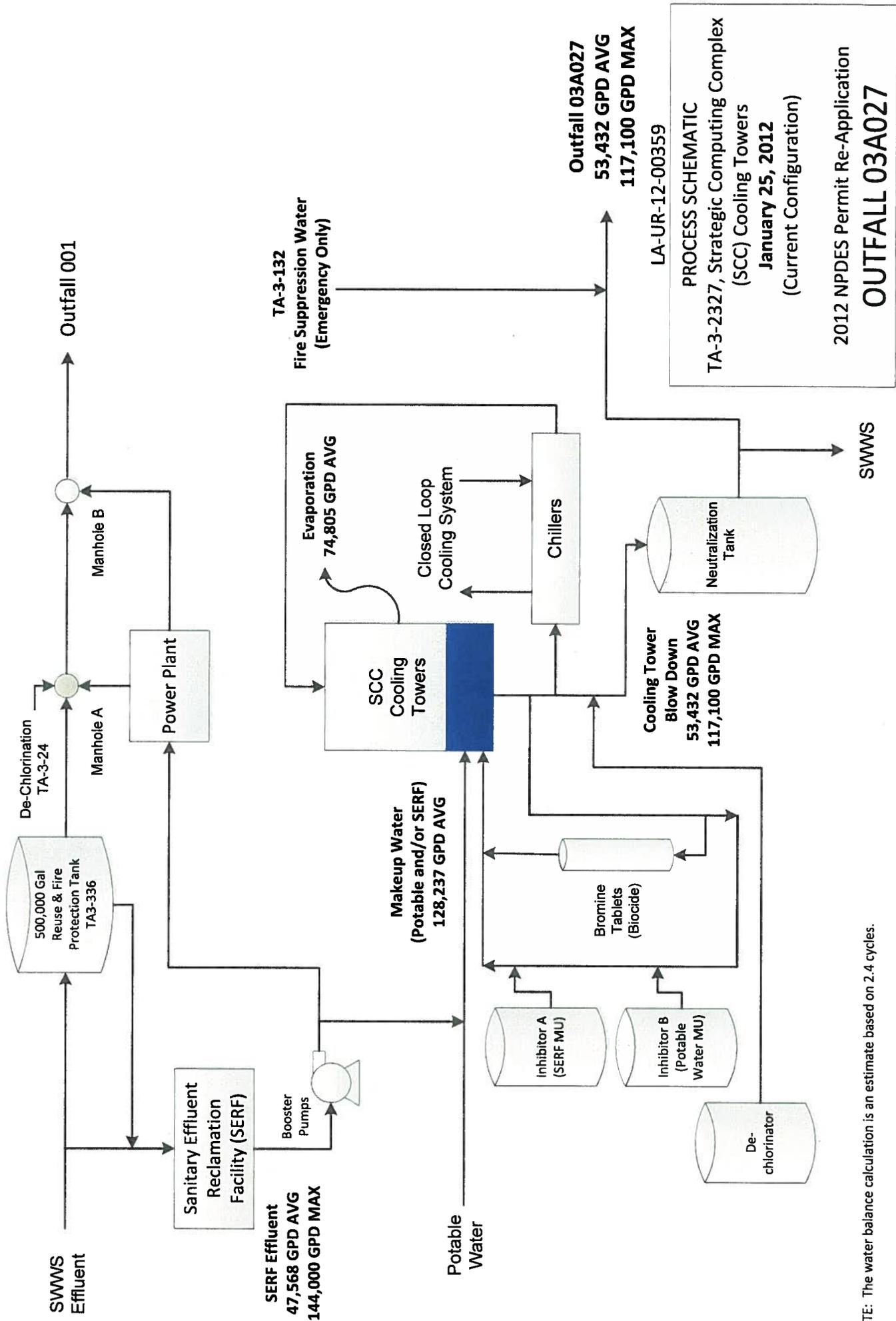
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
Process Schematic and Water Balance for the TA-3-2327, Strategic Computing Complex (SCC) Cooling Towers
(Current Configuration)



NOTE: The water balance calculation is an estimate based on 2.4 cycles.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-358P Inhibitor (Well Water)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-358P Cooling Tower Inhibitor
PRODUCT DESCRIPTION: An aqueous corrosion and scale inhibitor. This product is designed specifically for the control of corrosion and mineral scales in open circulating cooling water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Potassium Hydroxide	1310-58-3	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET
WEST C-358P Inhibitor

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET
WEST C-358P Inhibitor

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 12.0
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.124
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET
WEST C-358P Inhibitor

14. TRANSPORT INFORMATION

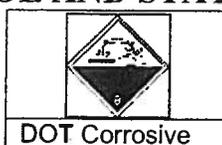
DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.
PRIMARY HAZARD CLASS/DIVISION: 8
UN/NA NUMBER: UN 1719
PACKING GROUP: II
LABEL: Corrosive - 8
NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (POTASSIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: NO CHRONIC: NO

16. OTHER INFORMATION

DATE PREPARED: 7/14/2010
MSDS No: C358P

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-552 Dispersant (Serf)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-552 Dispersant
PRODUCT DESCRIPTION: An aqueous dispersant, corrosion and scale inhibitor. This product is designed specifically for dispersion and corrosion control in water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Potassium Hydroxide	1310-58-3	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET

WEST C-552 Dispersant

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET
WEST C-552 Dispersant

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 10.8
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.103
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET

WEST C-552 Dispersant

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.

PRIMARY HAZARD CLASS/DIVISION: 8

UN/NA NUMBER: UN 1719

PACKING GROUP: II

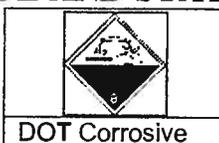
LABEL: Corrosive - 8

NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (POTASSIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: NO CHRONIC: NO

16. OTHER INFORMATION

DATE PREPARED: 3/3/2010

MSDS No: C552

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.

Houghton Chemical Corporation

52 Cambridge Street
P.O. Box 307
Allston (Boston), Massachusetts 02134

Tel: (617) 254-1010 Fax: (617) 254-2713

June 28, 2005

LESLIE BAKER
WEST INCORPORATED



HOUGHTON

We enclose material safety data sheets for the products listed below, a Shell publication on flammable solvents storage and handling, an article on liquid flow control, and a warning on the care and handling of empty drums which may contain residues of hazardous materials.

PUROBROM TABLETS(25 LB/PAIL)

The above products involve potential hazards. If you use, package or repackage them, you must affix a label to warn everyone of the contents and possible hazards, including what to do in case of spills, eye or skin contact, inhalation, ingestion, or fire, as well as empty drum handling and disposal.

You must provide clear warnings to instruct all personnel concerned not to store the product in unlabeled or unmarked containers. Also, if the item becomes all or part of a consumer product, the label should clearly provide instructions for use, with appropriate warnings, as well as comply with all applicable federal and state regulations.

Please read the Material Safety Data Sheet for each product carefully, paying particular attention to the health and hazard information as well as to the emergency and first aid procedures. Also, do not fail to provide instructions and precautions to your employees, agents, contractors, customers and any others whom you can reasonably foresee may be involved with this product. Review all data in your files, discarding outdated literature and replacing it with current information. If you are not directly responsible for the distribution of this warning and use information, please forward them to the appropriate person.

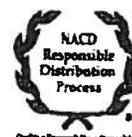
We may have supplemental information available on a range of health and safety subjects such as grounding equipment, regulatory requirements, hazardous materials training programs and other outside resources through consultants and chemical producers, and all this is available at no charge. We are eager to help you in whatever way possible towards your ongoing efforts to operate a safe and healthy environment for your employees, agents, contractors, customers and any others who may come in contact with your plant, services or products. We extend to you an open invitation for a tour of our plant facilities in the hopes that it might also provide you with operational insights and the opportunity to meet our staff.

We appreciate your business and look forward to a long and continuing relationship. Please call with any questions regarding this information.

Sincerely,
Bruce E. Houghton,
President

E:\Work\FORMS\WSDS Cover Letter #2 haz non flam.doc
Date Revised June 13, 2001
Distributors of Solvents and Chemicals
Manufacturers of Automotive Chemicals
Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



Houghton Chemical Corporation

52 Cambridge Street
P.O. Box 307
Allston (Boston), Massachusetts 02134

Tel: (617) 254-1010 Fax: (617) 254-2713



HOUGHTON

IMPORTANT EMPTY DRUM HAZARD WARNING

This is to alert you to a serious safety problem with emptied product drums. You may incur a legal liability as a result of any accident or injury from the misuse of such drums.

As you know, emptied chemical drums can be diverted into other uses such as trash barrels, barbeque grills, staging or flotation aids of one kind or another. This is a dangerous practice, because supposedly "empty" drums may contain residual liquid and or vaporized amounts of the original (or any other) product. Exposure of these empty drums to any source of spark or flame, especially welding torches or a static electric discharge, can cause fire, violent explosion, or the release of toxic vapors. The danger is very real and in the recent past there have been several "empty drum" accidents which have caused severe injuries. In addition, careless handling can expose individuals to hazardous residues unless all the precautions for the container's original contents are observed. Dispose of empty drums by sending to a professional drum reconditioner.

In recognition of this danger, we inform you and anyone who possesses full or "empty" drums to affix a special hazard warning on them next to or on the product label. A suggested text might be:

ATTENTION!

THIS CONTAINER IS DANGEROUS WHEN EMPTIED.

MAY STILL CONTAIN VAPORS OR LIQUIDS THAT ARE FLAMMABLE OR TOXIC OR BOTH.

KEEP CLOSED.

AVOID BREATHING OR TOUCHING CONTENTS.

KEEP ALL HEAT, SPARKS AND FLAMES AWAY.

DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

DO NOT REFILL UNTIL CLEANED AND DRIED BY A PROFESSIONAL DRUM RECONDITIONER.

Also, there is available a pre-printed empty drum warning label from "Labelmaster" in Chicago, Illinois. Their telephone number is 1-800-621-5808. Request information related to their empty drum label.

Although we cannot guarantee that such a warning will prevent accidents or release you from liability, we strongly recommend that, in addition to product labels which contain appropriate hazard warning and precautionary information, you begin using an empty drum warning statement on the containers you fill, distribute or use.

We also urge you, and it is your duty, to inform your customers, employees, especially plant personnel, warehousemen, and shippers of the dangers inherent in the handling and misuse of empty containers, and that such containers be reused only after cleaning and processing by an experienced drum reclaimer.

E:\Work\FORMS\Empty Drum Warning Letter.doc

Distributors of Solvents and Chemicals
Manufacturers of Automotive Chemicals
Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



HCC ID: 750413-G30-031216

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MATERIAL SAFETY DATA SHEET

MSDS

Purobrom Tablets

Date-Issued: 12/01/1997

MSDS Ref. No: BHCH22027

Date-Revised: 12/16/2003

Revision No: 8

1. PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME:** Purobrom Tablets**GENERAL USE:** Industrial water treatment.**CHEMICAL FAMILY:** Halogenated hydantoin**MANUFACTURER**

Manufactured by BioLab, Inc
For Houghton Chemical Corporation
52 Cambridge Street
Aliston, MA 02134
Customer SERVICE: (617) 254-1010

24 HR. EMERGENCY TELEPHONE NUMBERS

Poison Control Center (Medical): (877) 800 5553
CHEMTREC (US Transportation): (800) 424-9300

COMMENTS: EPA Registration Number: 5185-420-65199**2. COMPOSITION / INFORMATION ON INGREDIENTS**

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt. %</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	96

COMMENTS: (BCDMH)**3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW****PHYSICAL APPEARANCE:** White tablets with halogen odor.**IMMEDIATE CONCERNS:** DANGER. Corrosive. Causes irreversible eye damage and skin burns. Harmful if swallowed. Irritating to nose and throat. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear protective clothing and rubber gloves when handling this product. Avoid breathing dust and fumes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.**POTENTIAL HEALTH EFFECTS****EYES:** Causes irreversible eye damage. Do not get in eyes.**SKIN:** Causes severe skin burns. Do not get on skin.**INGESTION:** Harmful if swallowed.**INHALATION:** Irritating to nose and throat. Avoid breathing dust or fumes.**CHRONIC:** There are no known chronic hazards.**MEDICAL CONDITIONS AGGRAVATED:** Existing dermatitis may be aggravated by exposure.**ROUTES OF ENTRY:** Skin Contact, Inhalation, Ingestion, Eye Contact.**4. FIRST AID MEASURES****EYES:** If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes,

Purobrom Tablets

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then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for treatment advice.

NOTES TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

GENERAL HAZARD: In large fires fueled by other materials, this product may smolder for prolonged periods emitting a dense black smoke. Any spilled material should be considered contaminated. Neutralize to a non-oxidizing material for safe disposal. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the material is damp, it should be neutralized to a non-oxidizing material for safe disposal.

EXTINGUISHING MEDIA: In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include, but are not limited to, carbon monoxide, carbon dioxide, hydrogen bromide, bromine, hydrogen chloride or chlorine.

EXPLOSION HAZARDS: A dust explosion severity determination was performed using the Hartmann Dust Explosibility Bomb designed at the U.S. Bureau of Mines. The product was determined not to be ignitable.

FIRE FIGHTING PROCEDURES: Fires fueled by other materials may release hydrogen bromide, bromine, hydrogen chloride or chlorine. Wear self-contained breathing apparatus. Ammonium phosphate (ABC) fire extinguishers should not be used.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal. Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Avoid contact with eyes, skin or clothing. Avoid breathing dust.

HANDLING: STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not reseat container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE: Keep this product dry in original tightly closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Moisture may decompose this product and cause a violent reaction leading to fire and explosion. In case of decomposition, isolate container if possible and flood area with large amounts of water to dissolve all material before discarding this container. Do not contaminate food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Purobrom Tablets

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EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	EXPOSURE LIMITS					
	OSHA PEL		ACGIH TLV		SUPPLIER OEL	
	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	TWA	N/E ^[1]			N/E	

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS: General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.**PERSONAL PROTECTIVE EQUIPMENT:****EYES AND FACE:** Wear goggles or safety glasses with side shields when handling this product.**SKIN:** Wear rubber gloves when handling this product. Avoid contact with skin.**RESPIRATORY:** A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.**WORK HYGIENIC PRACTICES:** Remove and wash contaminated clothing before reuse.**OTHER USE PRECAUTIONS:** Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.**9. PHYSICAL AND CHEMICAL PROPERTIES****PHYSICAL STATE:** Solid**ODOR:** Faint halogen odor.**APPEARANCE:** Tablet**COLOR:** White**pH:** 4.5(0.1% solution in DI water)**VAPOR PRESSURE:** Not Applicable**VAPOR DENSITY:** Not Applicable**BOILING POINT:** Not Determined**MELTING POINT:** With Decomposition**THERMAL DECOMPOSITION:** 145°C to 150°C**SOLUBILITY IN WATER:** 0.15g/100g water**DENSITY:** 60.1 lb/ft³**10. STABILITY AND REACTIVITY****CONDITIONS TO AVOID:** High temperature. Poor ventilation. Contamination. Moisture/high humidity.**STABILITY:** This product is stable under normal conditions.**POLYMERIZATION:** Hazardous polymerization will not occur under normal conditions.**HAZARDOUS DECOMPOSITION PRODUCTS:** Hydrogen bromide, bromine, hydrogen chloride, chlorine.**INCOMPATIBLE MATERIALS:** Avoid contact with water on concentrated material in the container. Avoid contact with easily oxidizable material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; cyanonic acid containing compounds; calcium hypochlorite; alkalis. Avoid contact with all other chemicals.**11. TOXICOLOGICAL INFORMATION****ACUTE****EYES:** Toxicological studies indicate this product to be corrosive to eyes.

Purobrom Tablets

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DERMAL LD₅₀: The dermal LD₅₀ is greater than 2.0 g/kg (rabbit). The primary skin irritation index is 6.1 and the product is considered corrosive to skin.

ORAL LD₅₀: 578 mg/kg (rat).

EYE EFFECTS: This product causes irreversible eye damage.

SKIN EFFECTS: This product causes skin burns.

CARCINOGENICITY:

This product is not listed as a carcinogen by IARC.

This product is not listed as a carcinogen by NTP.

This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER: Do not reuse container. Rinse thoroughly before discarding in trash.

14. TRANSPORT INFORMATION**DOT (DEPARTMENT OF TRANSPORTATION)**

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

CANADA TRANSPORT OF DANGEROUS GOODS

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

15. REGULATORY INFORMATION**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****311/312 HAZARD CATEGORIES:**

FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: YES CHRONIC: NO

313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: This product or its components are not listed.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Purobrom Tablets

TSCA REGULATORY: This product or its components are not subject to export notification.

TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE: Product is hazardous by definition of the Hazardous Communication Standard.

CLEAN WATER ACT: Not Listed.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT): This product is a registered pesticide.

SDWA (SAFE DRINKING WATER ACT): Not listed.

CLEAN AIR ACT

40 CFR PART 68—RISK MANAGEMENT FOR CHEMICAL ACCIDENT RELEASE PREVENTION: Not listed.

CANADA

WHMIS CLASS: C - Oxidizer; E - Corrosive

CANADIAN ENVIRONMENTAL PROTECTION ACT: Pesticide Control Product Registration Number: 16857

DOMESTIC SUBSTANCE LIST (INVENTORY): Listed

CALIFORNIA PROPOSITION 65: This product or its components are not listed on any Proposition 65 lists of carcinogens or reproductive toxicants.

COMMENTS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

PREPARED BY: Regulatory Information Specialist

REVISION SUMMARY Revision #: 8 This MSDS replaces the July 14, 2003 MSDS. Any changes in information are as follows: In Section 1 MSDS Number Prepared By [] Print CHEMTREC Phone Number Section 1 Footnotes 24 Hour Emergency Phone Numbers In Section 1 [] Print CHEMTREC Phone Number 24 Hour Emergency Phone Numbers In Section 3 Emergency Overview - Immediate Concerns Physical Appearance Chronic Effects Potential Health Effects - Eyes Potential Health Effects - Skin Potential Health Effects - Ingestion Comments Health In Section 4 Firstaid - Eyes Firstaid - Skin Firstaid - Ingestion Firstaid - Inhalation In Section 5 Combustion Products In Section 7 Storage General Procedures In Section 9 Appearance Density (lbs) Density In Section 11 Eye Effects Skin Effects

HMIS RATING

HEALTH:	3
FLAMMABILITY:	1
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	B

NFPA RATING

HEALTH:	3
FIRE:	1
REACTIVITY:	1

Key

- 4 = Severe
- 3 = Serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

NFPA STORAGE CLASSIFICATION: NFPA Oxidizer Class 2

COMMENTS: The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard, National Fire Protection Association (NFPA), Hazardous Materials Identification System (HMIS), and Canada's Workplace Hazardous Information System (WHMIS) and Environmental Protection Agency (EPA). **MANUFACTURER DISCLAIMER: IMPORTANT:** The information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This

Purobrom Tablets

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information is true and accurate to the best of our knowledge.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 1
OTHER C

WEST R-603 Bisulfite (Well Water)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST R-603 Bisulfite
PRODUCT DESCRIPTION: An aqueous solution of sodium metabisulfite. This product is designed specifically for halogen removal in water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium Metabisulfite	7681-57-4		5 mg/m ³

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING! Harmful if swallowed or inhaled. Causes irritation to skin eyes and respiratory tract. May cause allergic respiratory reaction.

PHYSICAL APPEARANCE: Clear, pink liquid, sulfur dioxide odor.

POTENTIAL HEALTH EFFECTS

Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May cause allergic reaction in sensitive individuals.

Ingestion:

May cause gastric irritation by the liberation of sulfurous acid. An asthmatic reaction may occur after ingestion. Large doses may result in nausea, vomiting, diarrhea, abdominal pains, circulatory disturbance, and central nervous system depression. Estimated fatal dose is 10 gm.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain.

Eye Contact:

Causes irritation, redness, and pain. Contact may cause irreversible eye damage. Symptoms may include stinging, tearing, redness, swelling, corneal damage and blindness.

Chronic Exposure:

No information found.

MATERIAL SAFETY DATA SHEET
WEST R-603 Bisulfite

4. FIRST AID MEASURES

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. FIRE FIGHTING MEASURES

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Cautiously spray residue with plenty of water, providing ventilation to clear sulfur dioxide fumes generated from water contact.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from incompatibilities. Releases toxic sulfur dioxide gas. Keep away from oxidizing agents. Use only with appropriate protective equipment. Do not use in unventilated areas such as confined spaces. Containers of this material may be hazardous when empty since they retain product residues; observe all warnings and precautions listed for the product.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

MATERIAL SAFETY DATA SHEET
WEST R-603 Bisulfite

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits: (Sodium Metabisulfite)

ACGIH Threshold Limit Value (TLV): 5mg/m³ (TWA), A4 Not classifiable as a human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with an acid gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. (neoprene, polyvinyl chloride).

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOR:	Sulfur dioxide odor.
COLOR:	Clear, colorless to pale yellow
pH:	~ 4.3
PERCENT VOLATILE:	Not determined
VAPOR DENSITY:	Not determined
BOILING POINT:	212°F
SPECIFIC GRAVITY:	1.327
WATER SOLUBILITY:	Complete
EVAPORATION RATE (butyl acetate = 1):	<1

10. STABILITY AND REACTIVITY

Stability:

Strength diminishes somewhat with age. Gradually decomposes in air to sulfate, generating sulfurous acid gas. Contact with acids will release toxic sulfur dioxide gas.

Hazardous Decomposition Products:

Oxides of sulfur and sodium may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Acids, alkalis, sodium nitrite, oxidizers, aluminum powder.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

MATERIAL SAFETY DATA SHEET
WEST R-603 Bisulfite

11. TOXICOLOGICAL INFORMATION

Sodium Metabisulfite has been investigated as a tumorigen, mutagen, reproductive effector.

CARCINOGENICITY COMMENTS:

Ingredient	NTP Carcinogen		IARC Category
	Known	Anticipated	
Sodium Metabisulfite (7681-57-4)	No	No	3

12. ECOLOGICAL INFORMATION

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: BISULFITES, AQUEOUS SOLUTION, N.O.S.
UN/NA NUMBER: UN 2693
PACKING GROUP: II
LABEL: Corrosive - 8
NAERG: 154

15. REGULATORY INFORMATION

Federal, State & International Regulations							
Ingredient	SARA 302		SARA 313		CERCLA	RCRA 261.33	TSCA 8(d)
	RQ	TPQ	List	Chemical Catg.			
Sodium Metabisulfite (7681-57-4)	No	No	No	No	No	No	Yes

SARA 311/312:
Sodium Metabisulfite (7681-57-4):
Acute: Yes Chronic: No Fire: No Pressure: No Reactivity: Yes

MATERIAL SAFETY DATA SHEET
WEST R-603 Bisulfite

16. OTHER INFORMATION

DATE PREPARED: 7/14/2010
MSDS No: R603

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.

The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2263411	N/A	Hach Company	OSHA	English	1
1406428	N/A	Hach Company	OSHA	English	1
1407028	N/A	Hach Company	OSHA	English	1
2756549	N/A	Hach Company	OSHA	English	1
2076053	N/A	Hach Company	OSHA	English	1
203832	N/A	Hach Company	OSHA	English	1

Total Enclosures: 6

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00469

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Indicator
Catalog Number: 2263411

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00469
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes eye burns. Carcinogen.
Date of MSDS Preparation:
Day: 05
Month: August
Year: 2011

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 90.0 - 100.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: None

CAUSES EYE BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:

Health: 4

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: No effects are anticipated

Skin Absorption: Not applicable

Target Organs: Not applicable

Ingestion: Causes: burns of the mouth and esophagus May cause: circulatory disturbances diarrhea nausea vomiting rapid pulse and respirations

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Respiratory conditions Eye conditions

Chronic Effects: Chronic overexposure may cause erosion of the teeth chronic irritation or inflammation of the lungs cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: May emit toxic and corrosive fumes.

Fire / Explosion Hazards: May react violently with: oxidizers reducers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Dry chemical.

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant in the U. S. . Product is regulated as RCRA hazardous waste in the U.S.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Do not breathe mist or vapors. Use with adequate ventilation. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: reducers alkalies Protect from: heat Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: lab coat disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin Do not breathe: mist/vapor Use with adequate ventilation. Wash thoroughly after handling. Protect from: heat Keep away from: oxidizers reducers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: < 0.5

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: 100°C (212°F)

Melting Point: Not determined

Specific Gravity/ Relative Density (water = 1; air =1): 1.056

Evaporation Rate (water = 1): 0.811

Volatile Organic Compounds Content: None

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 0.7725
Aluminum: 0.290

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: reducers alkalies oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Skin testing of a 10% sulfuric acid solution shows no irritation to skin.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Sulfuric acid: Oral rat LD₅₀ = 2140 mg/kg, Inhalation rat LC50 = 87 ppm/4H

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002
Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)
DOT Hazard Class: 8
DOT Subsidiary Risk: NA
DOT ID Number: UN3264
DOT Packing Group: III
I.C.A.O.:
I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)
ICAO Hazard Class: 8
ICAO Subsidiary Risk: NA
ICAO ID Number: UN3264
ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.

(<10% Sulphuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Total chlorine analyzer reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. In-house information. Technical Judgment. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable

w/w - weight/weight

ND - Not Determined

w/v - weight/volume

NV - Not Available

v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE.
HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA
OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

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(970) 669-3050

MSDS No: M00110

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Total Chlorine Reagent
Catalog Number: 1406428

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00110
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause sensitization. May cause irritation.
Date of MSDS Preparation:
Day: 15
Month: October
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Potassium Iodide

CAS No.: 7681-11-0
TSCA CAS Number: 7681-11-0
Percent Range: 20.0 - 30.0
Percent Range Units: weight / weight
LD50: Oral Mouse LD50 = 1862 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes irritation.

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

Sodium Phosphate, Dibasic

CAS No.: 7558-79-4
TSCA CAS Number: 7558-79-4
Percent Range: 20.0 - 30.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 17 g/kg.
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: May cause irritation.

Other component

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: 0.1 - 1.0
Percent Range Units: weight / weight
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Carboxylate Salt

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 40.0 - 50.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White or light pink powder
Odor: None
MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation
Skin Contact: May cause irritation May cause allergic reaction
Skin Absorption: No effects anticipated
Target Organs: Not applicable
Ingestion: Causes: lethargy loss of strength loss of coordination difficult breathing diarrhea May cause iodism, which symptoms include skin rash, conjunctivitis, runny nose, sneezing, bronchitis, headache, fever and irritation of mucous membranes. DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.
Target Organs: Liver
Inhalation: May cause: respiratory tract irritation Effects similar to those of ingestion.
Target Organs: Liver
Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine Pre-existing: Eye conditions Skin conditions Respiratory conditions Persons with pre-existing respiratory conditions may be more susceptible to the effects of Potassium Iodide exposure.

Chronic Effects: Chronic overexposure may cause allergic skin reactions, hypothyroidism, liver damage. DPD may cause allergic skin reactions in some people causing severe skin rashes and itching. Iodine overdose, 'iodism', may cause skin rash, runny nose, headaches, fever and bronchitis.

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Maternal ingestion of potassium iodide during pregnancy may cause congenital goiter and hyperthyroidism in the newborn infant.

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Call physician if irritation develops.

Ingestion (First Aid): Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide, iodine compounds, phosphorus oxides, potassium oxides, sodium monoxide, nitrogen oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Scoop up spilled material into a large beaker and dissolve with water. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes, skin, clothing. Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light, heat, moisture

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Protect from: light heat moisture

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White or light pink powder

Physical State: Solid

Molecular Weight: Not applicable

Odor: None

pH: of 1% soln = 6.35 @ 20°C

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 145° C

Specific Gravity (water = 1): 1.79

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not determined

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 0.038 in/yr

Aluminum: 0.006 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Exposure to light. Excess moisture Extreme temperatures

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: carbon dioxide carbon monoxide iodine compounds phosphorus oxides potassium oxide nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat (female) LD₅₀ = 4700 mg/kg; Oral rat (male) LD₅₀ = 7000 mg/kg.

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: DPD Oral rat LD50 = 970 mg/kg; Potassium Iodide Oral mouse LDLo = 1862 mg/kg; Sodium Phosphate, Dibasic Oral rat LD50 = 17 g/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item is part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Sodium phosphate, dibasic 5000 lbs.

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium phosphate, dibasic - RQ 5000 lbs.

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): Not applicable

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Indicator for total chlorine

References: CCINFO MSDS/FTSS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. Outside Testing. Technical Judgment. In-house information. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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MSDS No: M00109

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Free Chlorine Reagent
Catalog Number: 1407028

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00109
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause sensitization. May cause irritation.
Date of MSDS Preparation:
Day: 15
Month: October
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

Carboxylate Salt

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 55.0 - 65.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation. Toxic properties unknown.

Sodium Phosphate Dibasic, Heptahydrate

CAS No.: 7782-85-6
TSCA CAS Number: 7558-79-4
Percent Range: 30.0 - 40.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 12930 mg/kg.
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: May cause irritation.

Ethylenediaminetetraacetic Acid, Disodium Salt

CAS No.: 6381-92-6
TSCA CAS Number: 139-33-3
Percent Range: 1.0 - 10.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 2000 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White or light pink powder
Odor: None
MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation
Skin Contact: May cause irritation May cause allergic reaction
Skin Absorption: None reported
Target Organs: None reported
Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.
Target Organs: None reported
Inhalation: May cause: respiratory tract irritation Effects similar to those of ingestion.
Target Organs: None reported
Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine Pre-existing: Eye conditions Skin conditions Respiratory conditions
Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with soap and plenty of water. Call physician if irritation develops.

Ingestion (First Aid): Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide, phosphorus oxides, nitrogen oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Scoop up spilled material into a large beaker and dissolve with water. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes, skin, clothing. Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light, moisture, heat

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mist, vapor, or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves, lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes, skin, clothing. Do not breathe: dust. Wash thoroughly after handling. Protect from: light, moisture, heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White or light pink powder

Physical State: Solid
Molecular Weight: Not applicable
Odor: None
pH: of 1% soln. = 6.35 @ 25°C
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Boiling Point: Not applicable
Melting Point: 110 C decomp
Specific Gravity (water = 1): 1.76
Evaporation Rate (water = 1): Not applicable
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
 Water: Soluble
 Acid: Soluble
 Other: Not determined
Metal Corrosivity:
 Steel: Not determined
 Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Exposure to light. Excess moisture Heating to decomposition.
Reactivity / Incompatibility: None reported
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: carbon dioxide carbon monoxide phosphorus oxides nitrogen oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
 LD50: None reported
 LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Salt of DPD Oral rat LD50 = 970 mg/kg; Sodium Phosphate Dibasic Oral Rat LD50 = 17 g/kg; EDTA Disodium Salt Oral Rat LD50 = 2000 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable
Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): 5000 lbs. Sodium phosphate, dibasic

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium phosphate, dibasic - RQ 5000 lbs.

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Outside Testing. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M01702

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: pH Storage Solution
Catalog Number: 2756549

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01702
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Practically non-toxic.
Date of MSDS Preparation:
Day: 01
Month: October
Year: 2010

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 85.0 - 95.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other components, each

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Potassium Chloride

CAS No.: 7447-40-7
TSCA CAS Number: 7447-40-7
Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: Oral rat LD₅₀ = 2600 mg/kg

LC50: None reported.
TLV: Not established.
PEL: Not established.
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid
Odor: None

HMIS:

Health: 0

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 0

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause mild irritation

Skin Contact: No effects are anticipated

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: Very large doses may cause: anorexia blood pressure changes cardiac depression fever gastroenteritis

Target Organs: Cardiovascular system

Inhalation: No effects anticipated

Target Organs: Not applicable

Medical Conditions Aggravated: Pre-existing: Cardiovascular diseases Kidney conditions

Chronic Effects: None reported

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Give 1-2 glasses of water. If you feel unwell, contact a physician.

Inhalation: None required.

5. FIRE FIGHTING MEASURES

Flammable Properties: Material will not burn. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: This material will not burn.

Fire / Explosion Hazards: This product will not burn or explode.

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Dilute with a large excess of water. Flush the spilled material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Keep container tightly closed when not in use.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes. Wash thoroughly after handling.

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: 6.4

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: ~100°C

Melting Point: Not determined

Specific Gravity/ Relative Density (water = 1; air = 1): Not determined

Evaporation Rate (water = 1): Not determined

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Heating to decomposition.

Reactivity / Incompatibility: Incompatible with: bromine trifluoride

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: chlorides potassium oxide

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: Potassium Chloride: eye irritation rabbit (Std. Draize): 500 mg/24 hrs = MILD.

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: Potassium Chloride: oral rat LD₅₀ = 2600 mg/kg.

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute material with excess water making a weaker than 5% solution. Open cold water tap completely, slowly pour the material to the drain. Flush system with plenty of water.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product does not meet the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): --

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Electrode storage solution

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable

w/w - weight/weight

ND - Not Determined

w/v - weight/volume

NV - Not Available

v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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(970) 669-3050

MSDS No: M00297

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Molybdovanadate Reagent
Catalog Number: 2076053

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00297
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Harmful if inhaled. Carcinogen. Causes eye burns.
Date of MSDS Preparation:
Day: 20
Month: April
Year: 2010

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ammonium Molybdate

CAS No.: 12054-85-2
TSCA CAS Number: 12027-67-7
Percent Range: 1.0 - 5.0
Percent Range Units: weight / volume
LD50: None reported.
LC50: None reported.
TLV: 5 mg/m³ as Mo
PEL: 5 mg/m³ as Mo
Hazard: Toxic. May cause irritation.

Ammonium Metavanadate

CAS No.: 7803-55-6
TSCA CAS Number: 7803-55-6
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 160 mg/kg; Oral rat LD50 = 58,100 µg/kg
LC50: Inhalation rat LC50 = 7800 µg/m³/4H
TLV: 0.05 mg/m³ as V₂O₅
PEL: Ceiling 0.05 mg/m³ as V₂O₅
Hazard: Toxic. May cause irritation.

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 50.0 - 60.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: No effects anticipated.

Other component

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 35.0 - 45.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, yellow liquid
Odor: None
CAUSES EYE BURNS HARMFUL IF INHALED CAUSES SKIN IRRITATION

HMIS:

Health: 3
Flammability: 0
Reactivity: 2
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3
Flammability: 0
Reactivity: 2
Symbol: Water Reactive

Potential Health Effects:

Eye Contact: Causes severe burns
Skin Contact: Causes irritation
Skin Absorption: None reported
Target Organs: None reported
Ingestion: Causes: severe burns May cause: loss of coordination copper deficiency gout May effect enzyme activity. Molybdenum compounds may cause loss of coordination, enzyme activity effects, copper deficiency and gout.
Target Organs: None reported
Inhalation: Causes: severe burns May cause: difficult breathing mouth soreness teeth erosion
Target Organs: Lungs
Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions Gout
Chronic Effects: Molybdenum poisoning signs include loss of appetite, listlessness and reduced growth rate. Excessive exposure to molybdenum compounds may cause gout and anemia. Chronic overexposure may cause erosion of the teeth enzyme activity effects copper deficiency chronic irritation or inflammation of the lungs cancer
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen
Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Contains: an experimental teratogen. an experimental mutagen.

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, corrosive and toxic gases may be generated by thermal decomposition. Not Flammable, but reacts with most metals to form flammable hydrogen gas.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: ammonia nitrogen oxides. sulfur oxides.

Fire / Explosion Hazards: May react violently with: reducers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Dry chemical. Do NOT use water.

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant in the U. S. . Product is regulated as RCRA hazardous waste in the U.S.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light Store away from: oxidizers reducers metals
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: light

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, yellow liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: < 0.5

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: 100°C (212°F)

Melting Point: Not determined

Specific Gravity (water = 1): 1.375

Evaporation Rate (water = 1): 0.06

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 11.273 in/yr

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Heating to decomposition.

Reactivity / Incompatibility: May react violently in contact with: oxidizers reducers Incompatible with: metals

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: ammonia nitrogen oxides sulfur oxides Contact with metals may release flammable hydrogen gas.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: This product is not corrosive to skin. Slight to well defined erythema. Absent to slight edema. (OECD Number 404, Acute Dermal Irritation/Corrosion)

Mutation Data: Ammonium Metavanadate: DNA damage - Human lymphocytes and ovary - 200 µmol/L; Mutation in somatic cells - hamster - lung - 5 µmol/L

Reproductive Effects Data: Intraperitoneal hamster TDLo = 2820 µg/kg - Musculoskeletal abnormalities;
Intraperitoneal hamster TDLo = 11280 µg/kg - Post-implantation mortality
Ingredient Toxicological Data: Sulfuric Acid: Oral rat LD50 = 2140 mg/kg, Inhalation rat LC50 = 347 ppm/1 hr;
Ammonium Metavanadate: Oral rat LD50 = 58 mg/kg, Ammonium Molybdate (anhydrous): Oral rat LD50 = 333 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLM in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN3264

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN3264

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Reactive
Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Ammonium compounds; Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid Ammonium vanadate 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: The label for this product bears the signal word "POISON" because the concentration of Sulfuric Acid in the product is greater than/equal to 10%.

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): Not applicable

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Indicator for phosphate

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. In-house information. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 15,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00471

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sulfuric Acid Solution 19.2 N
Catalog Number: 203832

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00471
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns. Harmful if inhaled. Carcinogen.
Date of MSDS Preparation:
Day: 20
Month: April
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 40.0 - 50.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 50.0 - 60.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: Acidic

CAUSES SEVERE BURNS HARMFUL IF INHALED

HMIS:

Health: 3

Flammability: 0

Reactivity: 2

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 2

Symbol: Water Reactive

Potential Health Effects:

Eye Contact: Causes severe burns

Skin Contact: Causes severe burns

Skin Absorption: No effects anticipated

Target Organs: None reported

Ingestion: Causes: severe burns May cause: nausea vomiting ulceration of the digestive tract

Target Organs: None reported

Inhalation: Causes: severe burns May cause: teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions

Chronic Effects: Chronic overexposure may cause chronic irritation or inflammation of the lungs erosion of the teeth cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: May emit toxic and corrosive fumes.

Fire / Explosion Hazards: May react violently with: strong acids strong bases alkali metals metal nitrates oxidizers reducers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Dry chemical. Do NOT use water.

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Product is regulated as RCRA hazardous waste. Product is regulated as a hazardous water pollutant.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 137

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: alkalies oxidizers reducers metals Keep container tightly closed when not in use.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use a fume hood to avoid exposure to dust, mist or vapor. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: laboratory fume hood

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Physical State: Liquid
Molecular Weight: Not applicable
Odor: Acidic
pH: <0.5
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: Not determined
Melting Point: Not determined
Specific Gravity (water = 1): 1.535
Evaporation Rate (water = 1): Not determined
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Soluble
Acid: Soluble
Other: Not determined
Metal Corrosivity:
Steel: 0.70 in/yr
Aluminum: 0.50 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Evaporation Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: May react violently in contact with: alkalies oxidizers reducers Incompatible with: metals
Hazardous Decomposition: Contact with metals may release flammable hydrogen gas. Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Sulfuric Acid: Oral rat LD50 = 2140 mg/kg; Inhalation rat LC50 = 87 ppm/4h, Inhalation Guinea Pig LC50 = 18 mg/m³

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: Sulfuric Acid: The 48-hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Sulphuric Acid

--

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1830

DOT Packing Group: II

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Sulphuric Acid

--

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1830

ICAO Packing Group: II

I.M.O.:

I.M.O. Proper Shipping Name: Sulphuric Acid

--

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1830

I.M.O. Packing Group: II

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard Reactive

S.A.R.A. Title III Section 313 (40 CFR 372): This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size.)

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: The label for this product bears the signal word "POISON" because the concentration of Sulfuric Acid in the product is greater than/equal to 10%.

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Standard solution

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Sax, N. Irving and Richard J. Lewis, Sr., revised by. Hawley's Condensed Chemical Dictionary, Eleventh Ed. New York: Van Nostrand Reinhold Co., 1987. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards. Cincinnati: Department of Health and Human Services, 1981. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. NIOSH Registry of Toxic Effects of Chemical Substances, 1985-86. Cincinnati: U.S. Department of Health and Human Services, April, 1987.

Revision Summary: Updates in Section(s) 14, 15,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

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The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2556900	2297255	Hach Company	OSHA	English	1
2556900	2314011	Hach Company	OSHA	English	1
2556900	2314111	Hach Company	OSHA	English	1

Total Enclosures: 3

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M01127

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Compound for Free and Total Chlorine Analyzers
Catalog Number: 2297255

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01127

Chemical Name: Confidential

CAS No.: Confidential

Chemical Formula: Confidential

Chemical Family: Confidential

Hazard: May cause irritation. May cause sensitization.

Date of MSDS Preparation:

Day: 16

Month: November

Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential

TSCA CAS Number: Confidential

Percent Range: 100.0

Percent Range Units: weight / weight

LD50: Oral rat LD₅₀ = 970 mg/kg.

LC50: None reported

TLV: Not established

PEL: Not established

Hazard: May cause sensitization. May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White powder

Odor: None

MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION

MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2

Flammability: 1

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2

Flammability: 1

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: May cause irritation May cause allergic reaction

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine

Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.

Cancer / Reproductive Toxicity Information:

O.S.H.A. Listed: No

IARC Listed: No

NTP Listed: No

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Dusts at sufficient concentrations can form explosive mixtures with air. Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide, nitrogen oxides.

Fire / Explosion Hazards: May react violently with: strong oxidizers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light moisture Keep away from: oxidizers

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Use with adequate ventilation. Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White powder

Physical State: Solid

Molecular Weight: Confidential

Odor: None

pH: 1.99 (5% sol'n)

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 180°C (356°F)

Specific Gravity (water = 1): 1.226

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Completely soluble

Acid: Not determined

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Excess moisture Exposure to light.

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Toxic fumes of: nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat LD₅₀ = 970 mg/kg.

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: Reversible conjunctivitis was reported in animal studies.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: --
Not applicable

12. ECOLOGICAL INFORMATION

Product Ecological Information: Daphnia magna EC50 at 48 hrs: 10.8: NOEC 12.5 mg/L at 24 hrs, 3.1 mg/L at 48 hrs;
Ready Biodegradability To 60% in 21 days

Ingredient Ecological Information: --
Not applicable

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable
304 CERCLA RQ (40 CFR 302.4): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
Clean Water Act (40 CFR 116.4): Not applicable
RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of Illinois. This product complies with Pennsylvania Trade Secret Regulations. New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

TSCA CAS Number: Confidential

16. OTHER INFORMATION

Intended Use: Laboratory Reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. In-house information. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Revision Summary: Updates in Section(s) 2, 11, 12,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00598

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Free Chlorine Indicator Solution for CL-17 Analyzer
Catalog Number: 2314011

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00598
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns.
Date of MSDS Preparation:
Day: 02
Month: November
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

p-Toluenesulfonic Acid

CAS No.: 104-15-4
TSCA CAS Number: 104-15-4
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2480 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes burns.

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 85.0 - 95.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Clear, colorless liquid
Odor: Irritating
CAUSES BURNS

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: Causes burns.

Skin Absorption: None reported

Target Organs: None reported

Ingestion: May cause: gastrointestinal irritation burns of the mouth and esophagus

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions

Chronic Effects: None reported

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: sulfur oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment. Absorb spilled liquid with non-reactive sorbent material.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up spilled material into a large beaker and dissolve with water. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Product is regulated as RCRA hazardous waste.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Protect from: freezing heat Keep away from: oxidizers Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have a safety shower nearby. Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: neoprene latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Protect from: freezing heat Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: Irritating

pH: 0.34

Vapor Pressure: Not available

Vapor Density (air = 1): Not available

Boiling Point: 99°C; 210°F

Melting Point: -3°C; 27°F

Specific Gravity (water = 1): 1.027

Evaporation Rate (water = 1): 0.80

Volatile Organic Compounds Content: Not available

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: 2.05 in/yr

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: p-Toluenesulfonic acid: Oral rat LD50 = 2480 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulfonic Acid Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1760

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulphonic Acid Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1760

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulphonic Acid Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1760

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. In-house information. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
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Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00599

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Free Chlorine Buffer for CL-17 Analyzer
Catalog Number: 2314111

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00599
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Toxic. May cause eye irritation.
Date of MSDS Preparation:
Day: 26
Month: September
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 65.0 - 75.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Lithium Bimaleate

CAS No.: 85796-96-9
TSCA CAS Number: 85796-96-9
Percent Range: 1.0 - 10.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

Lithium Maleate

CAS No.: 50977-65-6
TSCA CAS Number: 50977-65-6

Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, yellow liquid

Odor: Bland

HARMFUL IF SWALLOWED MAY CAUSE EYE IRRITATION

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: No effects are anticipated

Skin Absorption: None reported

Target Organs: None reported

Ingestion: Toxic May cause: drowsiness weakness anorexia nausea central nervous system effects
coma death

Target Organs: Central nervous system

Inhalation: No data reported.

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Central nervous system diseases

Chronic Effects: Lithium compounds have been implicated in development of aplastic anemia. Signs of lithium poisoning include dehydration, extreme weight loss, fine tremor of hands, nausea, vomiting and diarrhea, Chronic overexposure may cause central nervous system effects

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.
Ingestion (First Aid): Give large quantities of water. Call physician immediately.
Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide.
Fire / Explosion Hazards: None reported
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Stop spilled material from being released to the environment. Absorb spilled liquid with non-reactive sorbent material.
Clean-up Technique: Absorb spilled liquid with non-reactive sorbent material. Sweep up material. Place material in a plastic bag. Mark bag 'Non-hazardous trash', and dispose of as normal refuse. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: a gallon or more of liquid is spilled. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: None

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Wash thoroughly after handling.
Storage: Store between 10° and 25°C. Protect from: heat freezing
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.
Personal Protective Equipment:
Eye Protection: safety glasses with top and side shields
Skin Protection: disposable latex gloves
Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes Wash thoroughly after handling. Protect from: heat freezing

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, yellow liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: Bland

pH: 7.06

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: 99°C; 210°F

Melting Point: -65°C; -85°F

Specific Gravity (water = 1): 1.21

Evaporation Rate (water = 1): 0.53

Volatile Organic Compounds Content: Not available

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: 0.00 in/yr

Aluminum: 0.00 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures

Reactivity / Incompatibility: None reported

Hazardous Decomposition: Heating to decomposition releases toxic fumes of carbon monoxide and carbon dioxide.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: --

No toxicological data available for the ingredients of this product.

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None

Special Instructions (Disposal): Open cold water tap completely, slowly pour the material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33: Not applicable

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Gosselin, R. E. et al. Clinical Toxicology of Commercial Products, 5th Ed. Baltimore: The Williams and Wilkins Co., 1984. In-house information. Technical Judgment.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable w/w - weight/weight

ND - Not Determined w/v - weight/volume

NV - Not Available v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2557000	2263411	Hach Company	OSHA	English	1
2557000	2263511	Hach Company	OSHA	English	1
2557000	2297255	Hach Company	OSHA	English	1

Total Enclosures: 3

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00469

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Indicator
Catalog Number: 2263411

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00469
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes eye burns. Carcinogen.
Date of MSDS Preparation:
Day: 13
Month: March
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 90.0 - 100.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: None

CAUSES EYE BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:

Health: 4

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: No effects are anticipated

Skin Absorption: Not applicable

Target Organs: Not applicable

Ingestion: Causes: burns of the mouth and esophagus May cause: circulatory disturbances diarrhea nausea vomiting rapid pulse and respirations

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Respiratory conditions Eye conditions

Chronic Effects: Chronic overexposure may cause erosion of the teeth chronic irritation or inflammation of the lungs cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately.

Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: May emit toxic and corrosive fumes.
Fire / Explosion Hazards: May react violently with: oxidizers reducers
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Dry chemical.
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant. Product is regulated as RCRA hazardous waste.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Do not breathe mist or vapors. Use with adequate ventilation. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: reducers alkalies Protect from: heat Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: lab coat disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin Do not breathe: mist/vapor Use with adequate ventilation. Wash thoroughly after handling. Protect from: heat Keep away from: oxidizers reducers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable
Odor: None
pH: < 0.5
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: 100°C (212°F)
Melting Point: Not determined
Specific Gravity (water = 1): 1.056
Evaporation Rate (water = 1): 0.811
Volatile Organic Compounds Content: None
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
 Water: Soluble
 Acid: Soluble
 Other: Not determined
Metal Corrosivity:
 Steel: 0.7725
 Aluminum: 0.290

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: reducers alkalies oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
 LD50: None reported
 LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Skin testing of a 10% sulfuric acid solution shows no irritation to skin.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Sulfuric acid: Oral rat LD₅₀ = 2140 mg/kg, Inhalation rat LC50 = 87 ppm/4H

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002
Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN3264

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN3264

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Total chlorine analyzer reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. In-house information. Technical Judgment. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00470

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Buffer Solution
Catalog Number: 2263511

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00470
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns.
Date of MSDS Preparation:
Day: 08
Month: January
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Potassium Iodide

CAS No.: 7681-11-0
TSCA CAS Number: 7681-11-0
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral Mouse LD50 = 1862 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes irritation.

Sodium Hydroxide

CAS No.: 1310-73-2
TSCA CAS Number: 1310-73-2
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LDLo = 500 mg/kg.
LC50: None reported
TLV: 2 mg/m³ Ceiling/STEL
PEL: 2 mg/m³
Hazard: Causes severe burns. Toxic.

Demineralized Water

CAS No.: 7732-18-5

TSCA CAS Number: 7732-18-5
Percent Range: 50.0 - 60.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other components, each

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Sodium Citrate

CAS No.: 68-04-2
TSCA CAS Number: 68-04-2
Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 >8 g/Kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: None

CAUSES BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: Causes burns.

Skin Absorption: None reported

Target Organs: None reported

Ingestion: Can cause: burns of the mouth and esophagus nausea vomiting abdominal pain

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions

Chronic Effects: Iodines overdose, 'iodism', may cause skin rash, runny nose, headaches, fever and bronchitis.

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Contains: an experimental teratogen.

Maternal ingestion of potassium iodide during pregnancy may cause congenital goiter and hyperthyroidism in the newborn infant.

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not available

Hazardous Combustion Products: Toxic fumes of: iodine compounds carbon monoxide, carbon dioxide.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with a dry acid, such as citric or boric. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a weak acid solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: a gallon or more of liquid is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Keep away from: acids Protect from: heat

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Keep away from: acids/acid fumes Protect from: heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: 11.9

Vapor Pressure: Not available

Vapor Density (air = 1): Not available

Boiling Point: 106°C; 223°F

Melting Point: Not available

Specific Gravity (water = 1): 1.246

Evaporation Rate (water = 1): 0.605

Volatile Organic Compounds Content: Not available

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: 0.010 in/yr

Aluminum: 29.71 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Heat

Reactivity / Incompatibility: Incompatible with: acids oxidizers

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sodium oxides iodine compounds

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: Potassium Iodide oral human TDLo = 2700 mg/kg endocrine abnormalities in an offspring

Ingredient Toxicological Data: Sodium Hydroxide Oral rabbit LDLo = 500 mg/kg; Sodium Citrate Oral rat LD50 > 8 g/kg; Potassium Iodide Oral mouse LDLo = 1862 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None

Special Instructions (Disposal): Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Sodium Hydroxide Solution

--

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1824

DOT Packing Group: II

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Sodium Hydroxide Solution

--

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1824

ICAO Packing Group: II

I.M.O.:

I.M.O. Proper Shipping Name: Sodium Hydroxide Solution

--

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1824

I.M.O. Packing Group: II

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--
302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Sodium Hydroxide 1000 lbs.

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium Hydroxide - RQ = 1000 lbs. (454 kgs.)

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Buffer

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment. In-house information. Gosselin, R. E. et al. Clinical Toxicology of Commercial Products, 5th Ed. Baltimore: The Williams and Wilkins Co., 1984.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M01127

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Compound for Free and Total Chlorine Analyzers
Catalog Number: 2297255

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01127
Chemical Name: Confidential
CAS No.: Confidential
Chemical Formula: Confidential
Chemical Family: Confidential
Hazard: May cause irritation. May cause sensitization.
Date of MSDS Preparation:
Day: 16
Month: November
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 100.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White powder
Odor: None
MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2
Flammability: 1

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: May cause irritation May cause allergic reaction

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine

Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.

Cancer / Reproductive Toxicity Information:

O.S.H.A. Listed: No

IARC Listed: No

NTP Listed: No

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Dusts at sufficient concentrations can form explosive mixtures with air. Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide. nitrogen oxides.

Fire / Explosion Hazards: May react violently with: strong oxidizers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light moisture Keep away from: oxidizers

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Use with adequate ventilation. Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White powder

Physical State: Solid

Molecular Weight: Confidential

Odor: None

pH: 1.99 (5% sol'n)

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 180°C (356°F)

Specific Gravity (water = 1): 1.226

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Completely soluble

Acid: Not determined

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Excess moisture Exposure to light.

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Toxic fumes of: nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat LD₅₀ = 970 mg/kg.

LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Reversible conjunctivitis was reported in animal studies.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: --
Not applicable

12. ECOLOGICAL INFORMATION

Product Ecological Information: Daphnia magna EC50 at 48 hrs: 10.8: NOEC 12.5 mg/L at 24 hrs, 3.1 mg/L at 48 hrs;
Ready Biodegradability To 60% in 21 days

Ingredient Ecological Information: --
Not applicable

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard.
(29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of Illinois. This product complies with Pennsylvania Trade Secret Regulations. New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

TSCA CAS Number: Confidential

16. OTHER INFORMATION

Intended Use: Laboratory Reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. In-house information. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Revision Summary: Updates in Section(s) 2, 11, 12,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER 8

WEST C-825

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-825

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

EXPOSURE LIMITS

<u>Chemical Name</u>	<u>CAS#</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium bisulfate	7681-38-1	Not Determined	Not Determined

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION: May cause severe irritation to eyes. May be irritating to respiratory tract.

PHYSICAL APPEARANCE: Clear colorless liquid, odorless

POTENTIAL HEALTH EFFECTS

Signs and Symptoms of Acute Overexposure: Contact with mist, or vapor may cause skin irritation. Contact with eyes will cause immediate pain. May be corrosive to corneal tissue. May cause irritation to nose and throat. May be corrosive to esophageal linings and mucous membranes if ingested.

Signs and Symptoms of Chronic overexposure: Repeated exposure may cause chronic bronchitis or respiratory inflammation. Repeated or extended skin contact may be corrosive. Repeated eye contact may cause conjunctivitis and photosensitization

Medical Conditions Generally Aggravated by Exposure: No Data Available .

4. FIRST AID MEASURES

Inhalation: Remove victim to fresh air. Get prompt medical attention

Ingestion: Do not induce vomiting. Give victim large amounts of milk or water to drink. Get victim to hospital promptly.

Skin Contact: Remove contaminated clothing and footwear. Wash skin for 15 minutes with soap and water. Wash clothing before reuse. If irritation persists, get medical attention.

Eye Contact: Immediately flush eyes with water for 15 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye and eyelid tissue. Do not allow victim to rub or keep eyes closed. Get immediate medical attention.

Note to Physician: Treat symptomatically. No specific antidote.

MATERIAL SAFETY DATA SHEET
WEST C-825

5. FIRE FIGHTING MEASURES

FIRE

Flash point: Not Applicable
Autoignition temperature: Not Applicable
Flammable limits in air % by volume:
l_{el}: ND; u_{el}: ND

UNUSUAL FIRE OR EXPLOSION HAZARDS

Not Combustible.

FIRE EXTINGUISHING MEDIA

Not combustible. Use extinguishing method suitable for surrounding fire.

SPECIAL FIRE FIGHTING PRECEDURES:

None.

HAZARDOUS DECOMPOSITION MATERIALS (Under Fire Conditions):

Sulfur dioxide and/or sulfur trioxide may be released in fire, if water is allowed to evaporate. Wear SCBA if in fire situation.

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:

Ventilate closed spaces before entering. Wear appropriate protective gear for situation. See Personal Protection information in Section 8.

Containment of Spill:

Follow procedure described below under Cleanup and Disposal of Spill

Cleanup and Disposal of Spill:

Scrape up and place in appropriate closed container (see Section 7: Handling and Storage). Collect washings for disposal. Decontaminate tools and equipment following cleanup. Clean up residual material by washing area with water. Avoid creation of dusty conditions.

Environmental and Regulatory Reporting:

Do not flush to drain. If spilled on the ground, the affected area should be scraped clean placed in an appropriate container for disposal. Prevent material from entering public sewer system or any waterways. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact with the WEST Inc. using the Customer Service phone number in Section 1.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Protect against physical damage. Normal precautions common to safe manufacturing practice should be followed in handling and storage. Do not get in eyes. Do not breathe dusts. Avoid direct or prolonged contact with skin. Containers of this material may be hazardous when empty since they retain product residues; observe all warnings and precautions listed for the product.

Store in an area that is cool, dry, well-ventilated

FOR INDUSTRY USE ONLY.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Introductory Remarks:

These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

MATERIAL SAFETY DATA SHEET

WEST C-825

OSHA Final PELs: NDA
OSHA Vacated PELs: NDA

Engineering Controls:

Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures.

Respiratory Protection:

When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the latest OSHA standard (29 CFR 1910.134) and/or ANSI Z88.2 recommendations. Under normal conditions, in the absence of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by OSHA/ANSI: Air-purifying (half-mask / full-face) respirator with cartridges / canister approved for use against dusts, mists and fumes.

Eye/Face Protection:

Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. It is generally regarded as good practice to wear a minimum of safety glasses with side shields when working in industrial environments.

Skin Protection:

Skin contact should be minimized through use of gloves and suitable long-sleeved clothing (i.e., shirts and pants). Consideration must be given both to durability as well as permeation resistance.

Work Practice Controls:

Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- 1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- 3) Wash exposed skin promptly to remove accidental splashes of contact with this material.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear Colorless Liquid
Odor:	Odorless
Solubility:	Water-soluble
Specific Gravity:	1.147 at 20°C (68 F)
pH:	1.0-2.0
Boiling Point:	~ 212 °F
Melting Point:	Not Applicable
Vapor Density (Air=1):	Not Applicable
Vapor Pressure (kPa):	Not Applicable

10. STABILITY AND REACTIVITY

Stability: Product is stable under normal conditions of storage and handling.

Hazardous Decomposition Products: Sulphur dioxide and sulphur trioxide gases.

Hazardous Polymerization: will not occur.

Incompatibility: Strong oxidizers, nitric acid, chlorine. Solution is acidic and reacts with bases.

Conditions to Avoid: Incompatible substances.

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WEST C-825

11. TOXICOLOGICAL INFORMATION

Toxicological Data:

Considered GRAS by FDA. Carcinogenicity: Sodium bisulfate and water are not listed by ACGIH, IARC, NIOSH, NTR, or OSHA

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

No data found for product.

Chemical Fate Information:

No data found for product.

13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. State and local disposal regulations may differ from federal disposal regulations. Empty containers may contain residues. Thoroughly clean empty container, then offer for recycling, reuse or disposal in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

DOT Proper Shipping Name: CORROSIVE LIQUID, N.O.S., 8, UN1760, PG III

CONTAINS (INORGANIC ACID SOLUTION)

DOT Hazard Class: 8 (Corrosive)

UN Number: 1760

15. REGULATORY INFORMATION

TSCA: All chemical ingredients are listed on TSCA inventory, with no special reporting regulations

CERCLA Reportable Quantity: Not subject to CERCLA reporting

SARA TITLE III:

.....Section 302/304 Extremely Hazardous Substances: None

.....Section 311 Hazard Categorization: Acute Health

.....Section 313 Toxic Chemicals: NDA

Not subject to Proposition 65 labeling requirements (California)

CAA: Ingredients not listed as hazardous pollutants under CAA

OSHA: None of the ingredients are considered Extremely Hazardous by OSHA.

16. OTHER INFORMATION

DATE PREPARED: 2/23/2011

MSDS No: C-825

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



**MATERIAL SAFETY
DATA SHEET**

WEST R-630 SULFITE
(DeChlorinator)

HMIS RATING
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0
OTHER: C

1. PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME: WEST R-630 SULFITE
PRODUCT DESCRIPTION: An aqueous solution of sodium & potassium sulfites, bisulfites, and metabisulfites. This product is designed specifically for halogen removal in process water systems.

MANUFACTURER: Water & Energy Systems Technology, Inc
13109 Arctic Circle
Santa Fe Springs, CA 90670
Customer Service: (562) 921-5191

24 HR EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV

This product does not contain any hazardous materials under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, nearly colorless liquid with very little odor.
IMMEDIATE CONCERNS: Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: May cause irritation or redness on contact with eye.
SKIN: Substance may cause slight skin irritation.
SKIN ABSORPTION: None.
INGESTION: Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing larger amounts may cause serious injury.
INHALATION: Poses little or no immediate hazard. Vapor and mists may cause allergic reactions in persons sensitive to sulfite compounds.
ACUTE EFFECTS: May cause local irritation from exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Person with pre-existing skin disorders, eye problems, or impaired respiratory function may be more susceptible to the effects of this substance.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: No specific information is available.
CARCINOGENICITY: This product's ingredients are not found in the Federal, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.
SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not applicable.
AUTO IGNITION & TEMPERATURE: Not applicable.
UNUSUAL FIRE & EXPLOSION HAZARDS: Sulfur dioxide gas may result from incineration.
FIRE FIGHTING PROCEDURES: Full protective clothing, plus self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Small spills should be flushed with a water spray.
LARGE SPILL: Contain by diking with soil or other absorbent material.
ENVIRONMENTAL PRECAUTIONS: Keep out of sewers, drains, and surface waters.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Follow all MSDS and Label precautions even after container is emptied as container may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Normal area ventilation should be adequate.

PERSONAL PROTECTION

EYES AND FACE: Wear chemical goggles or safety glasses with side shields.
SKIN: Nitrile rubber, PVC, or Neoprene apron and gloves.
RESPIRATORY: None required under normal conditions.
PROTECTIVE CLOTHING: Where splashing is possible, chemical resistant clothing, rubber apron, and boots should be worn.
HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.
ODOR: Mild sulfur.
COLOR: Colorless.
pH: ~ 6.5 units.
PERCENT VOLATILE: Not determined.
VAPOR DENSITY: Not determined.
BOILING POINT: 212 °F
SPECIFIC GRAVITY: 1.251
WATER SOLUBILITY: Complete
EVAPORATION RATE: < 1 (butyl acetate = 1.00)

10. STABILITY AND REACTIVITY

STABLE: Yes
HAZARDOUS POLYMERIZATION: No
CONDITIONS TO AVOID: High ambient temperatures in storage areas.
HAZARDOUS DECOMPOSITION: Decomposes at high temperatures to form sulfur dioxide gas.
INCOMPATIBLE MATERIALS: Strong oxidizers, acids, alkali's, amines, halogens, halogen compounds, anhydrides, and aldehydes.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal OSHA, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: D.O.T. NONREGULATED WATER TREATMENT COMPOUND

15. REGULATORY INFORMATION

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: No PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: No

16. OTHER INFORMATION

DATE PREPARED: 12/31/2010
MSDS NUMBER: R630

MANUFACTURER DISCLAIMER:

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of, or reliance upon such information. No representations, or warranties, either express or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A048	TA-53	03A, Treated Cooling Water Discharges	Los Alamos Canyon

SOURCE OF DISCHARGE

Outfall 03A048 is located at TA-53 and discharges treated cooling tower blow-down from the Los Alamos Neutron Science Center (LANSCE) cooling towers located at TA-53-963/964 and TA-53-978/979 to a tributary of Los Alamos Canyon. The specific sources are identified in Table 1.

**Table 1
 Sources for Discharges to Outfall 03A048**

Table 1 – Source for Discharges to Outfall 03A048		
TA	Bldg	Description
53	964 & 963	Treated cooling tower blow down. The treatment system and circulation pumps are located at 53-964. The West Cooling Towers are located in 53-963.
53	978 & 979	Treated cooling tower blow down. The treatment system and circulation pumps are located in 53-979. The East Cooling Towers are located in 53-978.

Figure 1 provides a process schematic.

WATER TREATMENT PROCESS

The water treatment systems associated with the LANSCE cooling towers are controlled by a process logic controller (PLC) that monitors the tower water using a chlorine detection system and a conductivity meter. It treats the water using chemicals that may include a corrosion inhibitor, biocide, and de-chlorination agent. The tower at TA-53-963/964 also includes an arsenic monitoring system connected to the PLC that controls the blow down rate based on the concentration of arsenic in the cooling tower basin. The water treatment codes associated with the cooling towers are provided in Table 2.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A048**

Treatment Code	Treatment Process	Description
2-H	Disinfection (other)	Chemicals are added to control Microorganisms
2-E	Dechlorination	Blow down is de-chlorinated prior to discharge
2-L	Reduction	Chemicals that are Corrosion Inhibitors are added

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control corrosion, limit biological growth and de-chlorinate the water prior to discharge. The chemicals used to treat the water in the cooling towers are identified in Table 3.

Table 3
Treatment Chemicals Used in the LANSCE Cooling Towers

Chemical Name	Reason for Use/Frequency	Hazardous Substances Form 2C, Table 2C-4
PuroBrom Tablets	Biocide (control of Microorganisms)	chlorine
WEST C-358	Corrosion Control/Scale Inhibitor	Sodium Hydroxide
WEST R-630	Dechlorination	Sodium Bisulfite

POTENTIAL POLLUTANTS

The treatment chemicals used to treat the cooling water constitute the pollutant load of the discharge to Outfall 03A048. Table 4 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 constituents identified.

Table 4
Potential Pollutants Discharged to Outfall 03A048

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
Cooling Tower Blow-down – West Towers at 53-963	Sodium Bisulfite, Sodium Hydroxide, Chlorine
Cooling Tower Blow-down – East Towers at 53-978	Sodium Bisulfite, Sodium Hydroxide, Chlorine

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to Outfall 03A048 are provided in Table 5.

Table 5
Source Flow Rates/Frequencies to Outfall 03A048

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
53-963 Cooling Towers	39,207	2-H, 2-E, 2-L
53-978 Cooling Towers	22,541	2-H, 2-E, 2-L

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A048 for the Permit Re-Application on August 8, 2011.

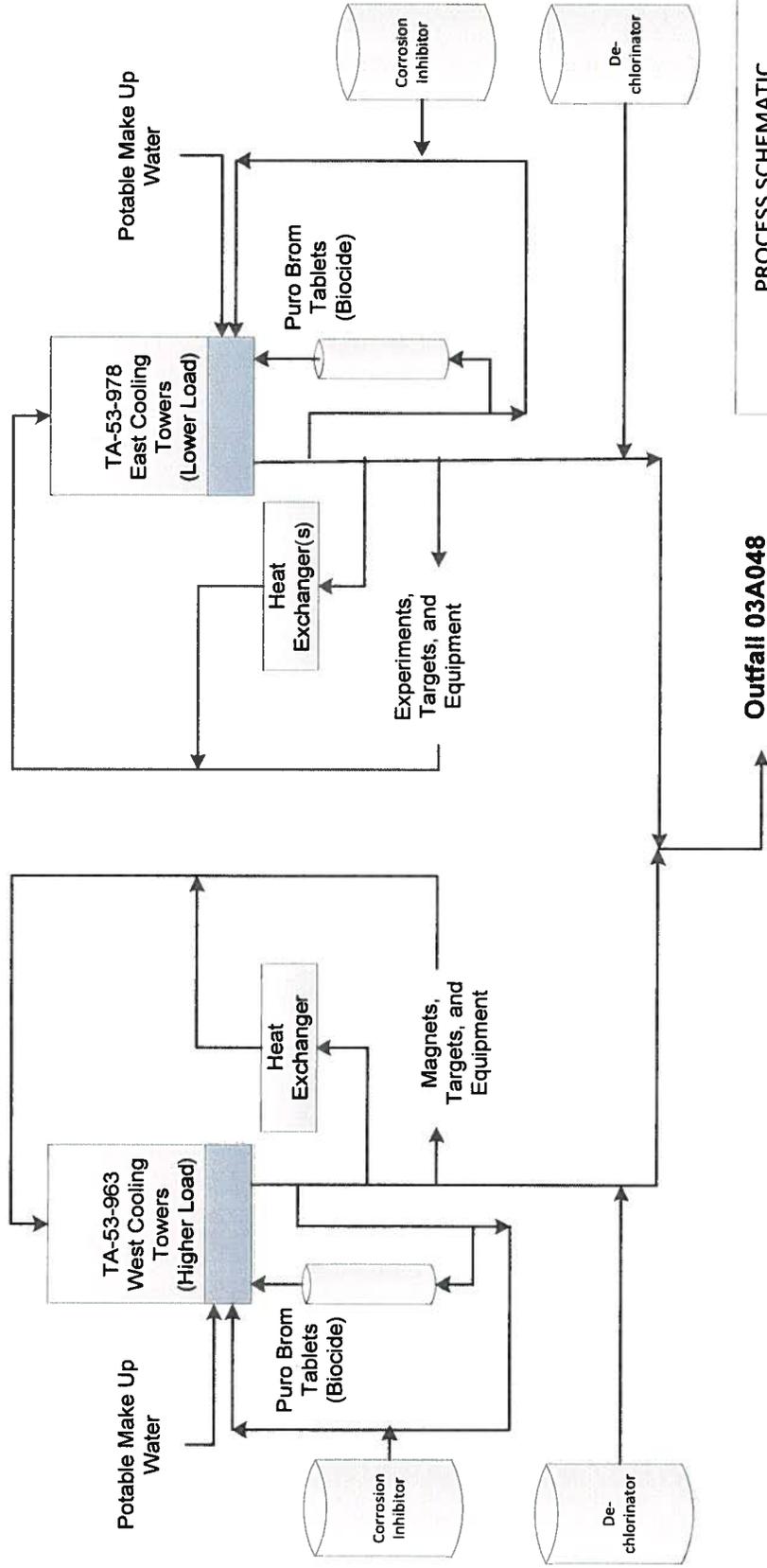
ANALYTICAL RESULTS PROVIDED

- Form 2C Analytes from a grab sample collected August 8, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°52'11"N
- Longitude – 106°15'45"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 179 mg/L.

Figure 1
 Process Schematic for the Los Alamos Neutron Science Center (LANSCCE) Cooling Towers and Outfall 03A048

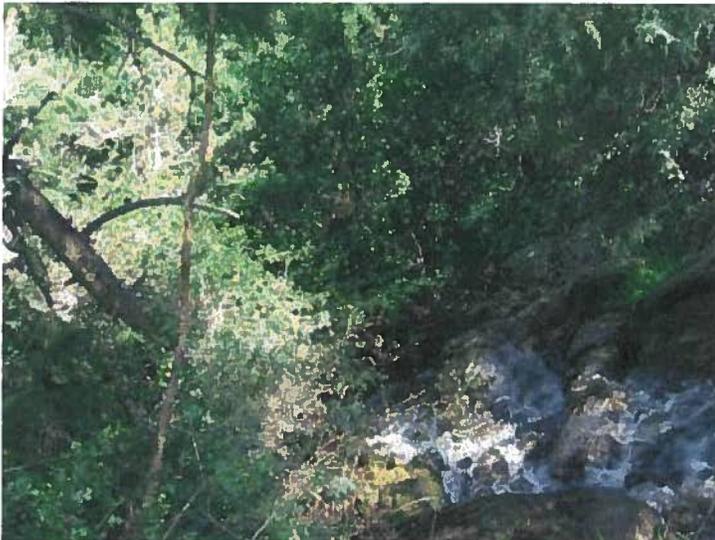


PROCESS SCHEMATIC
 TA-53-963 and 978 Cooling Towers, Water
 Treatment System, and Outfall
 January 25, 2012
 2012 NPDES Permit Re-Application
OUTFALL 03A048

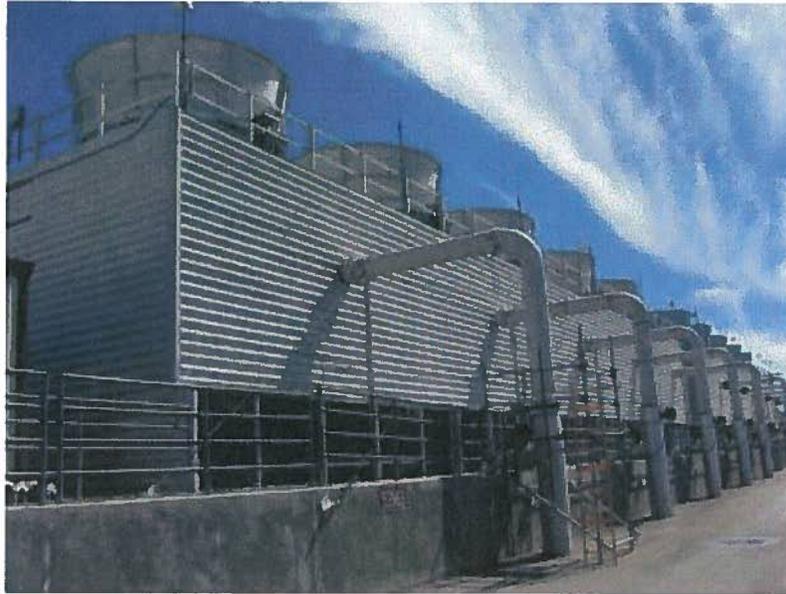
Photographs: LANSCE Cooling Towers and Outfall 03A048



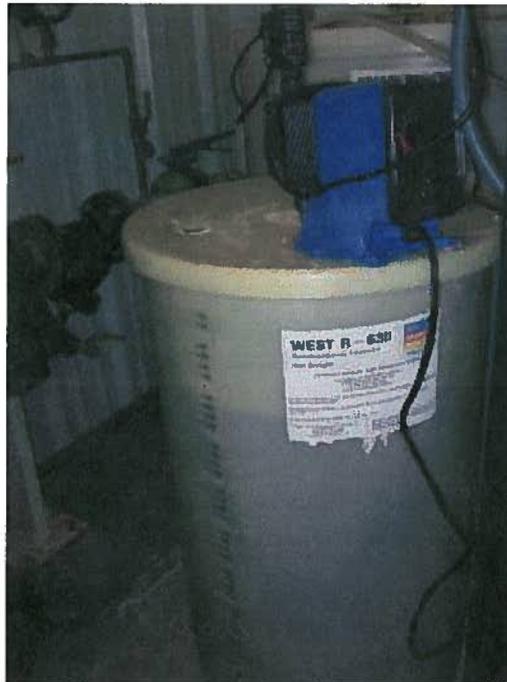
Photograph 1 – LANSCE Cooling Towers and Treatment System
Outfall 03A048



Photographs 2 & 3 – LANSCE Cooling Towers and Treatment System
Outfall 03A048 – Receiving Stream



Photograph 4 – LANSCE Cooling Towers and Treatment System
LANSCE West Cooling Towers



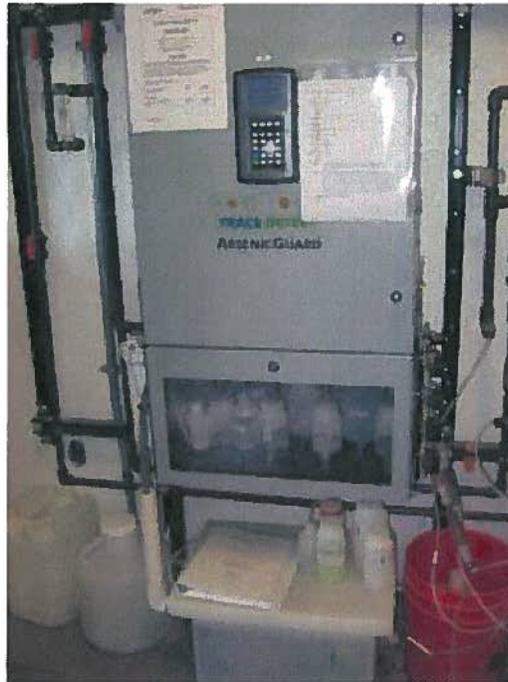
Photograph 5 – LANSCE Cooling Towers and Treatment System
LANSCE West Cooling Towers – Chemical Feed System



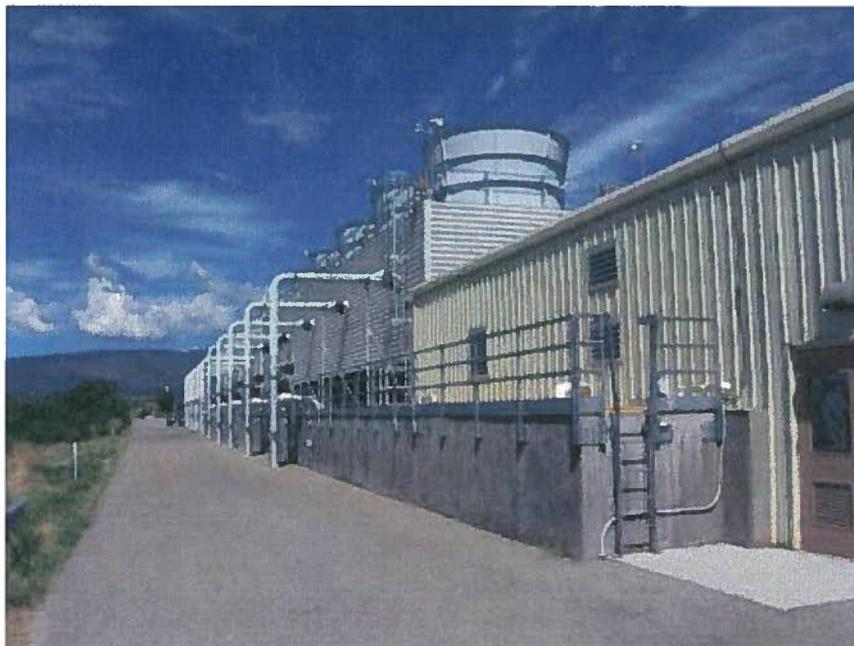
Photograph 6 – LANSCE Cooling Towers and Treatment System
LANSCE West Cooling Towers – PuroBrom Tablet Tank



Photograph 7 – LANSCE Cooling Towers and Treatment System
LANSCE West Cooling Towers – Chlorine Analyzer



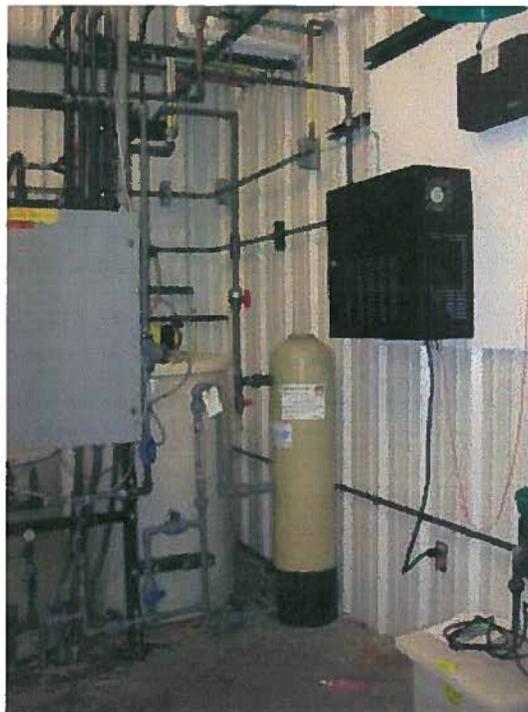
Photograph 8 – LANSCE Cooling Towers and Treatment System
LANSCE West Cooling Towers – Arsenic Analyzer



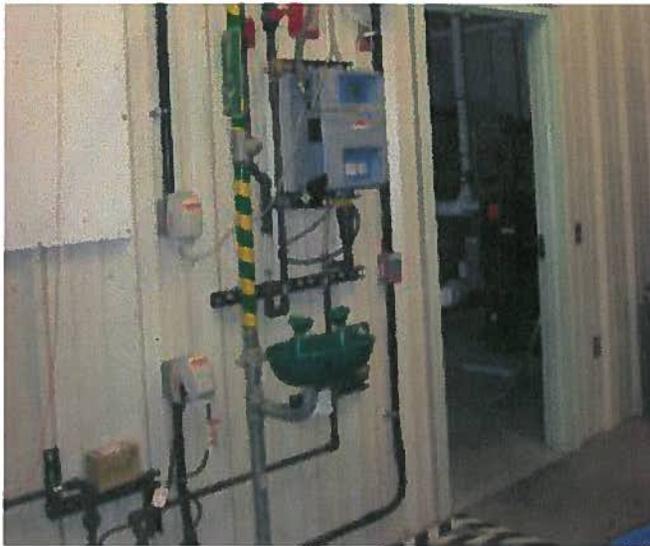
Photograph 9 – LANSCE Cooling Towers and Treatment System
LANSCE East Cooling Towers



Photograph 10 – LANSCE Cooling Towers and Treatment System
LANSCE East Cooling Towers – Chemical Feed System



Photograph 11 – LANSCE Cooling Towers and Treatment System
LANSCE East Cooling Towers – PuroBrom Tank



Photograph 12 & 13 – LANSCE Cooling Towers and Treatment System
LANSCE East Cooling Towers – Chlorine Analyzers

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR										
				Flow Rate			Analytical Lab Result			Result	Units	MOL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples	
				Average	Maximum	Units	Symbol	Result	Units											MOL
03A027	3-2327	8/07	Flow (Totalized Est.)	0.03532	0.04778	MGD									0.03532	0.04778	MGD			1
		9/07	Flow (Totalized Est.)	0.03064	0.04400	MGD									0.03064	0.04400	MGD			1
		10/07	Flow (Totalized Est.)	0.02275	0.02872	MGD									0.02275	0.02872	MGD			1
		11/07	Flow (Totalized Est.)	0.02275	0.03403	MGD									0.02275	0.03403	MGD			1
		12/07	Flow (Totalized Est.)	0.01864	0.02318	MGD									0.01864	0.02318	MGD			1
		1/08	Flow (Totalized Est.)	0.01847	0.02105	MGD									0.01847	0.02105	MGD			1
		2/08	Flow (Totalized Est.)	0.01874	0.02955	MGD									0.01874	0.02955	MGD			1
		3/08	Flow (Totalized Est.)	0.02537	0.03472	MGD									0.02537	0.03472	MGD			1
		4/08	Flow (Totalized Est.)	0.02446	0.03732	MGD									0.02446	0.03732	MGD			1
		5/08	Flow (Totalized Est.)	0.02840	0.03651	MGD									0.02840	0.03651	MGD			1
		6/08	Flow (Totalized Est.)	0.03134	0.03638	MGD									0.03134	0.03638	MGD			1
		7/08	Flow (Totalized Est.)	0.03325	0.04077	MGD									0.03325	0.04077	MGD			1
		8/08	Flow (Totalized Est.)	0.03866	0.04784	MGD									0.03866	0.04784	MGD			1
		9/08	Flow (Totalized Est.)	0.04236	0.04600	MGD									0.04236	0.04600	MGD			1
		10/08	Flow (Totalized Est.)	0.03584	0.09294	MGD									0.03584	0.09294	MGD			1
		11/08	Flow (Totalized Est.)	0.03533	0.04048	MGD									0.03533	0.04048	MGD			1
		12/08	Flow (Totalized Est.)	0.03989	0.04735	MGD									0.03989	0.04735	MGD			1
		1/09	Flow (Totalized Est.)	0.03890	0.04413	MGD									0.03890	0.04413	MGD			1
		2/09	Flow (Totalized Est.)	0.03827	0.04623	MGD									0.03827	0.04623	MGD			1
		3/09	Flow (Totalized Est.)	0.03352	0.03828	MGD									0.03352	0.03828	MGD			1
		4/09	Flow (Totalized Est.)	0.03021	0.03754	MGD									0.03021	0.03754	MGD			1
		5/09	Flow (Totalized Est.)	0.03584	0.09294	MGD									0.03584	0.09294	MGD			1
		6/09	Flow (Totalized Est.)	0.05801	0.06715	MGD									0.05801	0.06715	MGD			1
		7/09	Flow (Totalized Est.)	0.06283	0.07820	MGD									0.06283	0.07820	MGD			1
		8/09	Flow (Totalized Est.)	0.06043	0.07348	MGD									0.06043	0.07348	MGD			1
		9/09	Flow (Totalized Est.)	0.05575	0.06540	MGD									0.05575	0.06540	MGD			1
		10/09	Flow (Totalized Est.)	0.04445	0.08099	MGD									0.04445	0.08099	MGD			1
		11/09	Flow (Totalized Est.)	0.03984	0.05681	MGD									0.03984	0.05681	MGD			1
		12/09	Flow (Totalized Est.)	0.03390	0.04563	MGD									0.03390	0.04563	MGD			1
		1/10	Flow (Totalized Est.)	0.03522	0.04394	MGD									0.03522	0.04394	MGD			1
		2/10	Flow (Totalized Est.)	0.03129	0.05282	MGD									0.03129	0.05282	MGD			1
		3/10	Flow (Totalized Est.)	0.03814	0.05161	MGD									0.03814	0.05161	MGD			1
		4/10	Flow (Totalized Est.)	0.03990	0.04725	MGD									0.03990	0.04725	MGD			1
		5/10	Flow (Totalized Est.)	0.04199	0.05676	MGD									0.04199	0.05676	MGD			1
		6/10	Flow (Totalized Est.)	0.04804	0.05794	MGD									0.04804	0.05794	MGD			1
		7/10	Flow (Totalized Est.)	0.04584	0.05769	MGD									0.04584	0.05769	MGD			1
		8/10	Flow (Totalized Est.)	0.04394	0.05544	MGD									0.04394	0.05544	MGD			1
		9/10	Flow (Totalized Est.)	0.03678	0.04420	MGD									0.03678	0.04420	MGD			1
		10/10	Flow (Totalized Est.)	0.10493	0.11710	MGD									0.10493	0.11710	MGD			1
		11/10	Flow (Totalized Est.)	0.04355	0.05190	MGD									0.04355	0.05190	MGD			1
		12/10	Flow (Totalized Est.)	0.04009	0.04920	MGD									0.04009	0.04920	MGD			1
		1/11	Flow (Totalized Est.)	0.04649	0.05530	MGD									0.04649	0.05530	MGD			1
		2/11	Flow (Totalized Est.)	0.04490	0.05430	MGD									0.04490	0.05430	MGD			1
		3/11	Flow (Totalized Est.)	0.05115	0.06890	MGD									0.05115	0.06890	MGD			1
		4/11	Flow (Totalized Est.)	0.06123	0.06780	MGD									0.06123	0.06780	MGD			1
		5/11	Flow (Totalized Est.)	0.06145	0.07340	MGD									0.06145	0.07340	MGD			1

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR										
				Flow Rate			Analytical Lab Result			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples				
				Average	Maximum	Units	Symbol	Result	Units								MOL	Result	Units	MOL
		6/11	Flow (Totalized Est.)	0.05946	0.07220	MGD						0.05946	0.07220	MGD		1				
		7/11	Flow (Totalized Est.)	0.04599	0.06290	MGD						0.04599	0.06290	MGD		1				
		8/11	Flow (Totalized Est.)	0.05973	0.07270	MGD						0.05973	0.07270	MGD		1				
		9/11	Flow (Totalized Est.)	0	0	MGD						0	0	MGD						
		10/11	Flow (Totalized Est.)	0	0	MGD						0	0	MGD						
		11/11	Flow (Totalized Est.)	0.06000	0.06930	MGD						0.06000	0.06930	MGD		1				
		12/11	Flow (Totalized Est.)	0.07500	0.05499	MGD						0.07500	0.05499	MGD		1				
				Average			Maximum			NA	NA	0.10493	0.11710	MGD		Total				
03A027	3-2327	8/07	pH								8.1				8.4	SU	6.0 - 9.0	SU	4	5
		9/07	pH								8.0				8.4	SU	6.0 - 9.0	SU	4	4
		10/07	pH								7.8				8.4	SU	6.0 - 9.0	SU	4	4
		11/07	pH								8.3				8.5	SU	6.0 - 9.0	SU	5	5
		12/07	pH								8.4				8.5	SU	6.0 - 9.0	SU	4	4
		1/08	pH								8.1				8.5	SU	6.6 - 8.8	SU	5	5
		2/08	pH								8.0				8.5	SU	6.6 - 8.8	SU	4	4
		3/08	pH								7.8				8.4	SU	6.6 - 8.8	SU	4	4
		4/08	pH								8.1				8.3	SU	6.6 - 8.8	SU	5	5
		5/08	pH								8.1				8.2	SU	6.6 - 8.8	SU	4	4
		6/08	pH								8.0				8.2	SU	6.6 - 8.8	SU	4	4
		7/08	pH								8.0				8.2	SU	6.6 - 8.8	SU	5	5
		8/08	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		9/08	pH								8.0				8.3	SU	6.6 - 8.8	SU	4	4
		10/08	pH								8.2				8.5	SU	6.6 - 8.8	SU	4	4
		11/08	pH								8.0				8.4	SU	6.6 - 8.8	SU	4	4
		12/08	pH								8.1				8.5	SU	6.6 - 8.8	SU	4	4
		1/09	pH								8.3				8.7	SU	6.6 - 8.8	SU	4	4
		2/09	pH								8.2				8.5	SU	6.6 - 8.8	SU	4	4
		3/09	pH								8.5				8.6	SU	6.6 - 8.8	SU	4	4
		4/09	pH								8.3				8.6	SU	6.6 - 8.8	SU	5	5
		5/09	pH								8.5				8.7	SU	6.6 - 8.8	SU	4	4
		6/09	pH								8.1				8.3	SU	6.6 - 8.8	SU	5	5
		7/09	pH								8.1				8.5	SU	6.6 - 8.8	SU	4	4
		8/09	pH								8.4				8.4	SU	6.6 - 8.8	SU	4	4
		9/09	pH								8.0				8.4	SU	6.6 - 8.8	SU	5	5
		10/09	pH								7.8				8.5	SU	6.6 - 8.8	SU	4	4
		11/09	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		12/09	pH								8.3				8.7	SU	6.6 - 8.8	SU	5	5
		1/10	pH								8.4				8.6	SU	6.6 - 8.8	SU	4	4
		2/10	pH								8.4				8.7	SU	6.6 - 8.8	SU	4	4
		3/10	pH								8.0				8.3	SU	6.6 - 8.8	SU	5	5
		4/10	pH								8.1				8.3	SU	6.6 - 8.8	SU	4	4
		5/10	pH								8.0				8.2	SU	6.6 - 8.8	SU	4	4
		6/10	pH								8.1				8.4	SU	6.6 - 8.8	SU	5	5
		7/10	pH								8.2				8.4	SU	6.6 - 8.8	SU	4	4
		8/10	pH								8.2				8.6	SU	6.6 - 8.8	SU	4	4

DMR Outfall Discharge Summary - 03A027
 Los Alamos National Laboratory
 NPDES Permit No. NM 0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR															
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Permit Limit			Number of Samples
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units			
		3/09	TSS											4	4	4	mg/L	30/100	mg/L	1					
		4/09															mg/L	30/100	mg/L						
		5/09															mg/L	30/100	mg/L						
		6/09	TSS											4	4	4	mg/L	30/100	mg/L	1					
		7/09															mg/L	30/100	mg/L						
		8/09															mg/L	30/100	mg/L						
		9/09	TSS											1	1	1	mg/L	30/100	mg/L	1					
		10/09															mg/L	30/100	mg/L						
		11/09															mg/L	30/100	mg/L						
		12/09	TSS											2	2	2	mg/L	30/100	mg/L	1					
		1/10															mg/L	30/100	mg/L						
		2/10	TSS											2	2	2	mg/L	30/100	mg/L	1					
		3/10															mg/L	30/100	mg/L						
		4/10															mg/L	30/100	mg/L						
		5/10	TSS											2	2	2	mg/L	30/100	mg/L	1					
		6/10															mg/L	30/100	mg/L						
		7/10	TSS											2	2	2	mg/L	30/100	mg/L	1					
		8/10															mg/L	30/100	mg/L						
		9/10	TSS											3	3	3	mg/L	30/100	mg/L	1					
		10/10															mg/L	30/100	mg/L						
		11/10	TSS											2	2	2	mg/L	30/100	mg/L	1					
		12/10															mg/L	30/100	mg/L						
		1/11															mg/L	30/100	mg/L						
		2/11	TSS											2	2	2	mg/L	30/100	mg/L	1					
		3/11															mg/L	30/100	mg/L						
		4/11															mg/L	30/100	mg/L						
		5/11	TSS											2	2	2	mg/L	30/100	mg/L	1					
		6/11															mg/L	30/100	mg/L						
		7/11	TSS											1	1	1	mg/L	30/100	mg/L	1					
		8/11															mg/L	30/100	mg/L						
		9/11	TSS											13	13	13	mg/L	30/100	mg/L	1					
		10/11															mg/L	30/100	mg/L						
		11/11															mg/L	30/100	mg/L						
		12/11	TSS											9	9	9	mg/L	30/100	mg/L	2					
				Average			NA	NA			NA			2.94			mg/L			Total					
				Maximum			NA	NA			NA			13.00			mg/L			19					
03A027	3-2327	8/07	Total Phosphorus											4	4	4	mg/L	20/40	mg/L	1					
		9/07															mg/L	20/40	mg/L						
		10/07															mg/L	20/40	mg/L						
		11/07															mg/L	20/40	mg/L						
		12/07	Total Phosphorus											4	4	4	mg/L	20/40	mg/L	1					
		1/08															mg/L	20/40	mg/L						
		2/08															mg/L	20/40	mg/L						
		3/08	Total Phosphorus											3	3	3	mg/L	20/40	mg/L	1					
		4/08															mg/L	20/40	mg/L						
		5/08															mg/L	20/40	mg/L						

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																				
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	Minimum	Average	Maximum	Units	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples				
		6/08	Total Phosphorus											5	5	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		7/08	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		8/08	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		9/08	Total Phosphorus											0	0	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		10/08	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		11/08	Total Phosphorus											3	3	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		12/08	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		1/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		2/09	Total Phosphorus											2	2	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		3/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		4/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		5/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		6/09	Total Phosphorus											1	1	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		7/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		8/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		9/09	Total Phosphorus											3	3	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		10/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		11/09	Total Phosphorus											1	1	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		12/09	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		1/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		2/10	Total Phosphorus											5	5	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		3/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		4/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		5/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		6/10	Total Phosphorus											2	2	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		7/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		8/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		9/10	Total Phosphorus											0	0	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		10/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		11/10	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		12/10	Total Phosphorus											0	0	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		1/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		2/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		3/11	Total Phosphorus											1	1	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		4/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		5/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		6/11	Total Phosphorus											1	1	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		7/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		8/11	Total Phosphorus											0	0	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		9/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		10/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		11/11	Total Phosphorus													mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	1						
		12/11	Total Phosphorus											1	1	mg/L	20/40	mg/L	20/40	mg/L	20/40	mg/L	20/40	2						
				Average	Maximum	Units							NA	NA	mg/L	2.00	mg/L	2.00	mg/L	2.00	mg/L	2.00	Total							
				Maximum	Units								NA	NA	mg/L	5.00	mg/L	5.00	mg/L	5.00	mg/L	5.00	mg/L	Total						
03A027	3-2327	8/07-12/07	Total Copper											0	0	mg/L	Report	mg/L	Report	mg/L	Report	mg/L	Report	19						
																mg/L	Report	mg/L	Report	mg/L	Report	mg/L	Report	1						

DMR Outfall Discharge Summary - 03A027
 Los Alamos National Laboratory
 NPDES Permit No. NM 0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR											
				Flow Rate			Analytical Lab Result			DMR Units			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units								MQL	
		1/08-12/08	Total Copper								1.8 ug/L	10				0	mg/L	Report	mg/L	1	
		1/09-12/09	Total Copper								2.24 ug/L	10				0	mg/L	Report	mg/L	1	
		1/10-12/10	Total Copper								2.88 ug/L	10				0	mg/L	Report	mg/L	1	
		1/11-12/11	Total Copper								2.21 ug/L	10				0	mg/L	Report	mg/L	1	
				Average			Average			NA	NA	0.00	mg/L			NA	mg/L			Total	4
				Maximum			Maximum			NA	NA	0.00	mg/L			NA	mg/L				

DMR Outfall Data Summary - 03A027

Biological Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
03A027	5/14/2008	Grab	Ceriodaphnia pulex Pimephales promelas	48 hr acute 96 hr acute	80 80	P P

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A027	TA-3-2327, SCC (A) Cooling Tower Blow Down - Potable (Makeup Water) - SERF (Makeup Water) [INTERMITTENT]	7	12	0.053432 mgal/d	0.117100 mgal/d	53,432 Gallons	117,100 gallons	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding -- Complete one set of tables for each outfall -- Annotate the outfall number in the space provided.
 NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE	
Table 2C-3 Believed to be Absent.	SEE FORM 2C ANALYTICAL DATA]	EDTA	SCC Reagent (HACH1407028)	
Table 2C-4 (B)		Sulfuric Acid	De-Mineralizer; SCC Indicators (HACH 2263411, HACH2076053, HACH203832)	
Sodium Bisulfite		Boiler (NALCO 1720); Power Plant De-chlorination (NALCO 7408); SSC De-chlorination (WEST R-630)	Ferric Chloride	SERF Precipitation
Sodium Tripolyphosphate		Boiler (NALCO (R) 22341)	Hydrochloric Acid	SERF Precipitation & pH Adjustment
Sodium Hydroxide		Boiler (NALCO 8735); De-mineralizer; CT Corrosion Inhibitor (STABREX-ST20); SERF pH Adjustment & Precipitation; SWWS Disinfectant	Sodium Hypochlorite	CT Corrosion Inhibitor (STABREX-ST20); SERF Disinfection; SWWS Disinfection (Clorox, Hilex)
Potassium Hydroxide		Boiler (NALCO 8735); SCC Corrosion Inhibitors (WEST C-358P, C-522)		
Phosphoric Acid, Zinc Chloride		CT Corrosion Inhiitor (TG-7356)		[SEE FORM 2C ANALYTICAL DATA]
Sodium phosphate (dibasic)		SCC Reagents HACH1407028, HACH1406428		
chlorine		SCC Biocide (PuroBrom)		***See Additional Page 3 of 4 Attached*****

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?
 YES (list all such pollutants below) NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below) NO (go to Section VIII)

Whole Effluent Toxicity 48 hr Acute Toxicity - PASSED
 Pimephales promelas, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years
 Cerioddaphnia dubia, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

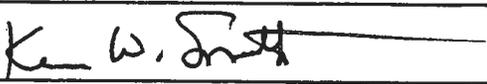
Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below) NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

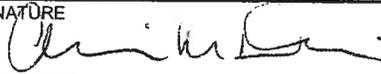
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Alison M. Dorries, Division Leader, ENV Protection Division	B. PHONE NO. (area code & no.) (505) 665-6952
C. SIGNATURE 	D. DATE SIGNED 1/27/12

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A027

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	<1.0	<0.977	(C)				1	mg/L	1b/D	NA	NA	NA
b. Chemical Oxygen Demand (COD)	55.1	53.8					1	mg/L	1b/D	NA	NA	NA
c. Total Organic Carbon (TOC)	14.2	13.9					1	mg/L	1b/D	NA	NA	NA
d. Total Suspended Solids (TSS)	13.0	12.7	13.0	11.4	6.25	2.79	4	mg/L	1b/D	NA	NA	NA
e. Ammonia (as N)	0.0631	0.0617					1	mg/L	1b/D	NA	NA	NA
f. Flow	VALUE 0.1171 (D)	VALUE 0.104926 (E)			VALUE 0.053432 (F)		365	MGD	NA	VALUE NA	NA	NA
g. Temperature (winter)	VALUE 21.1 (G)	VALUE 19.62 (H)			VALUE 18.1		13	°C		VALUE NA	NA	NA
h. Temperature (summer)	VALUE 25.6 (G)	VALUE 24.6 (H)			VALUE 23.9		12	°C		VALUE NA	NA	NA
i. pH	MINIMUM 7.9 (I)	MAXIMUM 8.8 (J)	MINIMUM 8.2 (J)	MAXIMUM 8.7 (J)			53	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"				3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES		
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS			
a. Bromide (24959-67-9)	X		3.54	3.46					1	mg/L	1b/D	NA	NA	NA		
b. Chlorine, Total Residual		X	0	0	0	0	0	0	53	mg/L	1b/D	NA	NA	NA		
c. Color	X		5	NA					1	SU	NA	NA	NA	NA		
d. Fecal Coliform		X	<1.0/100	NA	(K)				1	cfu/mL	NA	NA	NA	NA		
e. Fluoride (16984-48-6)	X		0.591	0.578					1	mg/L	1b/D	NA	NA	NA		
f. Nitrate-Nitrite (as N)	X		1.21	1.18					1	mg/L	1b/D	NA	NA	NA		

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CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		b. NO. OF ANALYSES	
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (if available)		b. MAXIMUM 30 DAY VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE			
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS		
g. Nitrogen, Total Organic (as N)	X		1.23	1.2			1	mg/L	1b/D	NA	NA	NA
h. Oil and Grease		X	<1.47	<1.44	(C)		1	mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1	0.9772	1	0.8756	4	mg/L	1b/D	NA	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<0.548	NA			1	pCi/L	NA	NA	NA	NA
(2) Beta, Total	X		20.8	NA			1	pCi/L	NA	NA	NA	NA
(3) Radium, Total		X	<0.616	NA			1	pCi/L	NA	NA	NA	NA
(4) Radium 226, Total		X	<0.283	NA			1	pCi/L	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		49.1	48.0			1	mg/L	1b/D	NA	NA	NA
l. Sulfide (as S)	X		<0.03	<0.0293	(C)		1	mg/L	1b/D	NA	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		1.7	1.66								
n. Surfactants		X	<0.016	<0.0156	(C)		1	mg/L	1b/D	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.0511	0.0499			1	mg/L	1b/D	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.0973	0.0951	(L)		1	mg/L	1b/D	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.0846	0.0827	(M)		1	mg/L	1b/D	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-04	(N)		1	mg/L	1b/D	NA	NA	NA
s. Iron, Total (7439-89-6)	X		0.0598	0.0584			1	mg/L	1b/D	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		13.0	12.7			1	mg/L	1b/D	NA	NA	NA
u. Molybdenum, Total (7439-98-7)		X	0.00452	0.00442	(O)		1	mg/L	1b/D	NA	NA	NA
v. Manganese, Total (7439-96-5)	X		0.00191	0.00187			1	mg/L	1b/D	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-03	(C)		1	mg/L	1b/D	NA	NA	NA
x. Titanium, Total (7440-32-6)	X		0.00832	0.00813			1	mg/L	1b/D	NA	NA	NA

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EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	03A027

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
													(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)			X	<1E-03		(N)				1	mg/L	1b/D	NA	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.0054						1	mg/L	1b/D	NA	NA	NA
3M. Beryllium, Total (7440-41-7)			X	<2E-04		(N)				1	mg/L	1b/D	NA	NA	NA
4M. Cadmium, Total (7440-43-9)			X	<1.1E-04		(N)				1	mg/L	1b/D	NA	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.012						1	mg/L	1b/D	NA	NA	NA
6M. Copper, Total (7440-50-8)		X		0.005		0.0049	0.005	0.0028	0.002	5	mg/L	1b/D	NA	NA	NA
7M. Lead, Total (7439-92-1)			X	<5E-04		<5E-04				1	mg/L	1b/D	NA	NA	NA
8M. Mercury, Total (7439-97-6)		X		4.5E-06		4E-06				1	mg/L	1b/D	NA	NA	NA
9M. Nickel, Total (7440-02-0)		X		0.00112		0.0011				1	mg/L	1b/D	NA	NA	NA
10M. Selenium, Total (7782-49-2)		X		0.0118		0.0115				1	mg/L	1b/D	NA	NA	NA
11M. Silver, Total (7440-22-4)			X	<2E-04		<2E-04	(N)			1	mg/L	1b/D	NA	NA	NA
12M. Thallium, Total (7440-28-0)			X	<4.5E-04		<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
13M. Zinc, Total (7440-66-6)			X	0.00373		0.0037	(P)			1	mg/L	1b/D	NA	NA	NA
14M. Cyanide, Total (57-12-5)			X	<1.5E-03		<2E-03	(N)			1	mg/L	1b/D	NA	NA	NA
15M. Phenols, Total			X	<1.6E-03		<2E-03				1	mg/L	1b/D	NA	NA	NA
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X												

DESCRIBE RESULTS The result provided is $8.31E-10$ mg/L, which is less than the MQL of 1E-08 mg/L.

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE			
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS		
GC/MS FRACTION - VOLATILE COMPOUNDS													
1V. Acrolein (107-02-8)			X	<1.25E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA		(R)							
5V. Bromoform (75-25-2)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
8V. Chlorodibromomethane (124-48-1)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	<2E-03	(C)		1	mg/L	1b/D	NA	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
12V. Dichlorobromomethane (75-27-4)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
13V. Dichlorodifluoromethane (75-71-8)			X	NA		(R)							
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA	NA
17V. 1,2-Dichloropropane (75-87-5)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
18V. 1,3-Dichloropropene (542-75-6)			X	<2.5E-04	<2E-04	(N, S)		1	mg/L	1b/D	NA	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<2E-04	(N)		1	mg/L	1b/D	NA	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)										
22V. Methylene Chloride (75-09-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	<3E-04	(C)	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<2E-04	(N)	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(R)				
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<5E-04	(N)	mg/L	1b/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS										
1A. 2-Chlorophenol (95-57-8)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5E-03	<5E-03	(N)	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
8A. p-Chloro-M-Cresol (59-50-7)			X	<3E-03	<3E-03	(C)	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3E-03	<3E-03	(N)	mg/L	1b/D	NA	NA

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS										
1B. Acenaphthene (83-32-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3E-04	(C)	1	mg/L	1b/D	NA	NA
3B. Anthracene (120-12-7)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
7B. 3,4-Benzofluoranthene (205-99-2)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3E-04	(C)	1	mg/L	1b/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
10B. Bis (2-Chloroethoxy) Methane (111-91-1)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
11B. Bis (2-Chloroethyl) Ether (111-44-4)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3E-03	(N)	1	mg/L	1b/D	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	<3E-03	(C)	1	mg/L	1b/D	NA	NA
18B. Chrysene (218-01-9)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
19B. Dibenz (a,h) Anthracene (53-70-3)			X	<3E-04	(N)	1	mg/L	1b/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	(N)	1	mg/L	1b/D	NA	NA
21B. 1,3-Dichlorobenzene (641-73-1)			X	<2.5E-04	(N)	1	mg/L	1b/D	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-7

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)										
22B. 1,4-Dichlorobenzene (106-46-7)			X	< 2.4E-04	< 2E-04	(N)	mg/L	1b/D	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	< 3E-03	< 3E-03	(C)	mg/L	1b/D	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	< 3E-03	< 3E-03	(C)	mg/L	1b/D	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
31B. Fluoranthene (206-44-0)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
32B. Fluorene (96-73-7)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
36B Hexachloroethane (67-72-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	< 3E-04	< 3E-04	(N)	mg/L	1b/D	NA	NA
38B. Isophorone (78-59-1)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
39B. Naphthalene (91-20-3)			X	< 3E-04	< 3E-04	(C)	mg/L	1b/D	NA	NA
40B Nitrobenzene (98-95-3)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	< 3E-03	< 3E-03	(N)	mg/L	1b/D	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GCMS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)										
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	(N, T)		mg/L	1b/D	NA	NA
44B. Phenanthrene (85-01-8)			X	<3E-04	(C)		mg/L	1b/D	NA	NA
45B. Pyrene (129-00-0)			X	<3E-04	(N)		mg/L	1b/D	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3E-03	(N)		mg/L	1b/D	NA	NA
GCMS FRACTION - PESTICIDES										
1P. Aldrin (309-00-2)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
2P. α-BHC (319-84-6)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
3P. β-BHC (319-85-7)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
4P. γ-BHC (58-89-9)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
5P. δ-BHC (319-86-6)			X	<6.65E-06	(C)		mg/L	1b/D	NA	NA
6P. Chlordane (57-74-9)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
10P. Dieldrin (60-57-1)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
11P. α-Endosulfan (115-29-7)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
14P. Endrin (72-20-8)			X	<1E-05	(N)		mg/L	1b/D	NA	NA
15P. Endrin Alderhyde (7421-93-4)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA
16P. Heptachlor (76-44-8)			X	<6.65E-06	(N)		mg/L	1b/D	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	03A027

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - PESTICIDES (continued)													
17P. Heptachlor Epoxide (1024-57-3)			X	<6.65E-06	<7E-06	(N)				mg/L	1b/D	NA	NA
18P. PCB-1242 (53469-21-9)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
19P. PCB-1254 (11097-69-1)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
20P. PCB-1221 (11104-28-2)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
21P. PCB-1232 (11141-16-5)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
22P. PCB-1248 (12672-29-6)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
23P. PCB-1260 (11096-82-5)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
24P. PCB-1016 (12674-11-2)			X	<3.43E-05	<3E-05	(N)				mg/L	1b/D	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.5E-04	<2E-04	(N)				mg/L	1b/D	NA	NA

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EPA Form 3510-2C (8-90)

FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A027

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from August 2010 to July 2011. The outfall discharged 364 days during the time period but is considered intermittent because it does not discharge 24 hours per day.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified because they are either components of the influent received by the Sanitary Waste Water System (SWWS) Facility or they are chemicals used to treat the water at the SERF and/or SCC Cooling Towers, and therefore, may be present in the effluent discharged to the outfall. There were not any Table 2C-3 hazardous substances identified.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- H. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. Boron was detected at a value less than the MQL of 0.1 mg/L.
- N. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- O. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- P. Zinc was detected at a value less than the MQL of 0.02 mg/L.
- Q. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A027

- R. EPA remanded the parameter.
- S. Result is for cis- and trans-1,3-dichloropropylene.
- T. Result is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

**EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)**

METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE

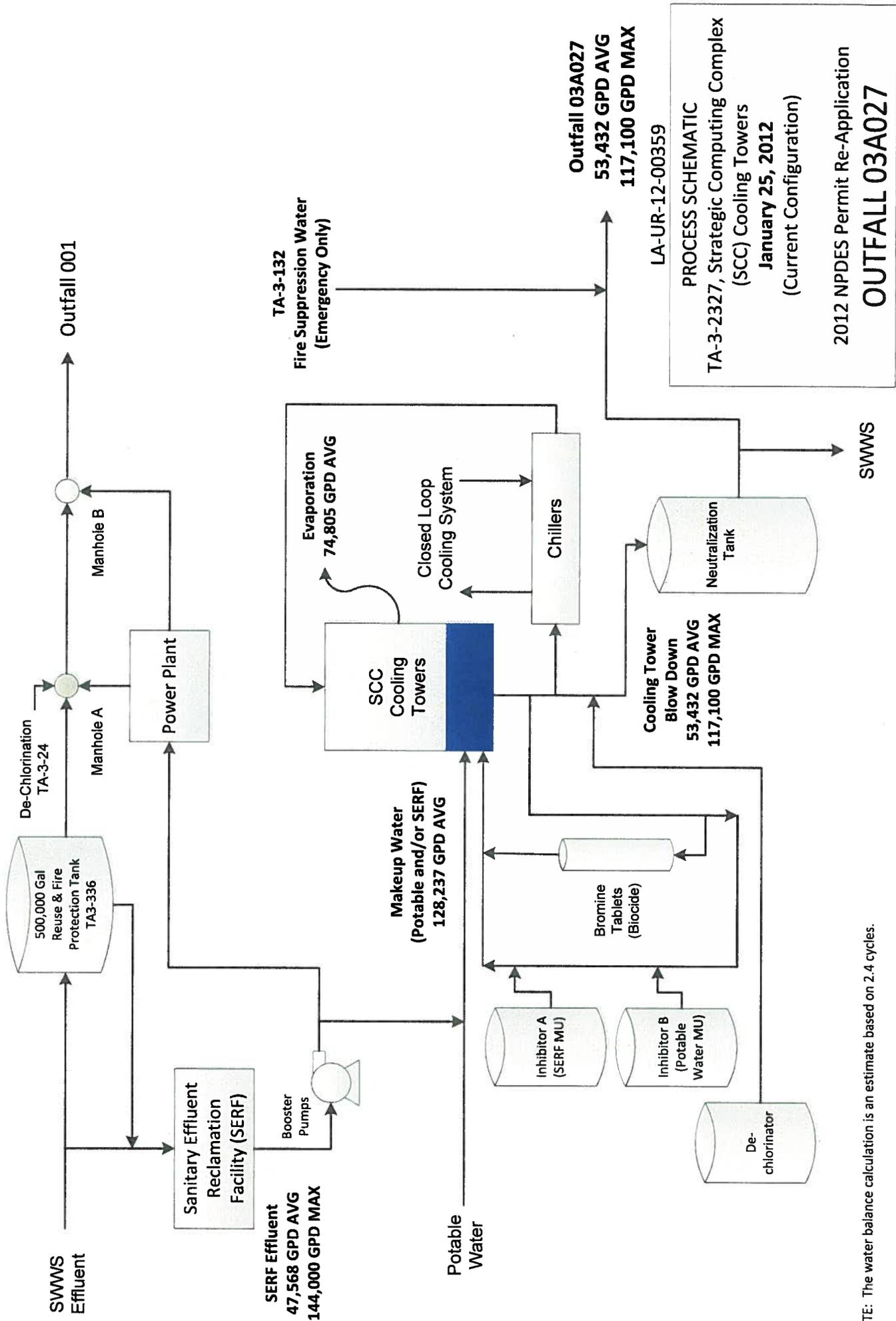
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

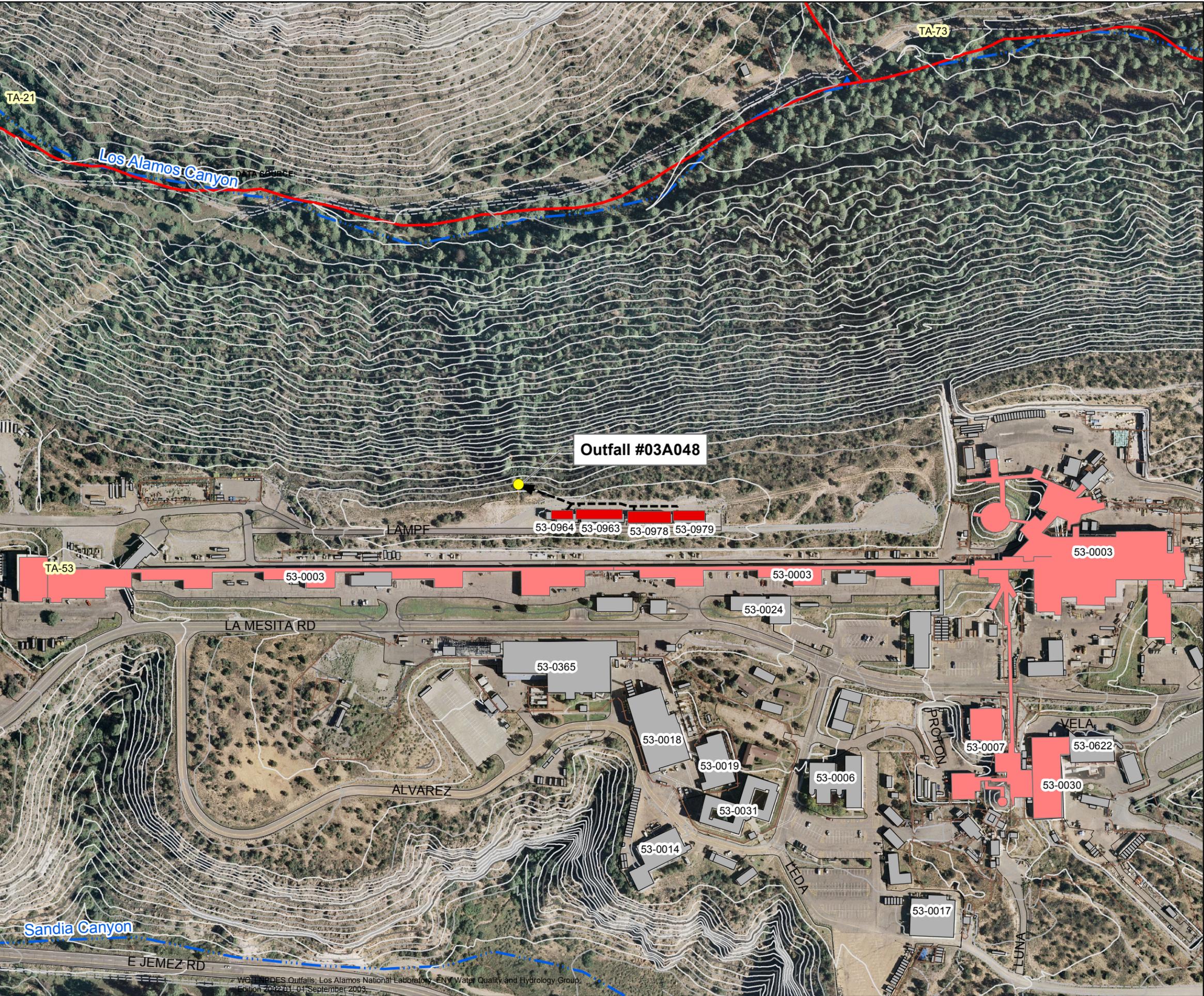
1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
Process Schematic and Water Balance for the TA-3-2327, Strategic Computing Complex (SCC) Cooling Towers
(Current Configuration)



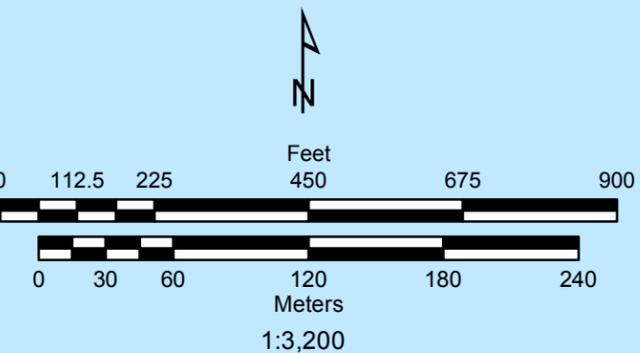
NOTE: The water balance calculation is an estimate based on 2.4 cycles.

**NPDES Permit Re-Application Project
TA-53 Building 964, 963, 978, 979
Outfall #03A048**



Legend

NPDES Outfall	Paved Roads
Springs	Source Structures
Drainages	Building Served by Source
100ft Contours	Structures
20ft Contours	LANL Boundary
10ft Contours	Technical Areas
Fences	
Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-04 23 August 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.
Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA . All other uses for this map should be confirmed with LANL ENV-RCRA staff.

WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

HCC ID: 750413-G30-031216

Page 1 of 6

MATERIAL SAFETY DATA SHEET

MSDS

Purobrom Tablets

Date-Issued: 12/01/1997

MSDS Ref. No: BHCH22027

Date-Revised: 12/16/2003

Revision No: 8

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Purobrom Tablets

GENERAL USE: Industrial water treatment.

CHEMICAL FAMILY: Halogenated hydantoin

MANUFACTURER

Manufactured by BioLab, Inc
 For Houghton Chemical Corporation
 52 Cambridge Street
 Allston, MA 02134
 Customer SERVICE: (617) 254-1010

24 HR. EMERGENCY TELEPHONE NUMBERS

Poison Control Center (Medical): (877) 800-5553
 CHEMTREC (US Transportation): (800) 424-9300

COMMENTS: EPA Registration Number: 5185-420-65199

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt.%</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	96

COMMENTS: (BCDMH)

3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW****PHYSICAL APPEARANCE:** White tablets with halogen odor

IMMEDIATE CONCERNS: DANGER Corrosive Causes irreversible eye damage and skin burns. Harmful if swallowed. Irritating to nose and throat. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear protective clothing and rubber gloves when handling this product. Avoid breathing dust and fumes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

POTENTIAL HEALTH EFFECTS**EYES:** Causes irreversible eye damage. Do not get in eyes.**SKIN:** Causes severe skin burns. Do not get on skin.**INGESTION:** Harmful if swallowed.**INHALATION:** Irritating to nose and throat. Avoid breathing dust or fumes.**CHRONIC:** There are no known chronic hazards.**MEDICAL CONDITIONS AGGRAVATED:** Existing dermatitis may be aggravated by exposure.**ROUTES OF ENTRY:** Skin Contact, Inhalation, Ingestion, Eye Contact.**4. FIRST AID MEASURES****EYES:** If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes,

Purobrom Tablets

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then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for treatment advice.

NOTES TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

GENERAL HAZARD: In large fires fueled by other materials, this product may smolder for prolonged periods emitting a dense black smoke. Any spilled material should be considered contaminated. Neutralize to a non-oxidizing material for safe disposal. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the material is damp, it should be neutralized to a non-oxidizing material for safe disposal.

EXTINGUISHING MEDIA: In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include, but are not limited to, carbon monoxide, carbon dioxide, hydrogen bromide, bromine, hydrogen chloride or chlorine.

EXPLOSION HAZARDS: A dust explosion severity determination was performed using the Hartmann Dust Explosibility Bomb designed at the U.S. Bureau of Mines. The product was determined not to be ignitable.

FIRE FIGHTING PROCEDURES: Fires fueled by other materials may release hydrogen bromide, bromine, hydrogen chloride or chlorine. Wear self-contained breathing apparatus. Ammonium phosphate (ABC) fire extinguishers should not be used.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal. Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Avoid contact with eyes, skin or clothing. Avoid breathing dust

HANDLING: STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not re-seal container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE: Keep this product dry in original tightly closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Moisture may decompose this product and cause a violent reaction leading to fire and explosion. In case of decomposition, isolate container if possible and flood area with large amounts of water to dissolve all material before discarding this container. Do not contaminate food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	<u>EXPOSURE LIMITS</u>					
	<u>OSHA PEL</u>		<u>ACGIH TLV</u>		<u>SUPPLIER OEL</u>	
	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	TWA N/E ⁽¹⁾		N/E			

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS: General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.

PERSONAL PROTECTIVE EQUIPMENT:

EYES AND FACE: Wear goggles or safety glasses with side shields when handling this product.

SKIN: Wear rubber gloves when handling this product. Avoid contact with skin.

RESPIRATORY: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

WORK HYGIENIC PRACTICES: Remove and wash contaminated clothing before reuse.

OTHER USE PRECAUTIONS: Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid

ODOR: Faint halogen odor.

APPEARANCE: Tablet

COLOR: White

pH: 4.5(0.1% solution in DI water)

VAPOR PRESSURE: Not Applicable

VAPOR DENSITY: Not Applicable

BOILING POINT: Not Determined

MELTING POINT: With Decomposition

THERMAL DECOMPOSITION: 145°C to 150°C

SOLUBILITY IN WATER: 0.15g/100g water

DENSITY: 60.1 lb ft³

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: High temperature. Poor ventilation. Contamination. Moisture/high humidity.

STABILITY: This product is stable under normal conditions.

POLYMERIZATION: Hazardous polymerization will not occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen bromide, bromine, hydrogen chloride, chlorine

INCOMPATIBLE MATERIALS: Avoid contact with water on concentrated material in the container. Avoid contact with easily oxidizable material: ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; cyanamic acid containing compounds; calcium hypochlorite; alkalis. Avoid contact with all other chemicals.

11. TOXICOLOGICAL INFORMATION

ACUTE

EYES: 1gx ecolog. cal studies indicate this product to be corrosive to eyes.

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DERMAL LD₅₀: The dermal LD₅₀ is greater than 2.0 g/kg (rabbit). The primary skin irritation index is 6.1 and the product is considered corrosive to skin.

ORAL LD₅₀: 578 mg/kg (rat).

EYE EFFECTS: This product causes irreversible eye damage.

SKIN EFFECTS: This product causes skin burns.

CARCINOGENICITY:

This product is not listed as a carcinogen by IARC.

This product is not listed as a carcinogen by NTP.

This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER: Do not reuse container. Rinse thoroughly before discarding in trash.

14. TRANSPORT INFORMATION**DOT (DEPARTMENT OF TRANSPORTATION)**

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

CANADA TRANSPORT OF DANGEROUS GOODS

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

15. REGULATORY INFORMATION**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****311/312 HAZARD CATEGORIES:**

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** NO

313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: This product or its components are not listed.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

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TSCA REGULATORY: This product or its components are not subject to export notification.

TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE: Product is hazardous by definition of the Hazardous Communication Standard.

CLEAN WATER ACT: Not Listed.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT): This product is a registered pesticide.

SDWA (SAFE DRINKING WATER ACT): Not listed.

CLEAN AIR ACT

40 CFR PART 68—RISK MANAGEMENT FOR CHEMICAL ACCIDENT RELEASE PREVENTION: Not listed.

CANADA

WHMIS CLASS: C - Oxidizer; E - Corrosive

CANADIAN ENVIRONMENTAL PROTECTION ACT: Pesticide Control Product Registration Number: 16857

DOMESTIC SUBSTANCE LIST (INVENTORY): Listed

CALIFORNIA PROPOSITION 65: This product or its components are not listed on any Proposition 65 lists of carcinogens or reproductive toxicants

COMMENTS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

PREPARED BY: Regulatory Information Specialist

REVISION SUMMARY Revision #: 8 This MSDS replaces the July 14, 2003 MSDS. Any changes in information are as follows: In Section 1 MSDS Number Prepared By [] Print CHEMTREC Phone Number Section 1 Footnotes 24 Hour Emergency Phone Numbers In Section 1 [] Print CHEMTREC Phone Number 24 Hour Emergency Phone Numbers In Section 3 Emergency Overview - Immediate Concerns Physical Appearance Chronic Effects Potential Health Effects - Eyes Potential Health Effects - Skin Potential Health Effects - Ingestion Comments Health In Section 4 Firstaid - Eyes Firstaid - Skin Firstaid - Ingestion Firstaid - Inhalation In Section 5 Combustion Products In Section 7 Storage General Procedures In Section 9 Appearance Density (lbs) Density In Section 11 Eye Effects Skin Effects

HMIS RATING	
HEALTH:	3
FLAMMABILITY:	1
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	B

NFPA RATING	
HEALTH:	3
FIRE:	1
REACTIVITY:	1

Key

- 4 = Severe
- 3 = Serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

NFPA STORAGE CLASSIFICATION: NFPA Oxidizer Class 2

COMMENTS: The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard, National Fire Protection Association (NFPA), Hazardous Materials Identification System (HMIS), and Canada's Workplace Hazardous Information System (WHMIS) and Environmental Protection Agency (EPA). **MANUFACTURER DISCLAIMER: IMPORTANT:** The information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This

Purobrom Tablets

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information is true and accurate to the best of our knowledge.



MATERIAL SAFETY DATA SHEET

HMS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-358 Inhibitor

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-358 Cooling Tower Inhibitor
PRODUCT DESCRIPTION: An aqueous corrosion and scale inhibitor. This product is designed specifically for the control of corrosion and mineral scales in open circulating cooling water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium Hydroxide	1310-73-2	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 12.0
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.102
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.

PRIMARY HAZARD CLASS/DIVISION: 8

UN/NA NUMBER: UN 1719

PACKING GROUP: II

LABEL: Corrosive - 8

NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (SODIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** NO **CHRONIC:** NO

16. OTHER INFORMATION

DATE PREPARED: 3/23/2005

MSDS No: C358

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



MATERIAL SAFETY DATA SHEET

WEST R-630 SULFITE

HMIS RATING

HEALTH:	1
FLAMMABILITY:	0
REACTIVITY:	0
OTHER:	C

1. PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME: **WEST R-630 SULFITE**
 PRODUCT DESCRIPTION: An aqueous solution of sodium & potassium sulfites, bisulfites, and metabisulfites. This product is designed specifically for halogen removal in process water systems.

MANUFACTURER:	24 HR EMERGENCY TELEPHONE NUMBER
Water & Energy Systems Technology, Inc 13109 Arctic Circle Santa Fe Springs, CA 90670 Customer Service: (562) 921-5191	Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV

This product does not contain any hazardous materials under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, nearly colorless liquid with very little odor.
 IMMEDIATE CONCERNS: Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: May cause irritation or redness on contact with eye.
 SKIN: Substance may cause slight skin irritation.
 SKIN ABSORPTION: None.
 INGESTION: Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing larger amounts may cause serious injury.
 INHALATION: Poses little or no immediate hazard. Vapor and mists may cause allergic reactions in persons sensitive to sulfite compounds.
 ACUTE EFFECTS: May cause local irritation from exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Person with pre-existing skin disorders, eye problems, or impaired respiratory function may be more susceptible to the effects of this substance.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: No specific information is available.
 CARCINOGENICITY: This product's ingredients are not found in the Federal, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.
 SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not applicable.
AUTO IGNITION & TEMPERATURE: Not applicable.
UNUSUAL FIRE & EXPLOSION HAZARDS: Sulfur dioxide gas may result from incineration.
FIRE FIGHTING PROCEDURES: Full protective clothing, plus self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Small spills should be flushed with a water spray.
LARGE SPILL: Contain by diking with soil or other absorbent material.
ENVIRONMENTAL PRECAUTIONS: Keep out of sewers, drains, and surface waters.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Follow all MSDS and Label precautions even after container is emptied as container may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Normal area ventilation should be adequate.
PERSONAL PROTECTION
EYES AND FACE: Wear chemical goggles or safety glasses with side shields.
SKIN: Nitrile rubber, PVC, or Neoprene apron and gloves.
RESPIRATORY: None required under normal conditions.
PROTECTIVE CLOTHING: Where splashing is possible, chemical resistant clothing, rubber apron, and boots should be worn.
HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.
ODOR: Mild sulfur.
COLOR: Colorless.
pH: ~ 6.5 units.
PERCENT VOLATILE: Not determined.
VAPOR DENSITY: Not determined.
BOILING POINT: 212 °F
SPECIFIC GRAVITY: 1.251
WATER SOLUBILITY: Complete
EVAPORATION RATE: < 1 (butyl acetate = 1.00)

10. STABILITY AND REACTIVITY

TABLE: Yes
HAZARDOUS POLYMERIZATION: No
CONDITIONS TO AVOID: High ambient temperatures in storage areas.
HAZARDOUS DECOMPOSITION: Decomposes at high temperatures to form sulfur dioxide gas.
INCOMPATIBLE MATERIALS: Strong oxidizers, acids, alkali's, amines, halogens, halogen compounds, anhydrides, and aldehydes.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal OSHA, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: D.O.T. NONREGULATED WATER TREATMENT COMPOUND

15. REGULATORY INFORMATION

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: No PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: No

16. OTHER INFORMATION

DATE PREPARED: 12/31/2010
MSDS NUMBER: R630

MANUFACTURER DISCLAIMER:

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of, or reliance upon such information. No representations, or warranties, either express or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A113	TA-53	03A, Treated Cooling Water Discharges	Ephemeral tributary to Sandia Canyon

SOURCE OF DISCHARGE

Outfall 03A113 is located at TA-53 and discharges treated cooling water from the Low Energy Demonstration Accelerator (LEDA) cooling towers located at TA-53-293, TA-53-952, and TA-53-1032 (currently inactive) to an ephemeral tributary of Sandia Canyon. It also receives storm water from the parking lots and building roof drains located in the area. The specific sources are identified in Table 1.

**Table 1
 Sources for Discharges to Outfall 03A113**

TA	Bldg	Description
53	293	Treated Cooling Tower Blow-down. The cooling tower is TA-53-293 but there is also a nearby building that houses the chemical feed system.
53	952	Treated Cooling Tower Blow-down. The cooling tower is TA-53-952 but there is also a nearby building TA-53-950 that houses the chemical feed system.
53	1032	Treated Cooling Tower Blow-down (inactive)
NA	NA	Storm water (parking lots, building roofs, and area drains)

Figure 1 provides a process schematic.

WATER TREATMENT PROCESS

The water treatment systems associated with the LEDA cooling towers are controlled by a process logic controller (PLC) that monitors the tower water using a conductivity meter. It treats the water using chemicals that may include a corrosion inhibitor, biocide, and de-chlorination agent. The outfall also collects seasonal discharges of storm water. The water treatment codes provided in Table 2 have been assigned to this outfall.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A113**

Treatment Code	Treatment Process	Description
2H	Disinfection (other)	Chemicals are added to control Microorganisms
2E	Dechlorination	Blow-down is de-chlorinated prior to discharge
2L	Reduction	Chemicals that are Corrosion Inhibitors are added

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control corrosion, limit biological growth and de-chlorinate the water prior to discharge. The chemicals used to treat the water in the cooling towers are identified in Table 3.

**Table 3
 Treatment Chemicals Used in the Cooling Towers**

Chemical Name	Reason for Use/Frequency	Hazardous Substances Form 2C, Table 2C-4
PuroBrom Tablets	Biocide (control of Microorganisms)	Chlorine
WEST C-358	Corrosion Control/Scale Inhibitor	Sodium Hydroxide
WEST R-630	De-chlorination	Sodium Bisulfite

POTENTIAL POLLUTANTS

The treatment chemicals used to treat the cooling water constitute the pollutant load of the discharge to Outfall 03A113. Table 4 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 constituents identified.

**Table 4
 Potential Pollutants Discharged to Outfall 03A113**

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
Cooling Tower Blow-Down – TA-53-293	Sodium Bisulfite, Sodium Hydroxide, Chlorine
Cooling Tower Blow-Down – TA-53-952	Sodium Bisulfite, Sodium Hydroxide, Chlorine

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to Outfall 03A113 are provided in Table 5.

**Table 5
 Source Flow Rates/Frequencies to Outfall 03A113**

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
TA-53-293	557	2H, 2E, 2L
TA-53-952	14,950	2H, 2E, 2L

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A113 for the Permit Re-Application on August 31, 2011.

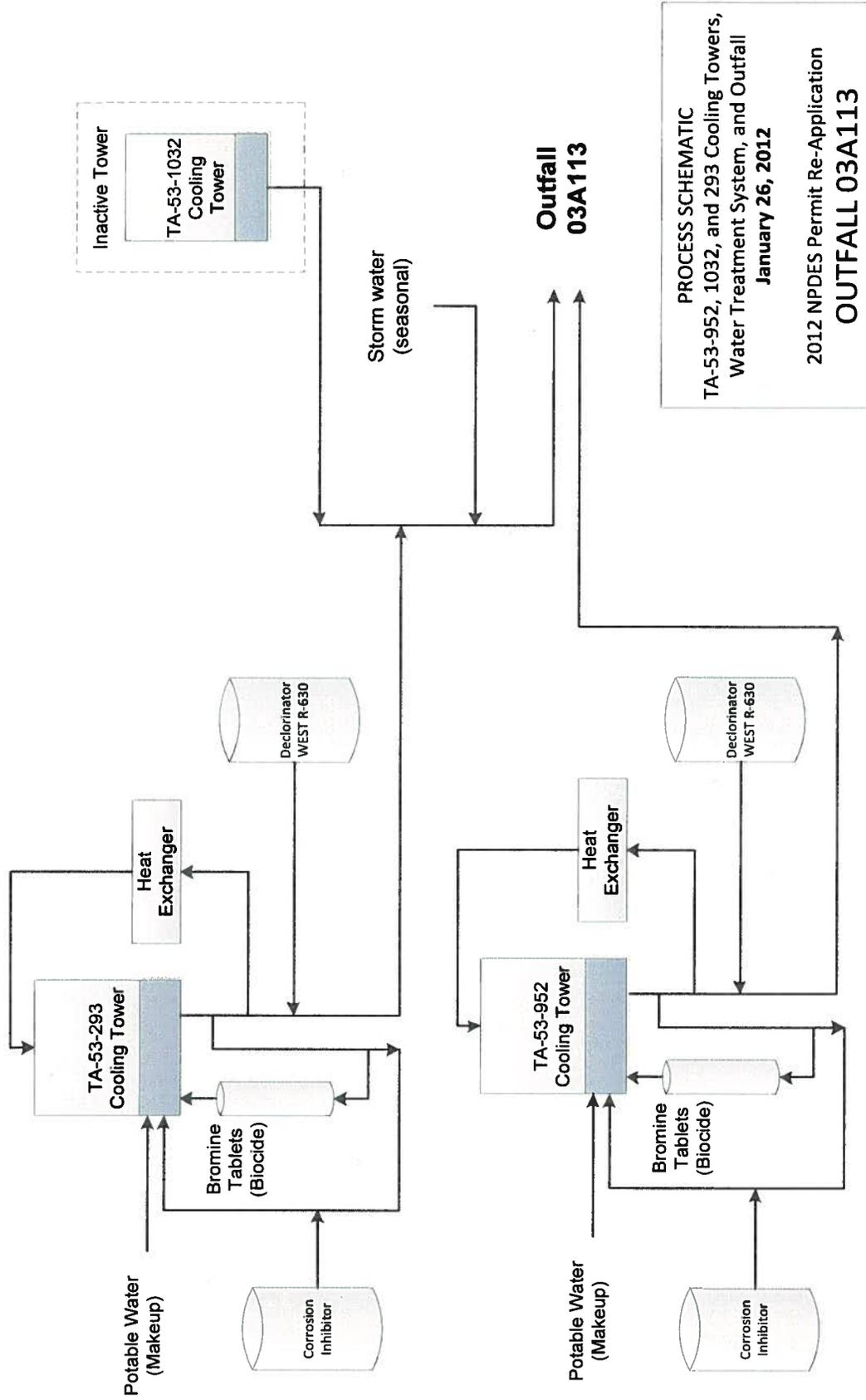
ANALYTICAL RESULTS PROVIDED

- Form 2C Analytes from a grab sample collected August 31, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

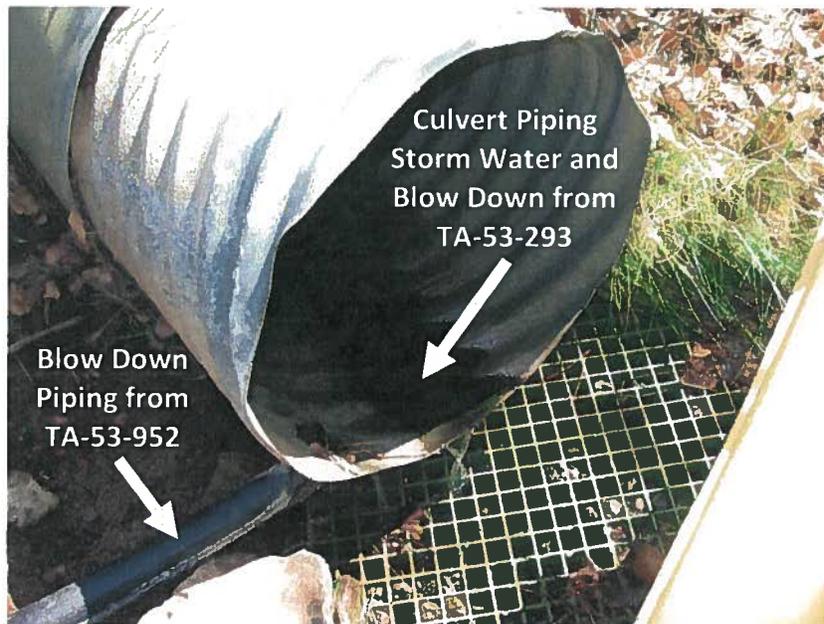
- Latitude – 35°52'03"
- Longitude – 106°15'43"
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 167 mg/L.

Figure 1
Process Schematic for the TA-53-293, 1032, and 952 Cooling Towers, Water Treatment Systems, and Outfall 03A113

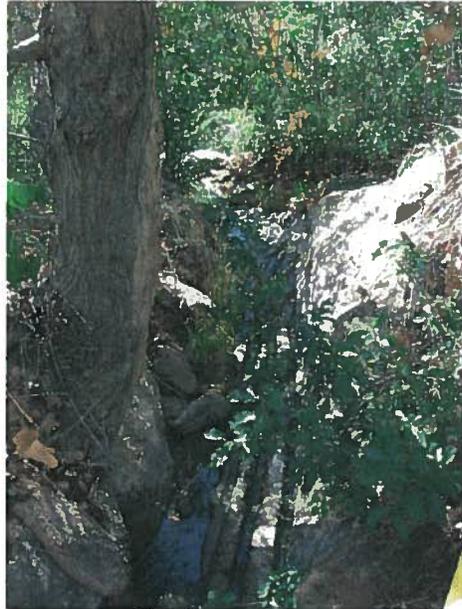


PROCESS SCHEMATIC
 TA-53-952, 1032, and 293 Cooling Towers,
 Water Treatment System, and Outfall
 January 26, 2012
 2012 NPDES Permit Re-Application
OUTFALL 03A113

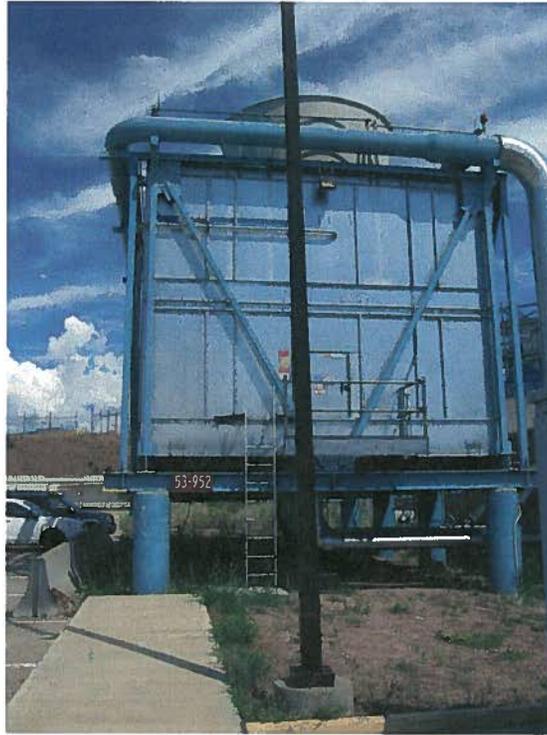
Photographs – Outfall 03A113, Cooling Towers, and Treatment Systems



Photograph 1 – TA-53-293 & 952 Cooling Towers and Treatment System
Outfall 03A113 and Storm Water Culvert



Photograph 2 – TA-53-293 & 952 Cooling Towers and Treatment System
Outfall 03A113 – Receiving Stream



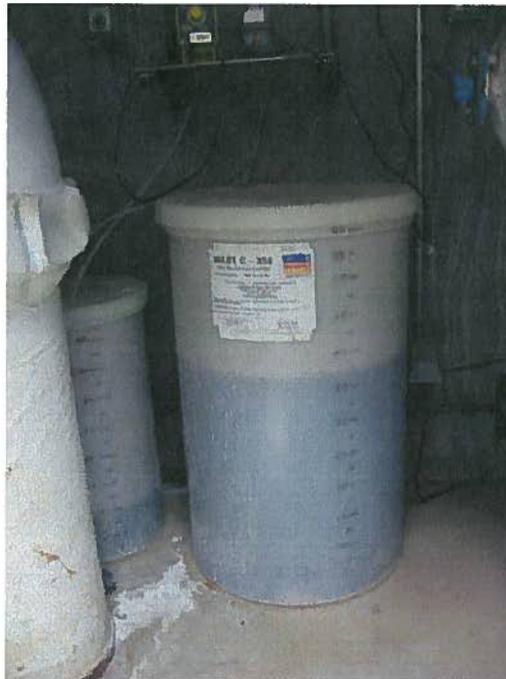
Photograph 3 – TA-53-293 & 952 Cooling Towers and Treatment System
TA-53-952 (LEDA) Cooling Tower



Photograph 5 – TA-53-293 & 952 Cooling Towers and Treatment System
TA-53-952 (LEDA) Cooling Tower – Chemical Feed System



Photograph 6 – TA-53-293 & 952 Cooling Towers and Treatment System
TA-53-293 Cooling Tower



Photograph 7 – TA-53-293 & 952 Cooling Towers and Treatment System
TA-53-293 Cooling Tower – Chemical Feed System

DMR Outfall Data Summary - 03A113
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data										Reported on DMR									
				Flow Rate			Analytical Lab Result			DMR Units				Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples			
				Average	Maximum	Units	Result	Units	MQL	Result	Units	MQL											
		12/10	Flow (Totalized Est.)	0.00075	0.00240	MGD									0.00075	0.00240	MGD				1		
		1/11	Flow (Totalized Est.)	0.00086	0.00267	MGD									0.00086	0.00267	MGD				1		
		2/11	Flow (Totalized Est.)	0.00030	0.00085	MGD									0.00030	0.00085	MGD				1		
		3/11	Flow (Totalized Est.)	0.00250	0.01599	MGD									0.00250	0.01599	MGD				1		
		4/11	Flow (Totalized Est.)	0.00210	0.01031	MGD									0.00210	0.01031	MGD				1		
		5/11	Flow (Totalized Est.)	0.00305	0.01094	MGD									0.00305	0.01094	MGD				1		
		6/11	Flow (Totalized Est.)	0.00303	0.00464	MGD									0.00303	0.00464	MGD				1		
		7/11	Flow (Totalized Est.)	0.00234	0.00501	MGD									0.00234	0.00501	MGD				1		
		8/11	Flow (Totalized Est.)	0.00219	0.00451	MGD									0.00219	0.00451	MGD				1		
		9/11	Flow (Totalized Est.)	0.00208	0.00327	MGD									0.00208	0.00327	MGD				1		
		10/11	Flow (Totalized Est.)	0.00187	0.00609	MGD									0.00187	0.00609	MGD				1		
		11/11	Flow (Totalized Est.)	0.00265	0.00738	MGD									0.00265	0.00738	MGD				1		
		12/11	Flow (Totalized Est.)	0.00172	0.01581	MGD									0.00172	0.01581	MGD				1		
				Average			NA	Average			NA	NA	NA	NA	NA	0.00359	MGD	Monthly	Monthly	Monthly	Total		
				Maximum			NA	Maximum			NA	7.9	8.3	8.3	8.3	8.3	8.3	SU	6.0-9.0	SU	6.0-9.0	SU	53
113	53-952-293	8/07	pH																			5	
		9/07	pH																			4	
		10/07	pH																			4	
		11/07	pH																			5	
		12/07	pH																			4	
		1/08	pH																			4	
		2/08	pH																			5	
		3/08	pH																			4	
		4/08	pH																			5	
		5/08	pH																			4	
		6/08	pH																			4	
		7/08	pH																			5	
		8/08	pH																			4	
		9/08	pH																			4	
		10/08	pH																			5	
		11/08	pH																			4	
		12/08	pH																			5	
		1/09	pH																			4	
		2/09	pH																			4	
		3/09	pH																			5	
		4/09	pH																			4	
		5/09	pH																			5	
		6/09	pH																			4	
		7/09	pH																			4	
		8/09	pH																			5	

DMR Outfall Data Summary - 03A113
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																							
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Units			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	Minimum	Maximum	Units	Minimum	Average	Maximum	Units	Minimum	Maximum	Units	Permit Limit	Units	Number of Samples					
		9/09	pH										8.0	8.6	SU	6.0-9.0	SU	4															
		10/09	pH										7.6	8.4	SU	6.0-9.0	SU	4															
		11/09	pH										7.8	8.7	SU	6.0-9.0	SU	4															
		12/09	pH										7.5	8.5	SU	6.0-9.0	SU	5															
		1/10	pH										7.3	8.6	SU	6.0-9.0	SU	4															
		2/10	pH										7.9	8.5	SU	6.0-9.0	SU	4															
		3/10	pH										7.3	8.6	SU	6.0-9.0	SU	5															
		4/10	pH										7.7	8.6	SU	6.0-9.0	SU	4															
		5/10	pH										8.5	8.5	SU	6.0-9.0	SU	4															
		6/10	pH										7.9	8.3	SU	6.0-9.0	SU	5															
		7/10	pH										7.5	8.5	SU	6.0-9.0	SU	4															
		8/10	pH										8.2	8.6	SU	6.0-9.0	SU	4															
		9/10	pH										8.1	8.5	SU	6.0-9.0	SU	5															
		10/10	pH										8.1	8.5	SU	6.0-9.0	SU	4															
		11/10	pH										7.7	8.5	SU	6.0-9.0	SU	4															
		12/10	pH										7.5	8.4	SU	6.0-9.0	SU	5															
		1/11	pH										7.4	7.8	SU	6.0-9.0	SU	4															
		2/11	pH										8.1	8.5	SU	6.0-9.0	SU	2															
		3/11	pH										7.6	8.5	SU	6.0-9.0	SU	5															
		4/11	pH										7.4	7.9	SU	6.0-9.0	SU	4															
		5/11	pH										7.9	8.4	SU	6.0-9.0	SU	4															
		6/11	pH										7.9	8.5	SU	6.0-9.0	SU	4															
		7/11	pH										8.1	8.5	SU	6.0-9.0	SU	4															
		8/11	pH										8.1	8.7	SU	6.0-9.0	SU	5															
		9/11	pH										8.1	8.5	SU	6.0-9.0	SU	4															
		10/11	pH										8.0	8.4	SU	6.0-9.0	SU	4															
		11/11	pH										7.6	8.6	SU	6.0-9.0	SU	5															
		12/11	pH										7.0	8.4	SU	6.0-9.0	SU	4															
													7.0	NA	NA	Monthly	NA	Total	228														
													NA	8.8	su	Monthly	NA	su	228														
113	53-952-293	8/07	Total Residual Chlorine															0	mg/L	0.011	mg/L	5											
		9/07	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											
		10/07	Total Residual Chlorine															0	mg/L	0.011	mg/L	5											
		11/07	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											
		12/07	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											
		1/08	Total Residual Chlorine															0	mg/L	0.011	mg/L	5											
		2/08	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											
		3/08	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											
		4/08	Total Residual Chlorine															0	mg/L	0.011	mg/L	5											
		5/08	Total Residual Chlorine															0	mg/L	0.011	mg/L	4											

DMR Outfall Data Summary - 03A113
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																							
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Units			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples										
		6/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		7/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		8/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		9/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		10/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		11/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		12/08	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		1/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		2/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		3/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		4/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		5/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		6/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		7/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		8/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		9/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		10/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		11/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		12/09	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		1/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		2/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		3/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		4/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		5/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		6/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		7/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		8/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		9/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		10/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		11/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		12/10	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		1/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		2/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		3/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	2													
		4/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
		5/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		6/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		7/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		8/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4													
		9/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	5													
			Total Residual Chlorine													0	mg/L	0.011	mg/L	4													

DMR Outfall Data Summary - 03A113

Los Alamos National Laboratory
NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR											
				Flow Rate			Analytical Lab Result			DMR Units			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units								MQL	
		10/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4	
		11/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	5	
		12/11	Total Residual Chlorine													0	mg/L	0.011	mg/L	4	
				Average			Maximum			NA	NA	0	mg/L	Monthly	mg/L	Monthly	mg/L	30/100	mg/L	Total	228
113	53-952-293	8/07																			
		9/07	TSS													6	mg/L	30/100	mg/L	mg/L	1
		10/07																			
		11/07																			
		12/07	TSS													3	mg/L	30/100	mg/L	mg/L	1
		1/08																			
		2/08																			
		3/08	TSS													8	mg/L	30/100	mg/L	mg/L	1
		4/08																			
		5/08																			
		6/08	TSS													<1	mg/L	30/100	mg/L	mg/L	1
		7/08																			
		8/08																			
		9/08	TSS													8	mg/L	30/100	mg/L	mg/L	1
		10/08																			
		11/08																			
		12/08	TSS													1	mg/L	30/100	mg/L	mg/L	1
		1/09																			
		2/09																			
		3/09	TSS																		
		4/09																			
		5/09																			
		6/09	TSS													3	mg/L	30/100	mg/L	mg/L	1
		7/09																			
		8/09																			
		9/09	TSS													<1	mg/L	30/100	mg/L	mg/L	1
		10/09																			
		11/09																			
		12/09	TSS													<1	mg/L	30/100	mg/L	mg/L	1
		1/10																			
		2/10																			
		3/10	TSS													2	mg/L	30/100	mg/L	mg/L	1
		4/10																			
		5/10																			
		6/10	TSS													1	mg/L	30/100	mg/L	mg/L	1

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A113	TA-53-293 Cooling Tower Blow Down (A) [Intermittent]	7	12	0.000557 MGD	0.001640 MGD	557 Gallons	1,640 Gallons	357
	TA-53-952 Cooling Tower Blow Down (A) [Intermittent]	7	12	0.014950 MGD	0.159807 MGD	14,950 Gallons	159,807 Gallons	310
	TA-53-1032 (inactive) Cooling Tower Blow Down	NA	NA	NA	NA	NA	NA	NA
	Stormwater (seasonal)	NA	NA	0.016763 MGD	0.136679 MGD	16,763 Gallons	136,678 Gallons	60

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-3 Believed to be Absent.			
Table 2C-4 (B) Sodium Bisulfite	WEST R-630 (dechlorination)		
Sodium Hydroxide	WEST C-358 (Corrosion Control/Scale Inhibitor)		
1-bromo-3-chloro-5,5-dimethyl hydantoin (Chlorine)	PuroBrom Tablets (Disinfection - chlorine; Disinfection - other)		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

NA

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below) NO (go to Section VIII)

NOTE: The existing permit requires that Whole Effluent Toxicity Testing (48 hr. Static Renewal - Daphnia pulex) be conducted for 03A113 before March 31, 2012. There is currently no biological test data on file for this outfall.

VIII. CONTRACT ANALYSIS INFORMATION

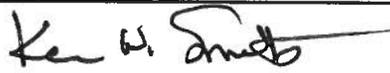
Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below) NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print)	B. PHONE NO. (area code & no.)
Kevin W. Smith, Manager, DOE/Los Alamos Site Office	(505) 606-2004
C. SIGNATURE	D. DATE SIGNED
	1/27/2012

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

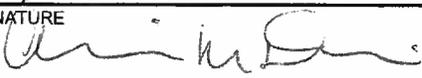
A. NAME & OFFICIAL TITLE (type or print)

Alison M. Dorries, Division Leader, ENV Protection Division

B. PHONE NO. (area code & no.)

(505) 665-6952

C. SIGNATURE



D. DATE SIGNED

1/27/12

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.
SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A113

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	4.2	5.66					1	mg/L	1b/Day	NA	NA	NA
b. Chemical Oxygen Demand (COD)	13	17.5					1	mg/L	1b/Day	NA	NA	NA
c. Total Organic Carbon (TOC)	4.93	6.64					1	mg/L	1b/Day	NA	NA	NA
d. Total Suspended Solids (TSS)	3.0	4.31	3.0	2.40	1.8	0.23	4	mg/L	1b/Day	NA	NA	NA
e. Ammonia (as N)	0.0274	0.0369					1	mg/L	1b/Day	NA	NA	NA
f. Flow	VALUE 161,447 (C)		VALUE 89,932 (D)		VALUE 15,507 (E)		360	MGD	NA	VALUE NA		NA
g. Temperature (winter)	VALUE 4.5 (F)		VALUE 7.0 (G)		VALUE 11.1		11	°C		VALUE NA		NA
h. Temperature (summer)	VALUE 22.2 (F)		VALUE 20.5 (G)		VALUE 20.2		12	°C		VALUE NA		NA
i. pH	MINIMUM 7.4 (H)	MAXIMUM 8.6 (H)	MINIMUM 7.6 (I)	MAXIMUM 8.4 (I)			50	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)		X	<0.066	<0.0889					1	mg/L	1b/D	NA	NA	NA
b. Chlorine, Total Residual	X		0	0	0	0	0	0	50	mg/L	1b/D	NA	NA	NA
c. Color	X		25	NA					1	SU	NA	NA	NA	NA
d. Fecal Coliform		X	191.8/100	NA					1	cfu/mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		0.334	0.45					1	mg/L	1b/D	NA	NA	NA
f. Nitrate-Nitrite (as N)	X		0.369	0.497					1	mg/L	1b/D	NA	NA	NA

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CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
g. Nitrogen Total Organic (as N)		X	<0.175	<0.236	(J)		1	mg/L	1b/D	NA	NA	NA	
h. Oil and Grease		X	<1.49	<2.01	(J)		1	mg/L	1b/D	NA	NA	NA	
i. Phosphorus (as P), Total (7723-14-0)	X		0	0	0	0	4	mg/L	1b/D	NA	NA	NA	
j. Radioactivity													
(1) Alpha, Total		X	<1.2	NA			1	pCi/L	NA	NA	NA	NA	
(2) Beta, Total	X		5.91	NA			1	pCi/L	NA	NA	NA	NA	
(3) Radium, Total		X	<1.166	NA			1	pCi/L	NA	NA	NA	NA	
(4) Radium 226, Total		X	<0.342	NA			1	pCi/L	NA	NA	NA	NA	
k. Sulfate (as SO ₄) (14808-79-8)	X		9.02	12.2			1	mg/L	1b/D	NA	NA	NA	
l. Sulfide (as S)		X	<0.03	<0.0404	(J)		1	mg/L	1b/D	NA	NA	NA	
m. Sulfite (as SO ₃) (14265-45-3)	X		0.32	0.431						NA	NA	NA	
n. Surfactants		X	<0.016	<0.0216	(J)		1	mg/L	1b/D	NA	NA	NA	
o. Aluminum, Total (7429-90-5)	X		0.0557	0.075			1	mg/L	1b/D	NA	NA	NA	
p. Barium, Total (7440-39-3)	X		0.053	0.0714	(L)		1	mg/L	1b/D	NA	NA	NA	
q. Boron, Total (7440-42-8)	X		0.0507	0.0683	(M)		1	mg/L	1b/D	NA	NA	NA	
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-04	(N)		1	mg/L	1b/D	NA	NA	NA	
s. Iron, Total (7439-89-6)	X		0.0518	0.0698			1	mg/L	1b/D	NA	NA	NA	
t. Magnesium, Total (7439-95-4)	X		7.88	10.6			1	mg/L	1b/D	NA	NA	NA	
u. Molybdenum, Total (7439-98-7)		X	<1.8E-03	<2E-03	(O)		1	mg/L	1b/D	NA	NA	NA	
v. Manganese, Total (7439-96-5)	X		0.0164	0.0221			1	mg/L	1b/D	NA	NA	NA	
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-03	(J)		1	mg/L	1b/D	NA	NA	NA	
x. Titanium, Total (7440-32-6)	X		0.0049	0.0066			1	mg/L	1b/D	NA	NA	NA	

CONTINUED FROM PAGE 3 OF FORM 2-C

EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515**
 OUTFALL NUMBER **03A113**

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2c for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES	
												(2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS												
1M. Antimony, Total (7440-36-0)			X	<1E-03	(N)		1	mg/L	lb/Day	NA	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.0025			1	mg/L	lb/Day	NA	NA	NA
3M. Beryllium, Total (7440-41-7)		X		<2E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
4M. Cadmium, Total (7440-43-9)		X		<1.1E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.0042	(P)		1	mg/L	lb/Day	NA	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0032			1	mg/L	lb/Day	NA	NA	NA
7M. Lead, Total (7439-92-1)		X		<5E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
8M. Mercury, Total (7439-97-6)		X		9.96E-06			1	mg/L	lb/Day	NA	NA	NA
9M. Nickel, Total (7440-02-0)		X		8.2E-04			1	mg/L	lb/Day	NA	NA	NA
10M. Selenium, Total (7782-49-2)			X	<1.5E-03	(N)		1	mg/L	lb/Day	NA	NA	NA
11M. Silver, Total (7440-22-4)			X	<2E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
12M. Thallium, Total (7440-28-0)			X	<4.5E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
13M. Zinc, Total (7440-66-6)		X		0.0369			1	mg/L	lb/Day	NA	NA	NA
14M. Cyanide, Total (57-12-5)			X	<1.5E-03	(N)		1	mg/L	lb/Day	NA	NA	NA
15M. Phenols, Total			X	<1.6E-03	(J)		1	mg/L	lb/Day	NA	NA	NA
DIOXIN												
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X									

2.3.7.8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6) The result from the analytical laboratory is <1.1E-08 mg/L. This is above the limit of the MQL of 1.0E-08 mg/L but is likely due to background in the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (J) for additional information.

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CONTINUED FROM THE FRONT

1. POLLUTANT AND GAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS ANALYSES
GCIMS FRACTION - VOLATILE COMPOUNDS										
1V. Acrolein (107-02-8)			X	<1.25E-03	<2E-03	(N)	mg/L	1b/D	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<1E-03	(N)	mg/L	1b/D	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<4E-04	(N)	mg/L	1b/D	NA	NA
4V. Bis (Chloro-methyl) Ether (542-88-1)				NA		(R)			NA	NA
5V. Bromoform (75-25-2)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<4E-04	(N)	mg/L	1b/D	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
8V. Chloro-dibromomethane (124-48-1)			X	<3E-04	<4E-04	(N)	mg/L	1b/D	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<4E-04	(J)	mg/L	1b/D	NA	NA
10V. 2-Chloro-ethylvinyl Ether (110-75-8)			X	<1.5E-03	<2E-03	(J)	mg/L	1b/D	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
12V. Dichloro-bromomethane (75-27-4)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
13V. Dichloro-difluoromethane (75-71-8)				NA		(R)			NA	NA
14V. 1,1-Dichloro-ethane (75-34-3)			X	<3E-04	<4E-04	(J)	mg/L	1b/D	NA	NA
15V. 1,2-Dichloro-ethane (107-06-2)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
16V. 1,1-Dichloro-ethylene (75-35-4)			X	<3E-04	<4E-04	(N)	mg/L	1b/D	NA	NA
17V. 1,2-Dichloro-propane (78-87-5)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
18V. 1,3-Dichloro-propylene (542-75-6)			X	<2.5E-04	<3E-04	(N, S)	mg/L	1b/D	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<3E-04	(N)	mg/L	1b/D	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<4E-04	(N)	mg/L	1b/D	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<4E-04	(J)	mg/L	1b/D	NA	NA

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CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES		
						(2) MASS	(2) MASS							
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)														
22V. Methylene Chloride (75-09-2)		X		3.83E-03	(T)			mg/L	1b/Day	1	NA	NA	NA	
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
25V. Toluene (108-88-3)			X	<2.5E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	(J)			mg/L	1b/Day	1	NA	NA	NA	
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
29V Trichloroethylene (79-01-6)			X	<2.5E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
30V. Trichlorofluoromethane (75-69-4)				NA	(R)						NA	NA	NA	
31V. Vinyl Chloride (75-01-4)			X	<5E-04	(N)			mg/L	1b/Day	1	NA	NA	NA	
GC/MS FRACTION - ACID COMPOUNDS														
1A. 2-Chlorophenol (95-57-8)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
2A. 2,4-Dichlorophenol (120-83-2)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
3A. 2,4-Dimethylphenol (105-67-9)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
5A. 2,4-Dinitrophenol (51-28-5)			X	<5.15E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
6A. 2-Nitrophenol (88-75-5)			X	<3.09E-03	(J)			mg/L	1b/Day	1	NA	NA	NA	
7A. 4-Nitrophenol (100-02-7)			X	<3.09E-03	(J)			mg/L	1b/Day	1	NA	NA	NA	
8A. P-Chloro-M-Cresol (69-50-7)			X	<3.09E-03	(J)			mg/L	1b/Day	1	NA	NA	NA	
9A. Pentachlorophenol (87-86-5)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
10A. Phenol (108-95-2)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3.09E-03	(N)			mg/L	1b/Day	1	NA	NA	NA	

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'			3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
					(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS												
1B. Acenaphthene (83-32-9)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3.09E-04	(J)			1	mg/L	1b/Day	NA	NA
3B. Anthracene (120-12-7)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
4B. Benzidine (92-87-5)			X	<3.09E-03	(N)			1	mg/L	1b/Day	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3.09E-04	(J)			1	mg/L	1b/Day	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3.09E-03	(J)			1	mg/L	1b/Day	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<3.09E-03	(N)			1	mg/L	1b/Day	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3.09E-03	(N)			1	mg/L	1b/Day	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3.09E-03	(N)			1	mg/L	1b/Day	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3.09E-03	(J)			1	mg/L	1b/Day	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3.09E-03	(N)			1	mg/L	1b/Day	NA	NA
16B. 2-Chloro-naphthalene (91-58-7)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	<3.09E-03	(J)			1	mg/L	1b/Day	NA	NA
18B. Chrysene (218-01-8)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3.09E-04	(N)			1	mg/L	1b/Day	NA	NA
20B. 1,2-Dichloro-benzene (95-50-1)			X	<2.5E-04	(N)			1	mg/L	1b/Day	NA	NA
21B. 1,3-Di-chloro-benzene (541-73-1)			X	<2.5E-04	(N)			1	mg/L	1b/Day	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-7

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)										
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	(N)		mg/L	1b/Day	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<3.09E-03	(J)		mg/L	1b/Day	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3.09E-03	(J)		mg/L	1b/Day	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
31B. Fluoranthene (206-44-0)			X	<3.09E-04	(N)		mg/L	1b/Day	NA	NA
32B. Fluorene (86-73-7)			X	<3.09E-04	(N)		mg/L	1b/Day	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
36B. Hexachloroethane (67-72-1)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	<3.09E-04	(N)		mg/L	1b/Day	NA	NA
38B. Isophorone (78-59-1)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
39B. Naphthalene (91-20-3)			X	<3.09E-04	(J)		mg/L	1b/Day	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<3.09E-03	(N)		mg/L	1b/Day	NA	NA

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)		b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)		b. NO. OF ANALYSES
				CONCENTRATION	(2) MASS	CONCENTRATION	(2) MASS				CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3.09E-03	<4E-03	(N, U)		1	mg/L	lb/D	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	<3.09E-04	<4E-04	(J)		1	mg/L	lb/Day	NA	NA	NA
45B. Pyrene (129-00-0)			X	<3.09E-04	<4E-04	(N)		1	mg/L	lb/Day	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3.09E-03	<4E-03	(N)		1	mg/L	lb/Day	NA	NA	NA
GC/MS FRACTION - PESTICIDES													
1P. Aldrin (309-00-2)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
2P. α-BHC (319-84-8)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
3P. β-BHC (319-85-7)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
4P. γ-BHC (58-89-9)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<6.72E-06	<9E-06	(J)		1	mg/L	lb/Day	NA	NA	NA
6P. Chlordane (57-74-9)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
11P. α-Endosulfan (115-29-7)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
14P. Endrin (72-20-8)			X	<1E-05	<1E-05	(N)		1	mg/L	lb/Day	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<6.72E-06	<9E-06	(N)		1	mg/L	lb/Day	NA	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	03A113

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES	
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					
GC/MS FRACTION - PESTICIDES (continued)												
17P. Heptachlor Epoxide (1024-57-3)			X	<6.72E-06	<9E-06	(N)			mg/L	1b/Day	NA	NA
18P. PCB-1242 (53469-21-9)			X	<3.47E-05	<5E-05	(N)			mg/L	1b/Day	NA	NA
19P. PCB-1254 (11097-69-1)			X	<9.2E-05	<1E-04	(N)			mg/L	1b/Day	NA	NA
20P. PCB-1221 (11104-28-2)			X	<3.47E-05	<5E-05	(N)			mg/L	1b/Day	NA	NA
21P. PCB-1232 (11141-16-5)			X	<3.47E-05	<5E-05	(N)			mg/L	1b/Day	NA	NA
22P. PCB-1248 (12672-29-6)			X	<3.47E-05	<5E-05	(N)			mg/L	1b/Day	NA	NA
23P. PCB-1260 (11096-82-5)			X	<6.9E-05	<1E-04	(N)			mg/L	1b/Day	NA	NA
24P. PCB-1016 (12674-11-2)			X	3.47E-05	<5E-05	(N)			mg/L	1b/Day	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.52E-04	<2E-04	(N)			mg/L	1b/Day	NA	NA

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EPA Form 3510-2C (8-90)

FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A113

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from July 2010 to June 2011. The outfall discharged 360 days during that time period but is considered intermittent because it does not discharge 24 hours per day.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified in Section V.D of the form because they are components of the chemicals used to treat the cooling tower water and, therefore, may be present in the blow down discharged to the outfall. here were not any Table 2C-3 hazardous substances identified.
- C. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from July 2010 to June 2011. It is the highest daily value recorded during that period of time.
- D. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between July 2010 and June 2011. It is the highest average flow rate for that period of time.
- E. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from July 2010 to June 2011. It is the average of those values within that period of time.
- F. The reported values are the maximum daily temperature observed in the summer and the minimum daily temperature observed in the winter from August 2010 to July 2011.
- G. The reported values are the minimum/maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- H. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- I. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- J. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL
- K. The results for E. Coli are used as the indicator for Fecal Coliform. Fecal Coliform is not suspected to be present due to the source discharging to the outfall. The positive result is likely due to the presence of wildlife living in the culvert.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. Boron was detected at a value less than the MQL of 0.1 mg/L.
- N. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- O. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- P. Chromium was detected a value less than the MQL of 0.01 mg/L.
- Q. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- R. EPA remanded the parameter.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A113

- S. Result is for cis- and trans-1,3-dichloropropylene
- T. Methylene Chloride was detected at a value less than the MQL of 0.02 mg/L.
- U. The result provided is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)

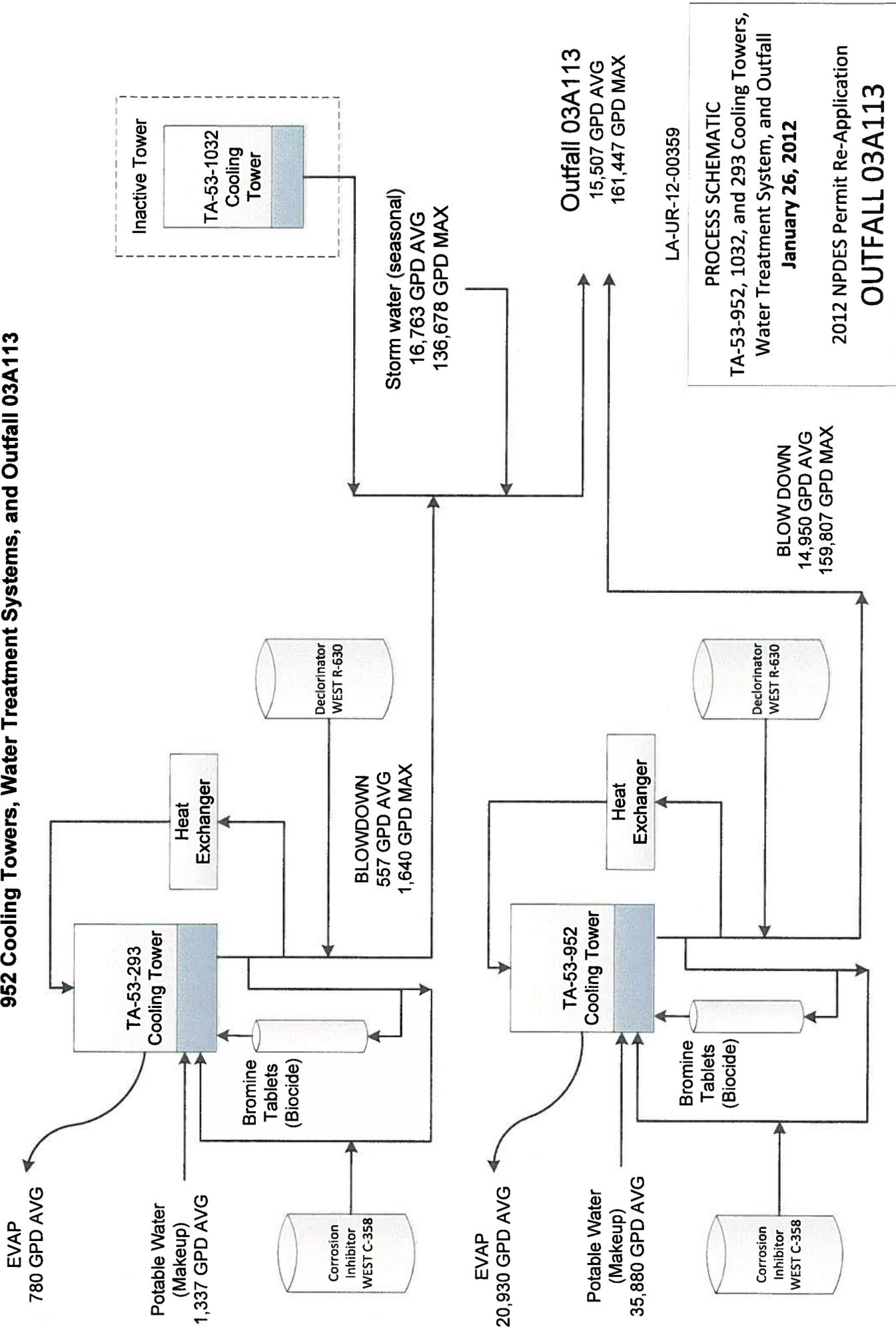
METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE			
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

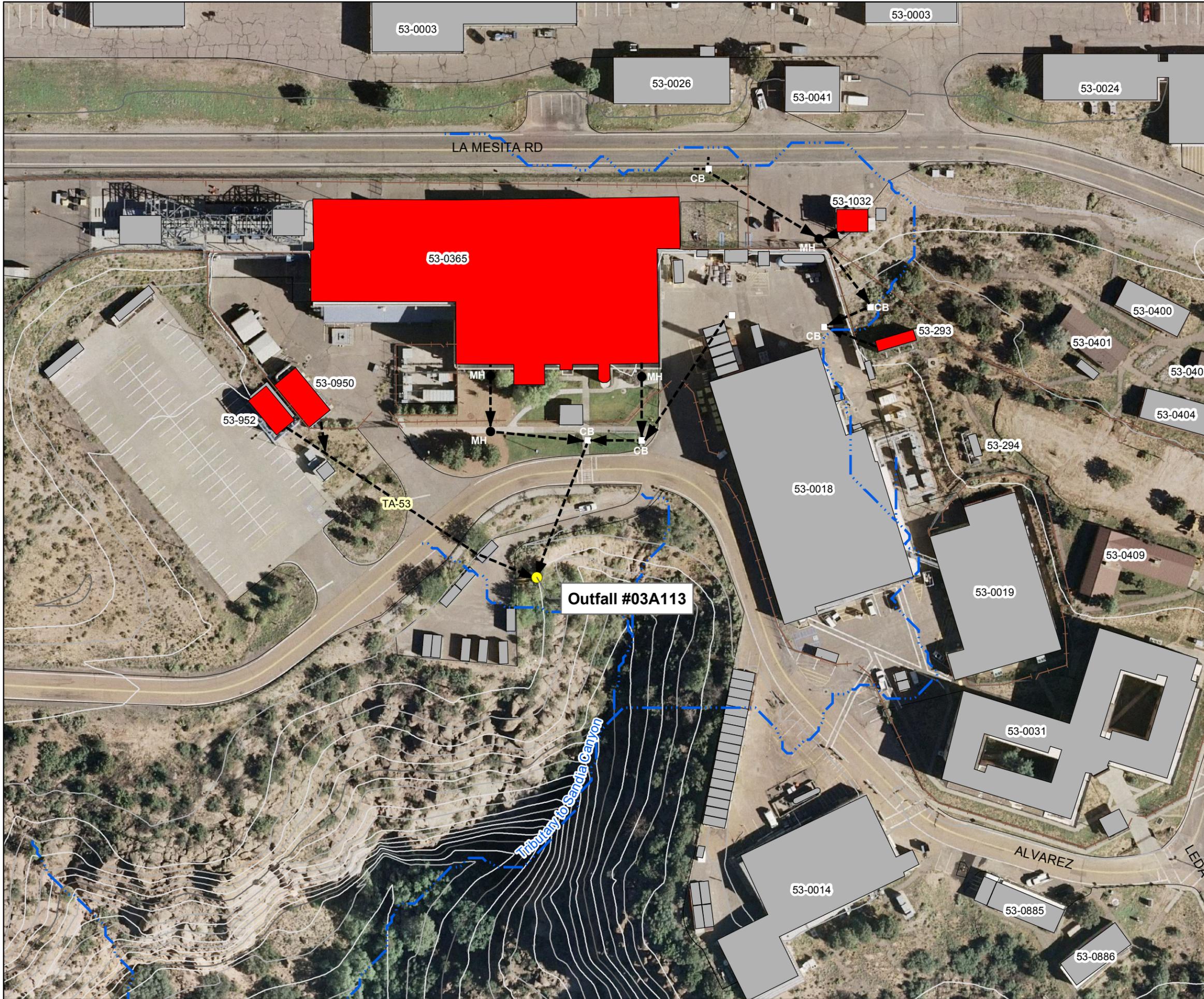
Figure II.A
2012 NPDES Permit Application Form 2C
Process Schematic and Water Balance for the TA-53-293, 1032, and
952 Cooling Towers, Water Treatment Systems, and Outfall 03A113



LA-UR-12-00359

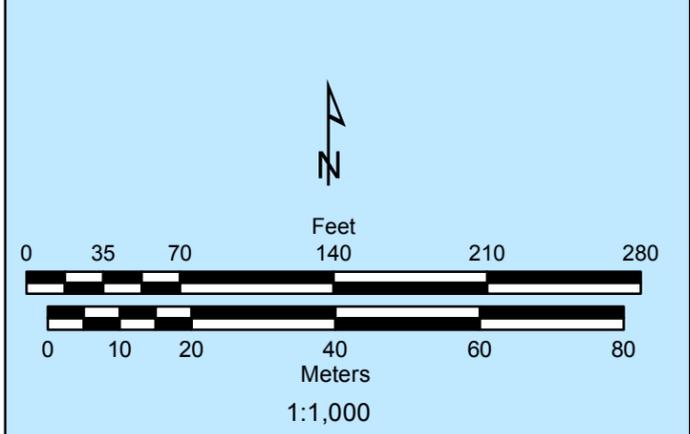
PROCESS SCHEMATIC
 TA-53-952, 1032, and 293 Cooling Towers,
 Water Treatment System, and Outfall
January 26, 2012
 2012 NPDES Permit Re-Application
OUTFALL 03A113

**NPDES Permit Re-Application Project
TA-53 Building 293, 365, 950,
952, 1032 (LEDA)
Outfall #03A113**



Legend

NPDES Outfall	Source Structures
Springs	Building Served by Source
Drainages	Structures
100ft Contours	LANL Boundary
20ft Contours	Technical Areas
10ft Contours	Catch Basin
Fences	Manhole
Dirt Roads	
Paved Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-05 31 August 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA . All other uses for this map should be confirmed with LANL ENV-RCRA staff.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-358 Inhibitor

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-358 Cooling Tower Inhibitor
PRODUCT DESCRIPTION: An aqueous corrosion and scale inhibitor. This product is designed specifically for the control of corrosion and mineral scales in open circulating cooling water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium Hydroxide	1310-73-2	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 12.0
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.102
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET

WEST C-358 Inhibitor

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.

PRIMARY HAZARD CLASS/DIVISION: 8

UN/NA NUMBER: UN 1719

PACKING GROUP: II

LABEL: Corrosive - 8

NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (SODIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: NO CHRONIC: NO

16. OTHER INFORMATION

DATE PREPARED: 3/23/2005

MSDS No: C358

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



MATERIAL SAFETY
DATA SHEET

WEST R-630 SULFITE

HMIS RATING
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0
OTHER: C

1. PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME: **WEST R-630 SULFITE**
PRODUCT DESCRIPTION: An aqueous solution of sodium & potassium sulfites, bisulfites, and metabisulfites. This product is designed specifically for halogen removal in process water systems.

MANUFACTURER: Water & Energy Systems Technology, Inc
13109 Arctic Circle
Santa Fe Springs, CA 90670
Customer Service: (562) 921-5191

24 HR EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV

This product does not contain any hazardous materials under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, nearly colorless liquid with very little odor.
IMMEDIATE CONCERNS: Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: May cause irritation or redness on contact with eye.
SKIN: Substance may cause slight skin irritation.
SKIN ABSORPTION: None.
INGESTION: Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing larger amounts may cause serious injury.
INHALATION: Poses little or no immediate hazard. Vapor and mists may cause allergic reactions in persons sensitive to sulfite compounds.
ACUTE EFFECTS: May cause local irritation from exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Person with pre-existing skin disorders, eye problems, or impaired respiratory function may be more susceptible to the effects of this substance.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: No specific information is available.
CARCINOGENICITY: This product's ingredients are not found in the Federal, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.
SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not applicable.
AUTO IGNITION & TEMPERATURE: Not applicable.
UNUSUAL FIRE & EXPLOSION HAZARDS: Sulfur dioxide gas may result from incineration.
FIRE FIGHTING PROCEDURES: Full protective clothing, plus self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Small spills should be flushed with a water spray.
LARGE SPILL: Contain by diking with soil or other absorbent material.
ENVIRONMENTAL PRECAUTIONS: Keep out of sewers, drains, and surface waters.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Follow all MSDS and Label precautions even after container is emptied as container may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Normal area ventilation should be adequate.

PERSONAL PROTECTION

EYES AND FACE: Wear chemical goggles or safety glasses with side shields.

SKIN: Nitrile rubber, PVC, or Neoprene apron and gloves.

RESPIRATORY: None required under normal conditions.

PROTECTIVE CLOTHING: Where splashing is possible, chemical resistant clothing, rubber apron, and boots should be worn.

HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.
ODOR: Mild sulfur.
COLOR: Colorless.
pH: ~ 6.5 units.
PERCENT VOLATILE: Not determined.
VAPOR DENSITY: Not determined.
BOILING POINT: 212 °F
SPECIFIC GRAVITY: 1.251
WATER SOLUBILITY: Complete
EVAPORATION RATE: < 1 (butyl acetate = 1.00)

10. STABILITY AND REACTIVITY

STABLE: Yes
HAZARDOUS POLYMERIZATION: No
CONDITIONS TO AVOID: High ambient temperatures in storage areas.
HAZARDOUS DECOMPOSITION: Decomposes at high temperatures to form sulfur dioxide gas.
INCOMPATIBLE MATERIALS: Strong oxidizers, acids, alkali's, amines, halogens, halogen compounds, anhydrides, and aldehydes.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal OSHA, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: D.O.T. NONREGULATED WATER TREATMENT COMPOUND

15. REGULATORY INFORMATION

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: No PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: No

16. OTHER INFORMATION

DATE PREPARED: 12/31/2010
MSDS NUMBER: R630

MANUFACTURER DISCLAIMER:

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of, or reliance upon such information. No representations, or warranties, either express or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.

HCC ID: 750413-G30-031216

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MATERIAL SAFETY DATA SHEET

MSDS

Purobrom Tablets

Date-Issued: 12/01/1997
MSDS Ref. No: BHCH22027
Date-Revised: 12/16/2003
Revision No: 8

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Purobrom Tablets
GENERAL USE: Industrial water treatment.
CHEMICAL FAMILY: Halogenated hydantoin

MANUFACTURER

Manufactured by BioLab, Inc
For Houghton Chemical Corporation
52 Cambridge Street
Allston, MA 02134
Customer SERVICE: (617) 254-1010

24 HR. EMERGENCY TELEPHONE NUMBERS

Poison Control Center (Medical) : (877) 800 - 5553
CHEMTREC (US Transportation) : (800) 424 - 9300

COMMENTS: EPA Registration Number: 5185-420-65199

2. COMPOSITION / INFORMATION ON INGREDIENTS

Table with 3 columns: Chemical Name, CAS#, Wt.%. Row 1: 1-bromo-3-chloro-5,5-dimethylhydantoin, 16079-88-2, 96

COMMENTS: (BCDMH)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: White tablets with halogen odor

IMMEDIATE CONCERNS: DANGER Corrosive Causes irreversible eye damage and skin burns. Harmful if swallowed. Irritating to nose and throat. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear protective clothing and rubber gloves when handling this product. Avoid breathing dust and fumes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

POTENTIAL HEALTH EFFECTS

EYES: Causes irreversible eye damage. Do not get in eyes.

SKIN: Causes severe skin burns. Do not get on skin.

INGESTION: Harmful if swallowed.

INHALATION: Irritating to nose and throat. Avoid breathing dust or fumes.

CHRONIC: There are no known chronic hazards.

MEDICAL CONDITIONS AGGRAVATED: Existing dermatitis may be aggravated by exposure.

ROUTES OF ENTRY: Skin Contact, Inhalation, Ingestion, Eye Contact.

4. FIRST AID MEASURES

EYES: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes.

Purobrom Tablets

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then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for treatment advice.

NOTES TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

GENERAL HAZARD: In large fires fueled by other materials, this product may smolder for prolonged periods emitting a dense black smoke. Any spilled material should be considered contaminated. Neutralize to a non-oxidizing material for safe disposal. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the material is damp, it should be neutralized to a non-oxidizing material for safe disposal.

EXTINGUISHING MEDIA: In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include, but are not limited to, carbon monoxide, carbon dioxide, hydrogen bromide, bromine, hydrogen chloride or chlorine.

EXPLOSION HAZARDS: A dust explosion severity determination was performed using the Hartmann Dust Explosibility Bomb designed at the U.S. Bureau of Mines. The product was determined not to be ignitable.

FIRE FIGHTING PROCEDURES: Fires fueled by other materials may release hydrogen bromide, bromine, hydrogen chloride or chlorine. Wear self-contained breathing apparatus. Ammonium phosphate (ABC) fire extinguishers should not be used.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal. Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Avoid contact with eyes, skin or clothing. Avoid breathing dust

HANDLING: STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not reseat container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE: Keep this product dry in original tightly closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Moisture may decompose this product and cause a violent reaction leading to fire and explosion. In case of decomposition, isolate container if possible and flood area with large amounts of water to dissolve all material before discarding this container. Do not contaminate food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Purobrom Tablets

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EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	<u>EXPOSURE LIMITS</u>					
	<u>OSHA PEL</u>		<u>ACGIH TLV</u>		<u>SUPPLIER OEL</u>	
	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	TWA	N/E ⁽¹⁾				N/E

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS: General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.**PERSONAL PROTECTIVE EQUIPMENT:****EYES AND FACE:** Wear goggles or safety glasses with side shields when handling this product.**SKIN:** Wear rubber gloves when handling this product. Avoid contact with skin.**RESPIRATORY:** A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.**WORK HYGIENIC PRACTICES:** Remove and wash contaminated clothing before reuse.**OTHER USE PRECAUTIONS:** Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.**9. PHYSICAL AND CHEMICAL PROPERTIES****PHYSICAL STATE:** Solid**ODOR:** Faint halogen odor.**APPEARANCE:** Tablet**COLOR:** White**pH:** 4.5(0.1% solution in DI water)**VAPOR PRESSURE:** Not Applicable**VAPOR DENSITY:** Not Applicable**BOILING POINT:** Not Determined**MELTING POINT:** With Decomposition**THERMAL DECOMPOSITION:** 145°C to 150°C**SOLUBILITY IN WATER:** 0.15g/100g water**DENSITY:** 60.1 lb ft³**10. STABILITY AND REACTIVITY****CONDITIONS TO AVOID:** High temperature. Poor ventilation. Contamination. Moisture/high humidity.**STABILITY:** This product is stable under normal conditions.**POLYMERIZATION:** Hazardous polymerization will not occur under normal conditions.**HAZARDOUS DECOMPOSITION PRODUCTS:** Hydrogen bromide, bromine, hydrogen chloride, chlorine**INCOMPATIBLE MATERIALS:** Avoid contact with water on concentrated material in the container. Avoid contact with easily oxidizable material: ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; cyanuric acid containing compounds; calcium hypochlorite; alkalis. Avoid contact with all other chemicals.**11. TOXICOLOGICAL INFORMATION****ACUTE****EYES:** Toxicological studies indicate this product to be corrosive to eyes.

Purobrom Tablets

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DERMAL LD₅₀: The dermal LD₅₀ is greater than 2.0 g/kg (rabbit). The primary skin irritation index is 6.1 and the product is considered corrosive to skin.

ORAL LD₅₀: 578 mg/kg (rat).

EYE EFFECTS: This product causes irreversible eye damage.

SKIN EFFECTS: This product causes skin burns.

CARCINOGENICITY:

This product is not listed as a carcinogen by IARC.

This product is not listed as a carcinogen by NTP.

This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER: Do not reuse container. Rinse thoroughly before discarding in trash.

14. TRANSPORT INFORMATION**DOT (DEPARTMENT OF TRANSPORTATION)**

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

CANADA TRANSPORT OF DANGEROUS GOODS

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

15. REGULATORY INFORMATION**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****311/312 HAZARD CATEGORIES:**

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** NO

313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: This product or its components are not listed

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Purobrom Tablets

TSCA REGULATORY: This product or its components are not subject to export notification.

TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE: Product is hazardous by definition of the Hazardous Communication Standard.

CLEAN WATER ACT: Not Listed.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT): This product is a registered pesticide.

SDWA (SAFE DRINKING WATER ACT): Not listed.

CLEAN AIR ACT

40 CFR PART 68—RISK MANAGEMENT FOR CHEMICAL ACCIDENT RELEASE PREVENTION: Not listed.

CANADA

WHMIS CLASS: C - Oxidizer; E - Corrosive

CANADIAN ENVIRONMENTAL PROTECTION ACT: Pesticide Control Product Registration Number: 16857

DOMESTIC SUBSTANCE LIST (INVENTORY): Listed

CALIFORNIA PROPOSITION 65: This product or its components are not listed on any Proposition 65 lists of carcinogens or reproductive toxicants

COMMENTS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

PREPARED BY: Regulatory Information Specialist

REVISION SUMMARY Revision #: 8 This MSDS replaces the July 14, 2003 MSDS. Any changes in information are as follows: In Section 1 MSDS Number Prepared By [] Print CHEMTREC Phone Number Section 1 Footnotes 24 Hour Emergency Phone Numbers In Section 1 [] Print CHEMTREC Phone Number 24 Hour Emergency Phone Numbers In Section 3 Emergency Overview Immediate Concerns Physical Appearance Chronic Effects Potential Health Effects - Eyes Potential Health Effects - Skin Potential Health Effects - Ingestion Comments Health In Section 4 Firstaid Eyes Firstaid Skin Firstaid - Ingestion Firstaid Inhalation In Section 5 Combustion Products In Section 7 Storage General Procedures In Section 9 Appearance Density (lbs) Density In Section 11 Eye Effects Skin Effects

HMIS RATING		NFPA RATING	
HEALTH:	3	HEALTH:	3
FLAMMABILITY:	1	FIRE:	1
PHYSICAL HAZARD:	1	REACTIVITY:	1
PERSONAL PROTECTION:	B		

- Key**
- 4 = Severe
 - 3 = Serious
 - 2 = Moderate
 - 1 = Slight
 - 0 = Minimal

NFPA STORAGE CLASSIFICATION: NFPA Oxidizer Class 2

COMMENTS: The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard, National Fire Protection Association (NFPA), Hazardous Materials Identification System (HMIS), and Canada's Workplace Hazardous Information System (WHMIS) and Environmental Protection Agency (EPA). **MANUFACTURER DISCLAIMER: IMPORTANT:** The information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This

Purobrom Tablets

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information is true and accurate to the best of our knowledge.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A160	TA-35-124/595	03A, Treated Cooling Water Discharges	Ten Site Canyon

SOURCE OF DISCHARGE

Outfall 03A160 is located at TA-35 and discharges treated and untreated cooling water from the National High Magnetic Field Laboratory (NHMFL) cooling tower and water treatment facility located at TA-35-124/595 to Ten Site Canyon an ephemeral tributary of Mortandad Canyon. Table 1 identifies the location of each source and provides a description.

**Table 1
 Sources for Discharges to Outfall 03A160**

TA	Bldg	Description
35	124/595	National High Magnetic Field Laboratory (NHMFL) Cooling Tower Blow-Down

Figure 1 provides a process schematic.

WATER TREATMENT PROCESS

The NHMFL cooling tower is treated using a corrosion inhibitor and discharges blow-down to two storage tanks. The cooling tower blow-down from these tanks is then batch treated through Ion Exchange (IX) to remove copper prior to being discharged to the outfall. The water treatment codes are provided in Table 2.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A160**

Treatment Code	Treatment Process	Description
2-L	Reduction	Chemicals that are Corrosion Inhibitors are added

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment process identified in Table 2 utilizes chemicals to control corrosion. The chemicals used to treat the water in the cooling tower are identified in Table 3.

**Table 3
 Treatment Chemicals Used in the NHMFL Cooling Tower**

Chemical Name	Reason for Use/Frequency	Hazardous Constituents from Table 2C-4
WEM CW 2581	Corrosion Inhibitor	Sodium Hydroxide, Maleic Acid

POTENTIAL POLLUTANTS

The treatment chemicals used to treat the cooling water constitute the pollutant load of the discharge to Outfall 03A160. Table 4 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 constituents identified.

Table 4
Potential Pollutants Discharged to Outfall 03A160

Description	Hazardous Constituents from Table 2C-4
Cooling Tower Blow Down	Sodium Hydroxide, Maleic Acid

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to Outfall 03A160 are provided in Table 5.

Table 5
Source Flow Rates/Frequencies to Outfall 03A160

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
Cooling Tower Blow Down	2,697	2L

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A160 for the Permit Re-Application on July 19, 2011.

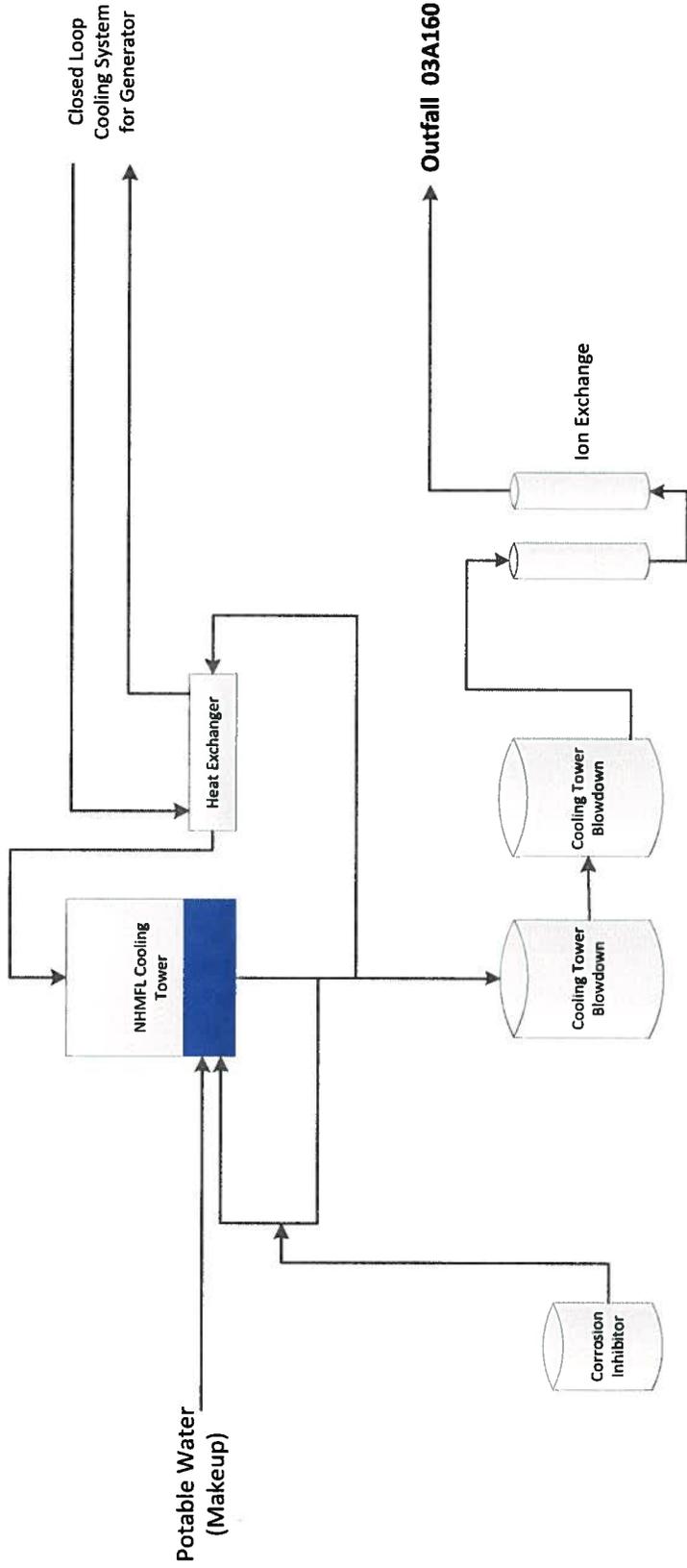
ANALYTICAL RESULTS PROVIDED

- Form 2C Analytes from a composite sample collected July 19, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°51'47"N
- Longitude – 106°17'49"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 118 mg/L.

Figure 1
Process Schematic for the NHMFL Cooling at TA-3-124 and Outfall 03A160

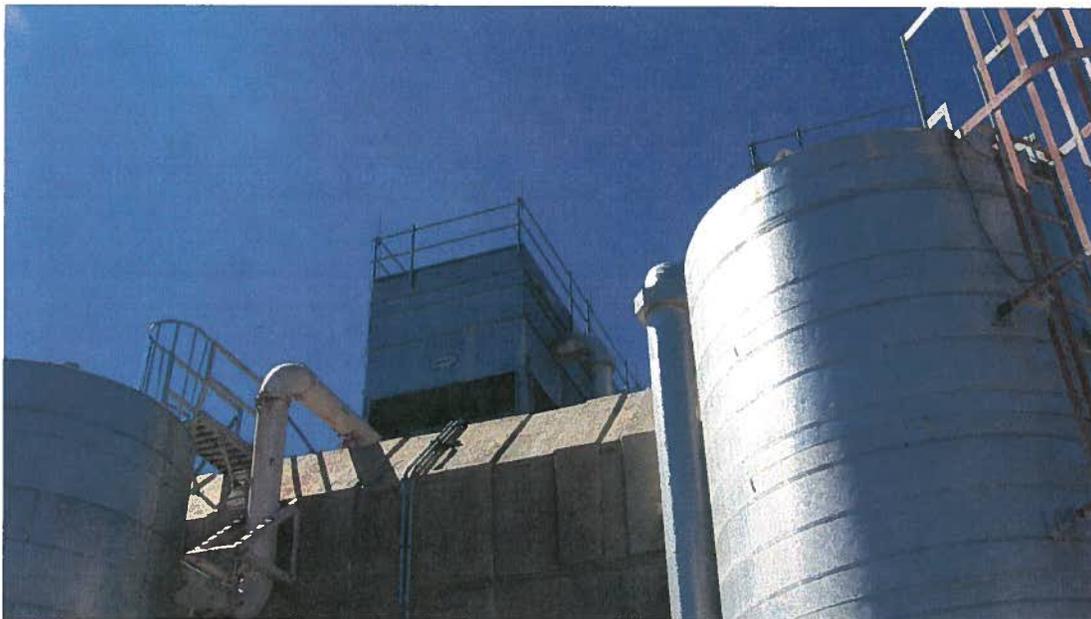


PROCESS SCHEMATIC
NHMFL Cooling Tower Blow Down
TA-35-124
January 26, 2012
2012 NPDES Permit Re-Application
OUTFALL 03A160

Photographs – National High Magnetic Field Laboratory (NHMFL) Cooling Tower and Treatment Equipment



**Photograph 1 – NHMFL Cooling Tower TA-35-124 & TA-35-595
Blow Down Drain & NPDES Sample Location**



**Photograph 2 – NHMFL Cooling Tower TA-35-124 & TA-35-595
Cooling Towers**

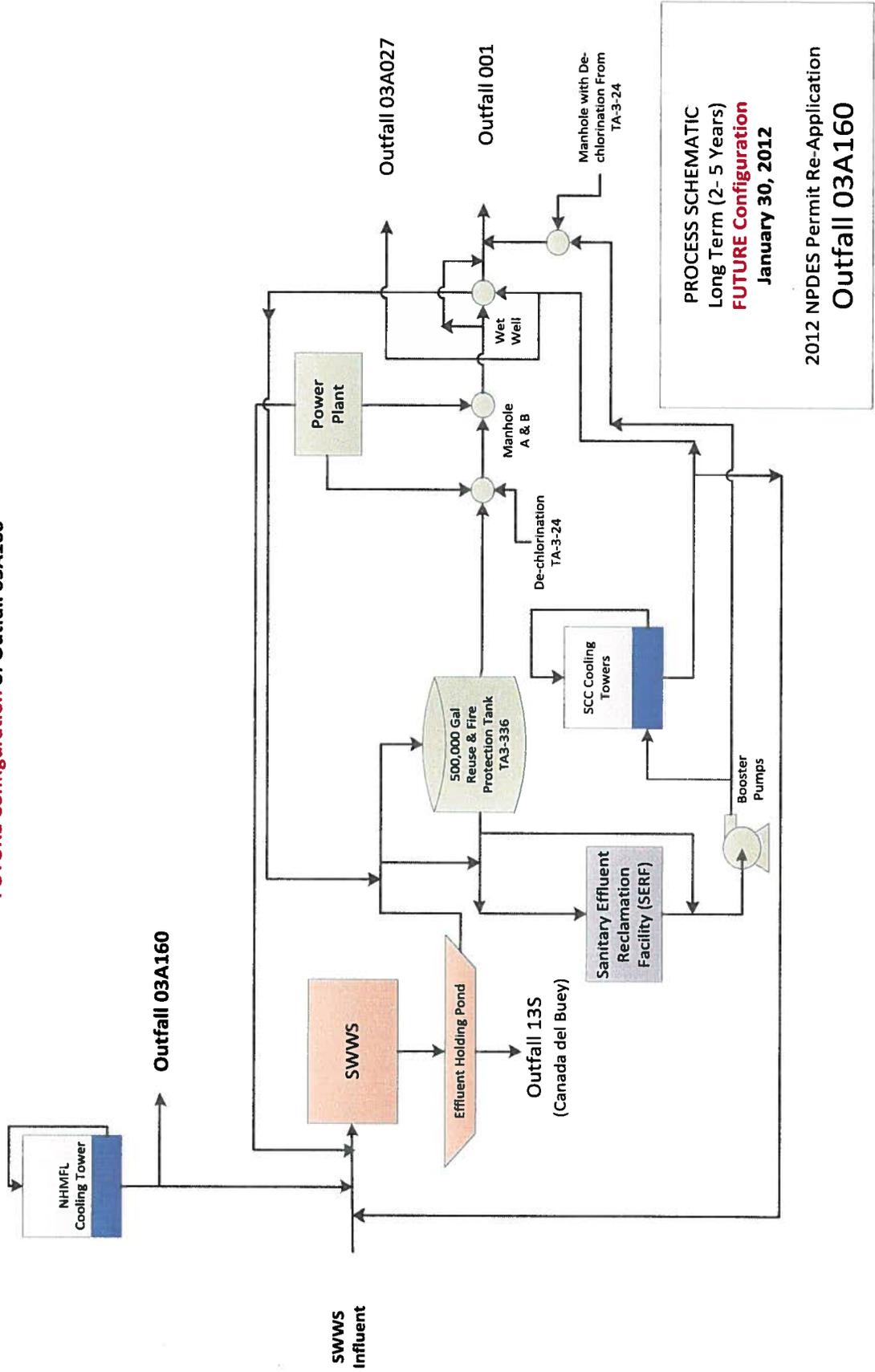


Photographs 3 & 4 – NHMFL Cooling Tower and Treatment System (TA-35-124 & TA-35-595)
Blow Down Storage Tanks, Filter, and Ion Exchange

Form 2C Section IV.A and B - Improvements (Long Term – [2 to 5 years])

In December 2007 the Laboratory completed LA-UR-07-8312, *NPDES Permit Compliance and Outfall Reduction Strategy*, which provides recommendations and options for the treatment, reduction, and/or elimination of the outfalls at LANL. There are three (3) outfalls included in this 2012 Permit Re-Application document that have been identified for possible elimination/reduction over the next 2 – 5 years. Figure 2 provides a process schematic that shows the anticipated future configuration of the Outfall 03A160 with respect to SWWS, SERF, and Outfall 001. The implementation of the elimination/reduction projects for each of these outfalls is subject to funding.

Figure 2
 Long Term (2 - 5 Years)
FUTURE Configuration of Outfall 03A160



DMR Outfall Data Summary - 03A160
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR									
				Flow Rate			Analytical Lab Result			DMR Units			DMR Units						
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units
160	35-124	8/07	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		9/07	Flow (Totalized Est.)	0.00215	0.00388	MGD													1
		10/07	Flow (Totalized Est.)	0.00300	0.00508	MGD													1
		11/07	Flow (Totalized Est.)	0.00254	0.00380	MGD													1
		12/07	Flow (Totalized Est.)	0.00288	0.00288	MGD													1
		1/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		2/08	Flow (Totalized Est.)	0.00508	0.00548	MGD													1
		3/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		4/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		5/08	Flow (Totalized Est.)	0.00444	0.00606	MGD													1
		6/08	Flow (Totalized Est.)	0.00412	0.01094	MGD													1
		7/08	Flow (Totalized Est.)	0.00144	0.00180	MGD													1
		8/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		9/08	Flow (Totalized Est.)	0.00299	0.00456	MGD													1
		10/08	Flow (Totalized Est.)	0.00331	0.00528	MGD													1
		11/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		12/08	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		1/09	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		2/09	Flow (Totalized Est.)	0.00241	0.00371	MGD													1
		3/09	Flow (Totalized Est.)	0.00165	0.00165	MGD													1
		4/09	Flow (Totalized Est.)	0.00310	0.00426	MGD													1
		5/09	Flow (Totalized Est.)	0.00411	0.00782	MGD													1
		6/09	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		7/09	Flow (Totalized Est.)	0.00234	0.00363	MGD													1
		8/09	Flow (Totalized Est.)	0.00771	0.00771	MGD													1
		9/09	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		10/09	Flow (Totalized Est.)	0.00173	0.00336	MGD													1
		11/09	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		12/09	Flow (Totalized Est.)	0.00106	0.00110	MGD													1
		1/10	Flow (Totalized Est.)	0.00377	0.00559	MGD													1
		2/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		3/10	Flow (Totalized Est.)	0.00069	0.00129	MGD													1
		4/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		5/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		6/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		7/10	Flow (Totalized Est.)	0.00306	0.00499	MGD													1
		8/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		9/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		10/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		11/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		12/10	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		1/11	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		2/11	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		3/11	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		4/11	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															
		5/11	Flow (Totalized Est.)	NO DISCHARGE TO OUTFALL															

DMR Outfall Data Summary - 03A160
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR													
				Flow Rate			Analytical Lab Result			DMR Units			Maximum			Average							
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	Minimum	Average	Maximum	Units	Permit Limit	Units	Numbers of Samples	
160	35-124	8/07	Total Phosphorus																				
		9/07		NO DISCHARGE TO OUTFALL																			
		10/07																					
		11/07																					
		12/07																					
		1/08																					
		2/08																					
		3/08																					
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1/11																							
2/11																							
3/11																							

DMR Outfall Data Summary - 03A160

Biological Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
03A160	3/8/2010	Grab	Daphnia pulex	48 hr acute	100	P
	3/9/2010					

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A160	TA-3-124 Cooling Tower Blow Down (A) [Intermittent]	7	12	0.002697	0.003762	2,697 Gallons	3,762 Gallons	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-3 Believed to be Absent.			
Table 2C-4 (B)			
Sodium Hydroxide	WEM CW 2581 - Corrosion Inhibitor		
Maleic Acid	WEM CW 2581 - Corrosion Inhibitor		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Whole Effluent Toxity 48 hour acute Toxicity - PASSED
 Daphnia pulex, 3-hr composite (2 samples, collected ~24 hours apart), 1 per 5 years

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

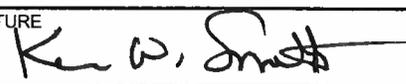
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Alison M. Dorries, Division Leader, ENV Protection Division	B. PHONE NO. (area code & no.) (505) 665-6952
C. SIGNATURE 	D. DATE SIGNED 1/27/12

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM08900019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A160

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	<1.0	<0.0314	(C)				1	mg/L	1b/D	NA	NA	NA
b. Chemical Oxygen Demand (COD)	7.3	0.229					1	mg/L	1b/D	NA	NA	NA
c. Total Organic Carbon (TOC)	1.16	0.0364					1	mg/L	1b/D	NA	NA	NA
d. Total Suspended Solids (TSS)	1.0	0.0314	1.0	0.0225	1.0	0.0225	3	mg/L	1b/D	NA	NA	NA
e. Ammonia (as N)	<0.0285	<9E-04	(C)				1	mg/L	1b/D	NA	NA	NA
f. Flow	VALUE	0.003762 (D)	VALUE	0.002697 (E)	VALUE	0.002697 (F)	2	MGD	NA	VALUE	NA	NA
g. Temperature (winter)	VALUE	NO DATA (G)	VALUE		VALUE		0	°C		VALUE	NA	NA
h. Temperature (summer)	VALUE	27.1 (H)	VALUE		VALUE		1	°C		VALUE	NA	NA
i. pH	MINIMUM	8.2 (I)	MAXIMUM	9.0 (I)	MINIMUM	8.4 (J)	MAXIMUM	9.0 (J)				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Bromide (24959-67-9)	X		0.193	0.00606					1	mg/L	1b/D	NA	NA	NA
b. Chlorine, Total Residual		X	0	0	0	0	0	0	4	mg/L	1b/D	NA	NA	NA
c. Color	X		5						1	mg/L	1b/D	NA	NA	NA
d. Fecal Coliform		X	<1/100		(K)				1	cfu/mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		1.19	0.0374					1	mg/L	1b/D	NA	NA	NA
f. Nitrate-Nitrite (as N)	X		4.51	0.142					1	mg/L	1b/D	NA	NA	NA

EPA Form 3510-2C (6-90) PAGE V-1 CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)		X	<0.035	<0.0011	(C)		1	mg/L	1b/D	NA	NA	NA
h. Oil and Grease	X		1.96	0.0615			1	mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1.0	0.0314	1.0	0.0225	3	mg/L	1b/D	NA	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<0.96				1	pCi/L	NA	NA	NA	NA
(2) Beta, Total	X		15.9				1	pCi/L	NA	NA	NA	NA
(3) Radium, Total		X	<0.379				1	pCi/L	NA	NA	NA	NA
(4) Radium 226, Total	X		1.03				1	pCi/L	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		29.9	0.939			1	mg/L	1b/D	NA	NA	NA
l. Sulfide (as S)		X	<3E-02	<9E-04	(C)		1	mg/L	1b/D	NA	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		0.04	0.00126				mg/L	1b/D	NA	NA	NA
n. Surfactants	X		0.0495	0.00155			1	mg/L	1b/D	NA	NA	NA
o. Aluminum, Total (7429-90-5)		X	<0.068	<0.0021	(U)		1	mg/L	1b/D	NA	NA	NA
p. Barium, Total (7440-39-3)	X		1.4E-03	4.4E-05	(L)		1	mg/L	1b/D	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.216	0.00678			1	mg/L	1b/D	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-03	<3E-05	(M)		1	mg/L	1b/D	NA	NA	NA
s. Iron, Total (7439-89-6)	X		0.0452	0.00142			1	mg/L	1b/D	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		5.81	0.182			1	mg/L	1b/D	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		1.55E-02	4.9E-04			1	mg/L	1b/D	NA	NA	NA
v. Manganese, Total (7439-96-5)		X	<2E-03	<6E-05	(C)		1	mg/L	1b/D	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<2.5E-03	<8E-05	(C)		1	mg/L	1b/D	NA	NA	NA
x. Titanium, Total (7440-32-6)		X	<1E-03	<3E-05	(C)		1	mg/L	1b/D	NA	NA	NA

EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515**
 OUTFALL NUMBER **03A160**

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available) (1)	c. LONG TERM AVRG. VALUE (if available) (1)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
										(1) CONCENTRATION	(2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS											
1M. Antimony, Total (7440-36-0)			X	<3.5E-03	<1E-04	(M)	1	mg/L	1b/D	NA	NA
2M. Arsenic, Total (7440-38-2)		X		1.2E-02	4E-04		1	mg/L	1b/D	NA	NA
3M. Beryllium, Total (7440-41-7)			X	<2E-04	<6E-06	(M)	1	mg/L	1b/D	NA	NA
4M. Cadmium, Total (7440-43-9)			X	<1E-03	<3E-05	(M)	1	mg/L	1b/D	NA	NA
5M. Chromium, Total (7440-47-3)		X		3.04E-02	1E-03		1	mg/L	1b/D	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0404	0.0013	0.0404	7	mg/L	1b/D	NA	NA
7M. Lead, Total (7439-92-1)		X		1.52E-03	5E-03		1	mg/L	1b/D	NA	NA
8M. Mercury, Total (7439-97-6)			X	<6.6E-05	<2E-06	(U)	1	mg/L	1b/D	NA	NA
9M. Nickel, Total (7440-02-0)		X		1.35E-03	4E-05		1	mg/L	1b/D	NA	NA
10M. Selenium, Total (7782-49-2)		X		0.0723	0.0023		1	mg/L	1b/D	NA	NA
11M. Silver, Total (7440-22-4)			X	<2E-04	<6E-06	(M)	1	mg/L	1b/D	NA	NA
12M. Thallium, Total (7440-28-0)		X		<4.5E-04	<1E-05	(M)	1	mg/L	1b/D	NA	NA
13M. Zinc, Total (7440-66-6)		X		4.4E-03	1E-04	(N)	1	mg/L	1b/D	NA	NA
14M. Cyanide, Total (57-12-5)		X		1.36E-02	4E-04		1	mg/L	1b/D	NA	NA
15M. Phenols, Total			X	<5E-03	<2E-04	(V)					

DIOXIN

2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)

DESCRIBE RESULTS The result from the analytical laboratory is <1.06E-08 mg/L. This is above the limit of the MQL of 1.0E-08 mg/L but is likely due to the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (O) for additional information.

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES	
						(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS		
GC/MS FRACTION - VOLATILE COMPOUNDS														
1V. Acrolein (107-02-8)			X	<1.25E-03	(M)	<4E-05				1	mg/L	1b/D	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	(M)	<3E-05				1	mg/L	1b/D	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
4V. Bis (Chloro-methyl) Ether (542-88-1)				NA	(P)									
5V. Bromoform (75-25-2)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
8V. Chloro-dibromomethane (124-48-1)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	(C)	<9E-06				1	mg/L	1b/D	NA	NA
10V. 2-Chloro-ethylvinyl Ether (110-75-8)			X	<1.5E-03	(C)	<5E-05				1	mg/L	1b/D	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
12V. Dichloro-bromomethane (75-27-4)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
13V. Dichloro-difluoromethane (75-71-8)				NA	(P)									
14V. 1,1-Dichloro-ethane (75-34-3)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
15V. 1,2-Dichloro-ethane (107-06-2)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
16V. 1,1-Dichloro-ethylene (75-35-4)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
17V. 1,2-Dichloro-propane (78-87-5)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
18V. 1,3-Dichloro-propylene (542-75-6)			X	<2.5E-04	(M, Q)	<8E-06				1	mg/L	1b/D	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	(M)	<8E-06				1	mg/L	1b/D	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	(M)	<9E-06				1	mg/L	1b/D	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	(C)	<9E-06				1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION -- VOLATILE COMPOUNDS (continued)										
22V. Methylene Chloride (75-09-2)			X	<3E-03	<9E-05	(M)	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<8E-06	(M)	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<9E-06	(M)	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<8E-06	(M)	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<9E-06	(M)	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	1E-05	(C)	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<8E-06	(M)	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<8E-06	(M)	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(P)				
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<2E-05	(M)	mg/L	1b/D	NA	NA
GC/MS FRACTION -- ACID COMPOUNDS										
1A. 2-Chlorophenol (95-57-8)			X	<2E-03	<6E-05	(M)	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<2E-03	<6E-05	(M)	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<2E-03	<6E-05	(M)	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3E-03	<9E-05	(M)	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5E-03	<2E-04	(M)	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<2E-03	<6E-05	(C)	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<2E-03	<6E-05	(C)	mg/L	1b/D	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X	<2E-03	<6E-05	(C)	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<2E-03	<6E-05	(M)	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)		X		8E-03	3E-04	(R)	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<2E-03	<6E-05	(M)	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE	
					(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS													
1B. Acenaphthene (83-32-9)			X	<3.1E-04	(M)				mg/L	1b/D	1	NA	NA
2B. Acenaphthylene (208-96-8)			X	<2E-04	(C)				mg/L	1b/D	1	NA	NA
3B. Anthracene (120-12-7)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	(M)				mg/L	1b/D	1	NA	NA
5B. Benzo (a) Anthracene (56-55-3)	X			2.6E-04	(S)				mg/L	1b/D	1	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<2E-04	(C)				mg/L	1b/D	1	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3E-03	(C)				mg/L	1b/D	1	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<2E-03	(M)				mg/L	1b/D	1	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-90-1)			X	<2E-03	(M)				mg/L	1b/D	1	NA	NA
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)			X	<2E-03	(M)				mg/L	1b/D	1	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<2E-03	(C)				mg/L	1b/D	1	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<2E-03	(M)				mg/L	1b/D	1	NA	NA
16B. 2-Chloro-naphthalene (91-58-7)			X	<3E-04	(M)				mg/L	1b/D	1	NA	NA
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	<2E-03	(C)				mg/L	1b/D	1	NA	NA
18B. Chrysene (218-01-9)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<2E-04	(M)				mg/L	1b/D	1	NA	NA
20B. 1,2-Dichloro-benzene (95-50-1)			X	<2.5E-04	(M)				mg/L	1b/D	1	NA	NA
21B. 1,3-Di-chloro-benzene (541-73-1)			X	<2.5E-04	(M)				mg/L	1b/D	1	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. TESTING REQUIRED (if available)	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)												
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	<8E-06	(M)		1	mg/L	1b/D	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
24B. Diethyl Phthalate (84-66-2)		X		0.0674	0.0021			1	mg/L	1b/D	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<2E-03	<6E-05	(C)		1	mg/L	1b/D	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3E-03	<9E-05	(C)		1	mg/L	1b/D	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
31B. Fluoranthene (206-44-0)			X	<2E-04	<6E-06	(M)		1	mg/L	1b/D	NA	NA
32B. Fluorene (86-73-7)			X	<2E-04	<6E-06	(M)		1	mg/L	1b/D	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3E-03	<9E-05	(M)		1	mg/L	1b/D	NA	NA
36B. Hexachloroethane (67-72-1)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	<2E-04	<6E-06	(M)		1	mg/L	1b/D	NA	NA
38B. Isophorone (78-59-1)			X	<3E-03	<9E-05	(M)		1	mg/L	1b/D	NA	NA
39B. Naphthalene (91-20-3)			X	<3E-04	<9E-06	(C)		1	mg/L	1b/D	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3E-03	<9E-05	(M)		1	mg/L	1b/D	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<2E-03	<6E-05	(M)		1	mg/L	1b/D	NA	NA

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CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)						
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE					
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	<9E-05	(M, T)				1	mg/L	1b/D	NA	NA	NA
44B. Phenanthrene (85-01-6)			X	<2E-04	<6E-06	(C)				1	mg/L	1b/D	NA	NA	NA
45E. Pyrene (129-00-0)			X	<3E-04	<9E-06	(M)				1	mg/L	1b/D	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-92-1)			X	<2E-03	<6E-05	(M)				1	mg/L	1b/D	NA	NA	NA
GC/MS FRACTION - PESTICIDES															
1P. Aldrin (309-00-2)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
2P. α-BHC (319-84-6)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
3P. β-BHC (319-85-7)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
4P. γ-BHC (68-89-9)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<7.1E-06	<2E-07	(C)				1	mg/L	1b/D	NA	NA	NA
6P. Chlordane (57-74-9)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
11P. α-Erosulfan (115-29-7)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
12P. β-Erosulfan (115-29-7)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
14P. Endrin (72-20-8)			X	<1.1E-05	<3E-07	(M)				1	mg/L	1b/D	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<7.1E-06	<2E-07	(M)				1	mg/L	1b/D	NA	NA	NA

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EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515** **OUTFALL NUMBER** **03A160**

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT		4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
GC/MS FRACTION – PESTICIDES (continued)									
17P. Heptachlor Epoxide (1024-57-3)			X	< 7.1E-06	< 2E-07	(M)	1	NA	NA
18P. PCB-1242 (53469-21-9)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
19P. PCB-1254 (11097-69-1)			X	< 3.58E-05	< 1E-06	(M)	1	NA	NA
20P. PCB-1221 (11104-28-2)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
21P. PCB-1232 (11141-16-5)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
22P. PCB-1248 (12672-29-6)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
23P. PCB-1260 (11096-82-5)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
24P. PCB-1016 (12674-11-2)			X	< 3.43E-05	< 1E-06	(M)	1	NA	NA
25P. Toxaphene (8001-35-2)			X	< 1.6E-04	< 5E-06	(M)	1	NA	NA

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FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A160

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from August 2010 to July 2011. The outfall is considered intermittent because it does not discharge 24 hours per day.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified in Section V.D of the form because they are components of the chemicals used to treat the cooling tower water and, therefore, may be present in the blow down discharged to the outfall. There were not any Table 2C-3 hazardous substances identified.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The data is unavailable. This outfall did not discharge during the winter months.
- H. There is temperature data available for the discharge made to Outfall 03A160 in July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- N. Zinc was detected at a value less than the MQL of 0.02 mg/L.
- O. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.000104 ug/L). This causes a result that is over the MQL.
- P. EPA remanded the parameter.
- Q. Result is for cis- and trans-1,3-dichloropropylene.
- R. Phenol was detected at a value less than the MQL of 0.01 mg/L.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A160

- S. Benzo(a)anthracene was detected at a value less than the MQL of 0.005 mg/L.
- T. The result provided is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).
- U. The MDL for this analyte was above the approved EPA Region 6 MQL at the time of testing. An additional sample will be collected and retested with an MDL below the MQL. The results of this analysis will be provided to confirm absence of the analyte in an Addendum that will be submitted at a later date.
- V. The analytical data did not include a specific value for total phenols because the analysis required results for the list of individual/specific phenols. The analytical results for each of the specific phenol were below both the MDL and MQL, are considered non-detects, and are believed to be absent from the effluent discharged to the outfall. The value provided for total phenols is the highest MDL utilized for the individual/specific phenols.

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)

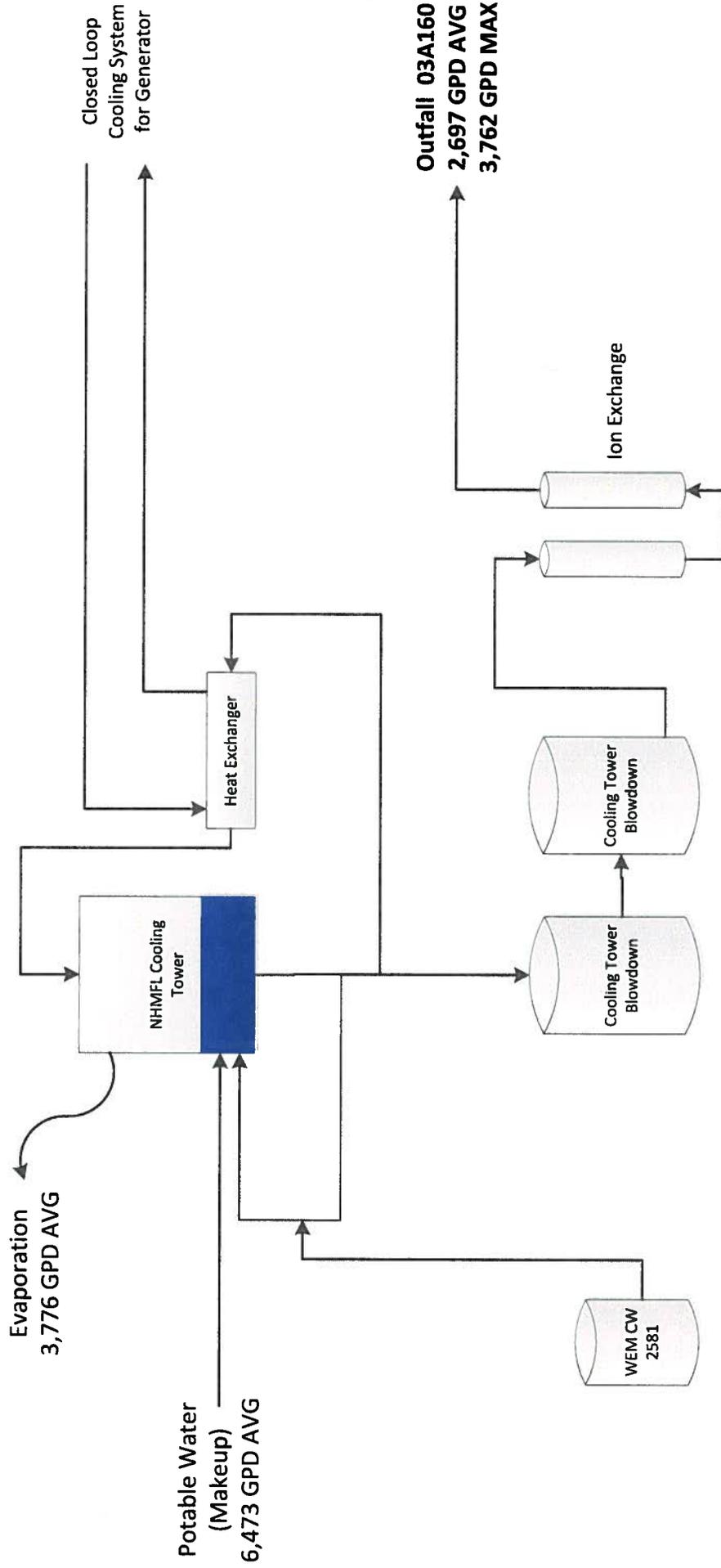
METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE			
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
2012 NPDES Permit Re-Application
Process Schematic and Water Balance for NHMFL Cooling Tower Blow Down,
TA-35-124 and Outfall 03A160



LA-UR-12-00359

PROCESS SCHEMATIC
NHMFL Cooling Tower Blow Down
TA-35-124
January 26, 2012
2012 NPDES Permit Re-Application
OUTFALL 03A160

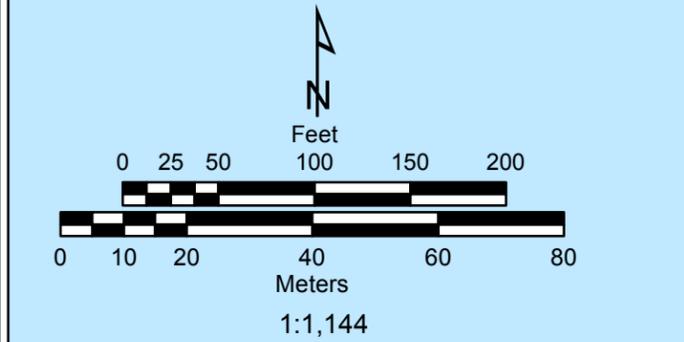
Water balance calculation is based on 2.4 cycles.



NPDES Permit Re-Application Project TA-35 Building 124 Outfall #03A160

Legend

<ul style="list-style-type: none"> ● NPDES Outfall ▲ Springs --- Drainages --- 100ft Contours --- 20ft Contours --- 10ft Contours --- Fences --- Dirt Roads 	<ul style="list-style-type: none"> --- Paved Roads ■ Source Structures ■ Building Served by Source ■ Structures LANL Boundary Technical Areas
--	--



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-09 14 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.

MATERIAL SAFETY DATA SHEET

Western Environmental Management Corp., Ltd.
P. O. Box 1807
3106 E. Greene St.
Carlsbad, NM 88220
OFFICE: (505) 885-5709
EMERGENCY: CHEMTREC 1/800-424-9300

TA 35 3rd Bldg 501

EPA outfall 03A-160

tower water

Date: 5/27/04

Product Name: WEM CW 2581

Hazard(s) as defined by OSHA Hazard Communication Standard:
Corrosive to skin and eyes.

treatment chemical

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Sodium Hydroxide
CAS #1310-23-2
Percent: 1.8
TLV: 2 mg/m³, Ceiling
PEL: 2 mg/m³, Ceiling

Polymaleic Acid
CAS #: 26099-09-02
Percent: 1.2

2 phosphono-1,2,4-butanetricarboxylic acid
CAS #: 37971-36-1
Percent: 1.0

(3-Methylphenyl)methyl, Butanedioic Acid
CAS #6315-20-4
Percent: Less than 1.0

Maleic Acid
CAS: #110-16-7
Percent: Less than 1.0

(4-Methylphenyl)methyl, Butanedioic Acid
CAS #: 6315-21-5
Percent: Less than 1.0

o-m-Tolyltriazole Sodium Salt
CAS #: 64665-57-2
Percent: Less than 1.0

1. COMPOSITION/INFORMATION ON INGREDIENTS – Continued:

The remainder of the components comprise proprietary information.

2. HAZARD IDENTIFICATION:

Emergency Overview: Corrosive Liquid. Causes burns to skin and eyes.

Health Effects: Mist may cause irritation of eyes, nose, throat and lungs. Product may cause burns to skin and eyes. Contact with eyes may cause permanent eye damage, including blindness.

3. FIRST AID INFORMATION:

Eye exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin exposure: Wash exposed area with plenty of soap and water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately.

Ingestion: DO NOT INDUCE VOMITING. Rinse with copious amounts of water or milk, first. Irrigate the esophagus and dilute stomach contents by slowly giving one (1) or two (2) glasses of water or milk. Avoid giving alcohol or alcohol related products. In cases where the individual is semi-comatose, comatose or convulsing, DO NOT GIVE FLUIDS BY MOUTH. In case of intentional ingestion of the product seek medical assistance immediately; take individual to nearest medical facility.

NOTE TO PHYSICIAN: Not available.

4. PRIMARY ROUTES OF EXPOSURE:

1. Effects from Acute Exposure:

Eye exposure: Corrosive to the eyes with possible permanent damage depending on the length of exposure, solution concentration and first aid measures.

Skin exposure: Corrosive. Effects may vary depending on length of exposure, solution concentration and first aid measures.

Inhalation: May cause irritation or corrosion of mucous membranes and the lungs. Exposed individuals should be monitored for respiratory distress, bronchitis or pneumonia.

Ingestion: Ingestion is not expected to be a primary route of exposure.

4. PRIMARY ROUTES OF EXPOSURE: CONTINUED

2. Effects from Chronic Exposure:

The effects from chronic exposure have not been fully evaluated.

5. TOXICOLOGICAL INFORMATION:

Carcinogenic potential: Not tested. Not shown as a carcinogen by OSHA, IARC, or NTP.

Target Organ Effects: Skin and eyes (burns and corrosion) are expected to be the target organs for this product.

Other health effects: None known.

6. PHYSICAL AND CHEMICAL PROPERTIES:

Boiling Point: Greater than 212 F

Vapor Pressure: 24 MM HG at 25 C (water)

Vaport Density (Air=1): 0.020 @ 25 C

Room Temperature:

Appearance and State: Yellowish/Bronw, Hazy Liquid

Odor: Slight

Specific Gravity (H₂O=1): 1.09

Solubility in H₂O % by wt.: Soluble in all proportions

% Volatiles: Not Available

Evaporation Rate (Butyl Acetate=1): Equivalent to water

pH (as is): >8.5

pH (1% solution): >8.5

Odor Threshold: Not Available

Coefficient Water/Oil Dist.: Not Availalbe

Flash Point: None below 212 F

Autoignition Temperature: Not Applicable

Flammable Limits Upper: Not Applicable

(Air) Lower: Not Applicable

Explosive Properties: Not Applicable

7. FIRE AND EXPLOSION INFORMATION:

Flammable limits: None below 212 F. Keep away from flames and other ignition sources.

Extinguishing media: Water fog, carbon dioxide, foam, dry chemical.

Special firefighting procedures: Fire fighters should wear full protective gear, including self contained breathing apparatus.

8. REACTIVITY INFORMATION:

Stability: Stable under ordinary conditions of use and storage.

Hazardous Polymerization: Will not occur

Conditions to Avoid: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.

Incompatibility: Alkaline materials, acid reactive salts such as nitrites and sulfites and oxidizing agents.

Hazardous Decomposition Products: Thermal decomposition and burning may produce carbon monoxide, carbon dioxide and phosphorus oxide.

9. HANDLING PRECAUTIONS:

Face shields are strongly recommended.

The handling precautions for this product are based on the characteristics of the neat product unless otherwise specified.

Chemical resistant gloves, indirect ventilation goggles, body-protective clothing, and chemical resistant safety shoes are required.

Provide dilution ventilation to control vapor and/or mist level. If misting occurs, a NIOSH/MSHA approved respirator may be required. Use a respirator approved for the material and level of exposure.

Keep container tightly closed when not in use.

10. SPILL, LEAK, AND DISPOSAL PROCEDURES:

Important: Before responding to a spill or leak of this product, review each section of this MSDS. Follow the recommendations given in the Handling Precautions sections. Check the Fire and Explosion Data section to determine if the use of non-sparking tools is merited. Insure that spilled or leaked product does not come into contact with materials listed as incompatible. If irritating fumes are present, consider evacuation of enclosed areas.

Initially minimize area affected by the spill or leak. Block any potential routes to water systems (e.g., sewers, streams, lakes, etc.). Based on the product's toxicological and chemical properties, and on the size and location of the spill or leak, assess the impact on contaminated environments (e.g. water systems, ground, air equipment, etc.). There are no methods available to completely eliminate any toxicity this product may have on aquatic environments. Minimize adverse effects on these environments. Determine if federal, state, and/or local release notification is required (see Regulatory Classifications section of this MSDS). Recover as much of the pure product as possible into appropriate containers. Later, determine if this recovered product can be used for its intended purpose. Address clean-up of contaminated environments. Spill or leak residuals may have to be collected and disposed of. Clay, soil, or commercially available absorbents may be used to recover any material that can

10. SPILL, LEAK AND DISPOSAL PROCEDURES – CONTINUED:

not readily be recovered as pure product. Flushing residual material to an industrial sewer, if present at the site of a spill or leak incident, may be acceptable if authorized approval is obtained. If product and/or spill/leak residuals are flushed to an industrial sewer, insure that they do not come into contact with incompatible materials. Contact the person(s) responsible for the operation of your facility's industrial sewer system prior to intentionally flushing or pumping spills or leaks of this product to the industrial sewer.

DISPOSAL GUIDELINES:

Note: Follow federal, state, and local regulations governing the disposal of waste materials.

Contaminated Materials: Determine if waste containing this product can be handled by available industrial effluent system or other on-site waste management unit. If off-site management is required, contact a company experienced in industrial waste management. This product is not specifically listed in 40 CFR 261 as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, spill or leak residuals may meet the criteria of a characteristic hazardous waste under this Act. Check the characteristics of the material to be disposed of and/or the physical and reactivity data given in this MSDS for the neat product.

Container Disposal: Empty containers, as defined by appropriate sections of the RCRA, are not RCRA hazardous wastes. However, insure proper management of any residuals remaining in container.

11. TRANSPORTATION AND SHIPPING INFORMATION:

DOT Proper Shipping Name: CORROSIVE LIQUID, N.O.S. (Sodium Hydroxide & Polymaleic Acid), 8, UN 1760, PG II

IATA: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Polymaleic Acid)

IMDG: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Polymaleic Acid)

DOT Classification: 8 (Corrosive)

DOT Labels: Corrosive

DOT Markings: Corrosive Liquid, N.O.S. (Sodium Hydroxide & Polymaleic Acid) UN 1760

DOT Placard: Corrosive

UN Number: UN 1760

Hazardous Substance/RQ: Not Applicable

49 STCC Number: Not applicable; not shipped via rail cars

Precautions to be Taken in Transportation: Protect against physical damage. Keep container tightly closed.

Other Shipping Information: Packing Group II, Emergency Response Guide Number 60.

12. REGULATORY INFORMATION:

The following Regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

SARA (Superfund Amendments and Reauthorization Act):

SARA 302 Extremely Hazardous Substances List: No components of this product are listed.

SARA 312 Hazard Category: Immediate (Acute) Health Hazard.

SARA 313 Toxic Chemicals List: No Section 313 listed substances are present above de minimus levels.

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): No components of this product are listed.

RCRA (Resource Conservation and Recovery Act) Listed Hazardous Wastes: No components of this product are listed.

CWA (Clean Water Act) Listed Substances: No components of this product are listed.

FDA (Food and Drug Administration): This product not approved for food contact uses.

TSCA (Toxic Substances Control Act) Applicability: All components are listed on TSCA Inventory.

FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act): No components of this product are listed.

HMIS/NPCA Ratings: Health 3; Flammability 1; Reactivity 1

NFPA Ratings: Health 3; Flammability 1; Reactivity 1

STATE REGULATIONS

Various State Right to Know Acts: Non-proprietary hazardous chemicals are listed in Section 1 of this MSDS. Should you require further information on specific proprietary chemicals or inerts please contact Western Environmental Management Corp., Ltd.

The information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazard Communication regulations.

Western Environmental Management Corp., Ltd. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE**. No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out of or relating to this contract, or breach thereof, shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgement upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A181	TA-55-6	03A, Treated Cooling Water Discharges	Mortandad Canyon

SOURCE OF DISCHARGE

Outfall 03A181 is located at TA-55-6 and discharges treated cooling tower blow-down from the Plutonium Facility Cooling Towers and water treatment system to Mortandad Canyon. The outfall receives cooling tower blow-down. Table 1 identifies the location of each source and provides a description.

**Table 1
 Sources for Discharges to Outfall 03A181**

TA	Bldg	Description
55	6	Cooling Tower Blow Down

Figure 1 provides a process schematic.

WATER TREATMENT PROCESS

The Plutonium Facility Cooling Towers water treatment system is controlled by a PLC that monitors the tower water using a chlorine detection system and a conductivity meter. The cooling water treatment chemicals may include a corrosion inhibitor, biocide, and a de-chlorination agent. The water treatment codes provided in Table 2 have been assigned to this outfall.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A181**

Treatment Code	Treatment Process	Description
2-L	Reduction	Chemicals that are Corrosion Inhibitors are added
2-H	Disinfection (other)	Chemicals are added to control Microorganisms
2-F	Disinfection (chlorine)	Chemicals are added to control Microorganisms
2-E	Dechlorination	Chlorine Scavenger Chemicals are added

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment process identified in Table 2 utilizes chemicals to control corrosion. The chemicals used to treat the water in the cooling tower are identified in Table 3.

**Table 3
 Treatment Chemicals Used in the Plutonium Facility Cooling Towers**

Chemical Name	Reason for Use	Hazardous Substances Form 2C, Table 2C-4
3D TRASAR 3DTBR06	Reagent that Monitors Biological Health	Cupric Sulfate
NALCO 7408	De-Chlorination	Sodium Bisulfite
STABREX ST20	Biocide	Sodium Hypochlorite
3D TRASAR 3DT288	Corrosion Inhibitor	Phosphoric Acid, Sulfuric Acid
NALCO 90005	Disinfectant	Ammonium chloride, acetaldehyde

POTENTIAL POLLUTANTS

The treatment chemicals used to treat the cooling water constitute the pollutant load of the discharge to Outfall 03A181. Table 4 identifies the Table 2C-4 and Table 2C-3 constituents by discharge source.

**Table 4
 Potential Pollutants Discharged to Outfall 03A181**

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
TA-55-6 Treated Cooling Tower Blow-Down	Cupric sulfate, sodium bisulfite, phosphoric acid, sulfuric acid, sodium hypochlorite, ammonium chloride, acetaldehyde ^a

a. Acetaldehyde is listed as a Table 2C-3 Hazardous Substance.

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to Outfall 03A181 are provided in Table 5.

**Table 5
 Source Flow Rates/Frequencies to Outfall 03A160**

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
TA-55-6 Cooling Tower	5,127	2H, 2E, 2F, 2L

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A181 for the Permit Re-Application on August 11, 2011.

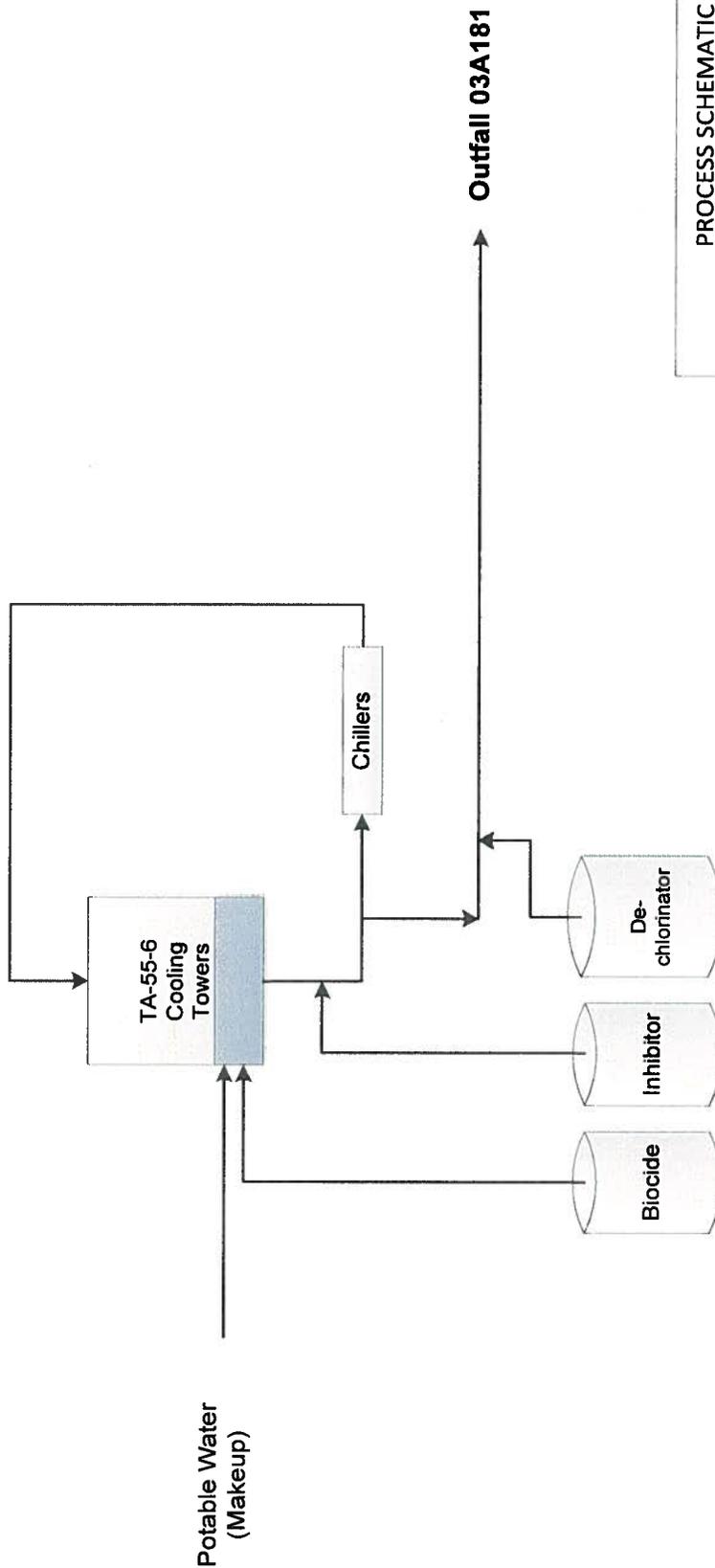
ANALYTICAL RESULTS PROVIDED

- Form 2C analytical data from a grab sample collected August 11, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°51'51"N
- Longitude – 106°18'05"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 84.7 mg/L.

Figure 1
Process Schematic of the TA-55-6 Cooling Towers, Water Treatment System, and Outfall 03A181

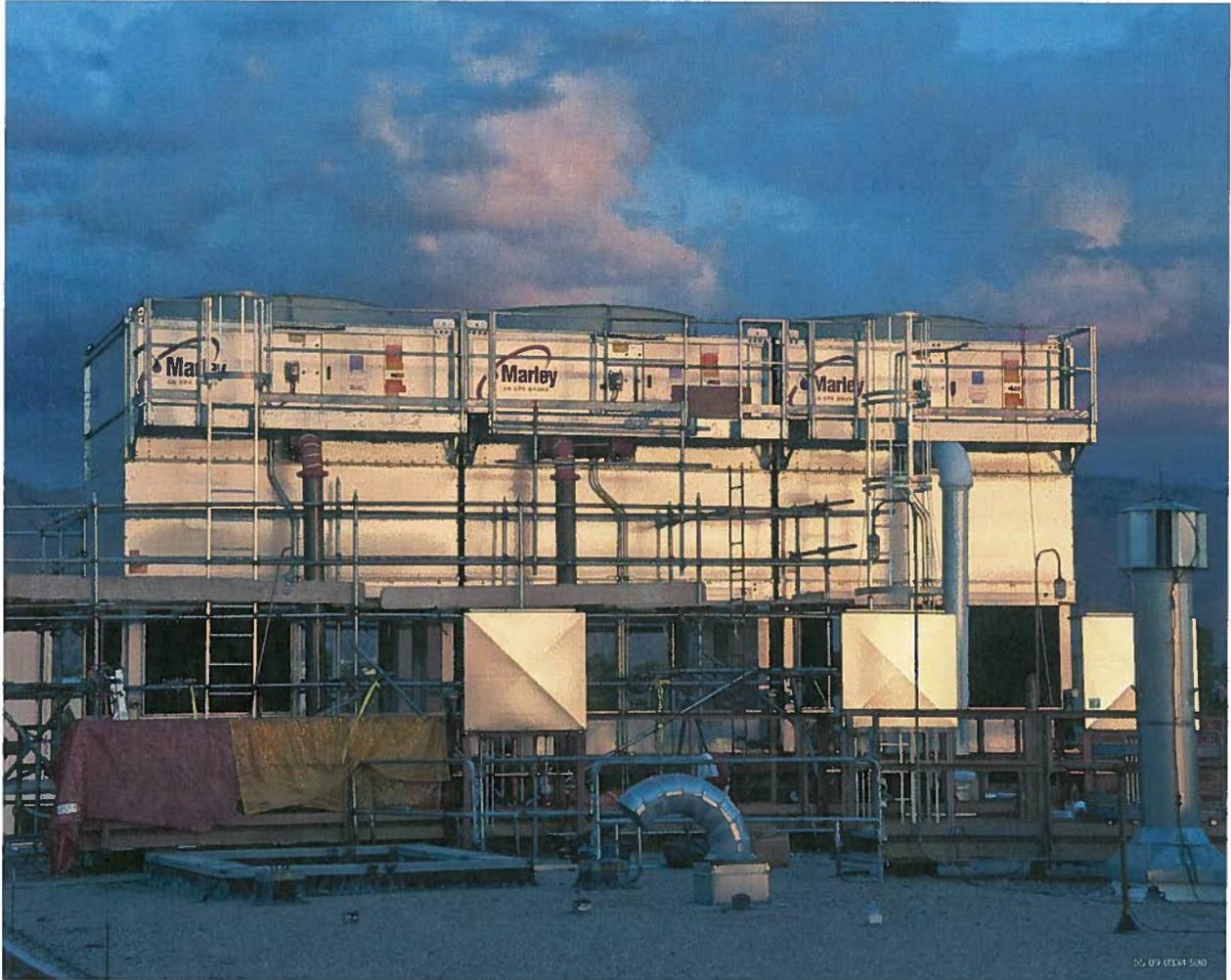


PROCESS SCHEMATIC
TA-55-6 Cooling Towers, Water Treatment
System, and Outfall
January 26, 2012
2012 NPDES Permit Re-Application
OUTFALL 03A181

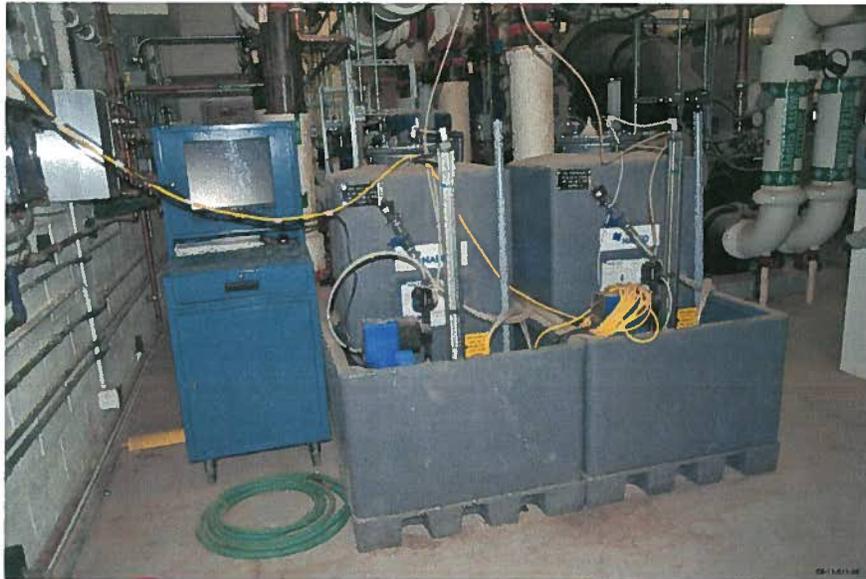
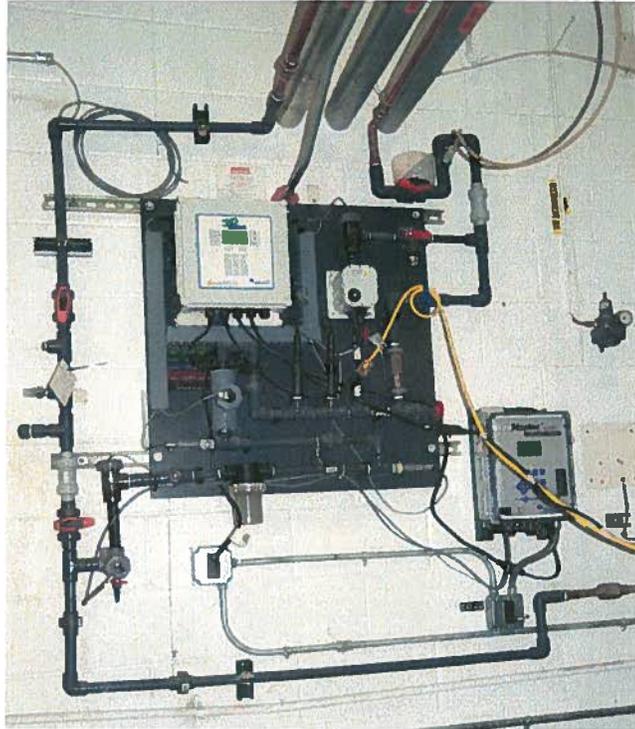
Photographs – TA-55 Cooling Towers and Treatment System



Photograph 1 & 2 – TA-55 Cooling Towers and Treatment System
Outfall 03A181



Photograph 3 – TA-55 Cooling Towers and Treatment System
TA-55 Cooling Towers

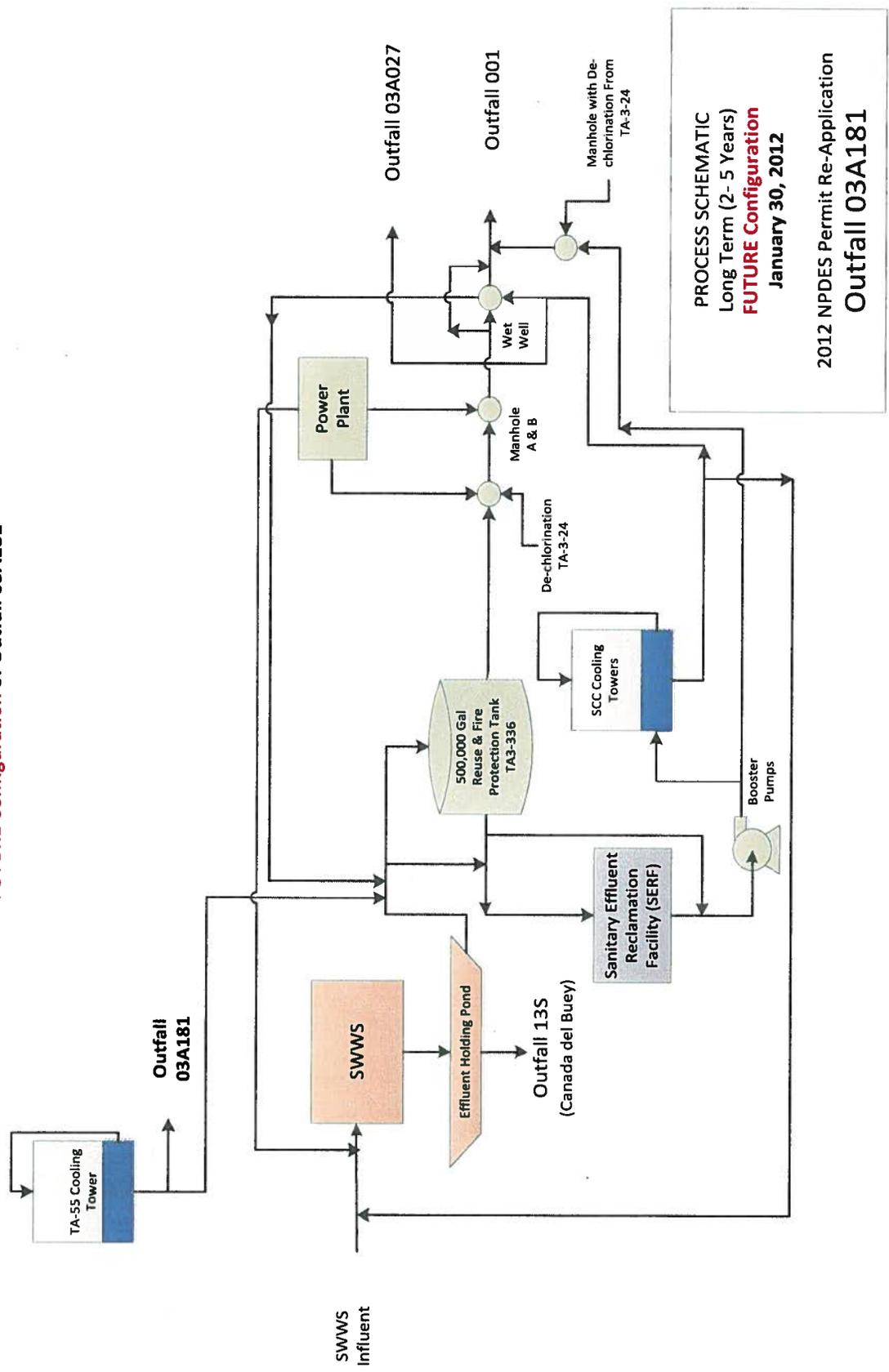


Photograph 4 & 5 – TA-55 Cooling Towers and Treatment System
Cooling Tower Water Treatment System

Form 2C Section IV.A and B - Improvements (Long Term – [2 to 5 years])

In December 2007 the Laboratory completed LA-UR-07-8312, *NPDES Permit Compliance and Outfall Reduction Strategy*, which provides recommendations and options for the treatment, reduction, and/or elimination of the outfalls at LANL. There are three (3) outfalls included in this 2012 Permit Re-Application document that have been identified for possible elimination/reduction over the next 2 – 5 years. Figure 2 provides a process schematic that shows the anticipated future configuration of the Outfall 03A181 with respect to SWWS, SERF, and Outfall 001. The implementation of the elimination/reduction projects for each of these outfalls is subject to funding.

Figure 2
 Long Term (2 - 5 Years)
 FUTURE Configuration of Outfall 03A181



PROCESS SCHEMATIC
 Long Term (2- 5 Years)
 FUTURE Configuration
 January 30, 2012
 2012 NPDES Permit Re-Application
 Outfall 03A181

DMR Outfall Data Summary - 03A181
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																							
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Units			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MCL	Result	Units	MCL	Result	Units	MCL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples										
		10/08	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		11/08	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		12/08	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		1/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		2/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		3/09	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		4/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		5/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		6/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		7/09	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		8/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		9/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		10/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		11/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		12/09	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		1/10	Total Residual Chlorine													0.11	mg/L			0.11	mg/L							5					
		2/10	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		3/10	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		4/10	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		5/10	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		6/10	Total Residual Chlorine													0	mg/L			0	mg/L							5					
		7/10	Total Residual Chlorine													0	mg/L			0	mg/L							4					
		8/10	Total Residual Chlorine													0	mg/L			0	mg/L							4					

DMR Outfall Data Summary - 03A181
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																				
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples										
		9/10	Total Residual Chlorine															0	mg/L									5		
		10/10	Total Residual Chlorine															0	mg/L									4		
		11/10	Total Residual Chlorine															0	mg/L									4		
		12/10	Total Residual Chlorine															0	mg/L									5		
		1/11	Total Residual Chlorine															0	mg/L									4		
		2/11	Total Residual Chlorine															0	mg/L									4		
		3/11	Total Residual Chlorine															0	mg/L									4		
		4/11	Total Residual Chlorine															0	mg/L									5		
		5/11	Total Residual Chlorine															0	mg/L									4		
		6/11	Total Residual Chlorine															0	mg/L									4		
		7/11	Total Residual Chlorine															0	mg/L									4		
		8/11	Total Residual Chlorine															0	mg/L									5		
		9/11	Total Residual Chlorine															0	mg/L									4		
		10/11	Total Residual Chlorine															0	mg/L									4		
		11/11	Total Residual Chlorine															0	mg/L									5		
		12/11	Total Residual Chlorine															0	mg/L									4		
				Average			NA	NA			NA	NA			0.00	mg/L			Total			229								
				Maximum			NA	NA			0.00	mg/L			mg/L			mg/L			mg/L			mg/L						
181	55-6	8/07	TSS														1	mg/L										1		
		9/07	TSS														1	mg/L										1		
		10/07	TSS														1	mg/L										1		
		11/07	TSS														1	mg/L										1		
		12/07	TSS														1	mg/L										1		
		1/08	TSS														1	mg/L										1		
		2/08	TSS														1	mg/L										1		
		3/08	TSS														1	mg/L										1		
		4/08	TSS														1	mg/L										1		
		5/08	TSS														1	mg/L										1		
		6/08	TSS														<1	mg/L										1		
		7/08	TSS														<1	mg/L										1		

DMR Outfall Data Summary - 03A181
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR												
				Flow Rate		Analytical Lab Result		DMR Units		Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples						
				Average	Maximum	Units	MQL	Result	Units								MQL	Result	Units			
		9/11	Total Phosphorus					mg/L														
		10/11						mg/L														
		11/11						mg/L														
		12/11	Total Phosphorus					mg/L														
								Average	NA	NA	2	NA	NA	2	mg/L						Total	
								Maximum	NA	NA	15	NA	NA	15	mg/L							Total
181	55-6	8/07 - 12/07	Total Selenium					mg/L														1
		1/08 - 12/08	Total Selenium					mg/L														1
		1/09 - 12/09	Total Selenium					mg/L														1
		1/10 - 12/10	Total Selenium					mg/L														1
		1/11 - 12/11	Total Selenium					mg/L														2
								Average	NA	NA	0.0007	NA	NA	0.0007	mg/L							Total
								Maximum	NA	NA	0.0010	NA	NA	0.0010	mg/L							Total
																						4

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A181	TA-55-6 Cooling Tower Blow Down (A) (Intermittent)	7	12	0.005127 mgal/d	0.014132 mgal/d	5,127 Gallons	14,132 Gallons	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-3 (B)		Table 2C-4 (B)	
Acetaldehyde	NALCO 90005 - Disinfectant	Cupric Sulfate	3D TRASAR 3DTBR06 - Reagent Monitoring Chemical
		Sodium Bisulfite	NALCO 7408 - De-Chlorination
		Phosphoric Acid	3D TRASAR 3DT288 - Corrosion Inhibitor
		Sulfuric Acid	3D TRASAR 3DT288 - Corrosion Inhibitor
		Sodium Hypochlorite	STABREX ST20 - Biocide
		Ammonium Chloride	NALCO 90005 - Disinfectant

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

NOTE: The existing permit requires that Whole Effluent Toxicity Testing (48 hr. Static Renewal - Daphnia pulex) be conducted for 03A181 before March 31, 2012. There is currently no biological test data on file for this outfall.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Espanola, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A181

PART A -- You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify, if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Biochemical Oxygen Demand (BOD)	<1	<0.118	(C)				1	mg/L	1b/Day	NA	NA	NA
b. Chemical Oxygen Demand (COD)	13.8	1.63					1	mg/L	1b/Day	NA	NA	NA
c. Total Organic Carbon (TOC)	5.69	0.671					1	mg/L	1b/Day	NA	NA	NA
d. Total Suspended Solids (TSS)	1.0	0.118	1.0	0.079	1.0	0.043	5	mg/L	1b/Day	NA	NA	NA
e. Ammonia (as N)	<0.0189	<0.0022	(C)				1	mg/L	1b/Day	NA	NA	NA
f. Flow	VALUE 0.014132 (D)	VALUE 0.009415 (E)	VALUE 0.005127 (F)				257	MGD	NA	VALUE NA	NA	NA
g. Temperature (winter)	VALUE 15.3 (G)	VALUE 17.7 (H)	VALUE 17.3				12	°C		VALUE NA	NA	NA
h. Temperature (summer)	VALUE 25.2 (G)	VALUE 24.6 (H)	VALUE 23.6				12	°C		VALUE NA	NA	NA
i. pH	MINIMUM 7.4 (I)	MAXIMUM 9.0 (I)	MINIMUM 8.1 (J)	MAXIMUM 8.8 (J)			52	STANDARD UNITS				

PART B -- Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Bromide (24959-67-9)	X		0.0959	0.0113					1	mg/L	1b/D	NA	NA	NA
b. Chlorine, Total Residual	X		0	0	0	0	0	0	52	mg/L	1b/D	NA	NA	NA
c. Color		X	5						1	mg/L	1b/D	NA	NA	NA
d. Fecal Coliform		X	2.0/100	(K)					1	cfu/mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		0.502	0.0592					1	mg/L	1b/D	NA	NA	NA
f. Nitrate-Nitrite (as N)	X		1.29	0.152					1	mg/L	1b/D	NA	NA	NA

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CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)		b. NO. OF ANALYSES
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)	X		0.299	0.0353			1	mg/L	1b/D	NA	NA	NA
h. Oil and Grease		X	<1.52	<0.179	(C)		1	mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		5.0	0.5897	5.0	0.3929	5	mg/L	1b/D	NA	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<1.27	NA			1	pCi/L	NA	NA	NA	NA
(2) Beta, Total	X		4.78	NA			1	pCi/L	NA	NA	NA	NA
(3) Radium, Total		X	<0.59	NA			1	pCi/L	NA	NA	NA	NA
(4) Radium 226, Total		X	<0.47	NA			1	pCi/L	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		21.5	2.54			1	mg/L	1b/D	NA	NA	NA
l. Sulfide (as S)		X	<0.03	<0.0035	(C)		1	mg/L	1b/D	NA	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		0.2	0.0236						NA	NA	NA
n. Surfactants		X	<0.016	<0.0019	(C)		1	mg/L	1b/D	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.015	0.0017			1	mg/L	1b/D	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.0759	0.00895	(L)		1	mg/L	1b/D	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.09	0.0106	(M)		1	mg/L	1b/D	NA	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-05	(N)		1	mg/L	1b/D	NA	NA	NA
s. Iron, Total (7439-89-6)		X	<0.03	<0.0035	(C)		1	mg/L	1b/D	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		11.7	1.38			1	mg/L	1b/D	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		0.0024	0.00028	(O)		1	mg/L	1b/D	NA	NA	NA
v. Manganese, Total (7439-96-5)		X	<1E-03	<1E-04	(C)		1	mg/L	1b/D	NA	NA	NA
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-04	(C)		1	mg/L	1b/D	NA	NA	NA
x. Titanium, Total (7440-32-6)	X		0.0096	0.00113			1	mg/L	1b/D	NA	NA	NA

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CONTINUED FROM PAGE 3 OF FORM 2-C

EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515**
 OUTFALL NUMBER **03A181**

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for each of these pollutants in concentrations of 10 ppb or greater. If you mark column 2c for acrolein, acrylonitrile, 2,4-dinitrophenol, or 2-methyl-4, 6-dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT			4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES (2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS											
1M. Antimony, Total (7440-36-0)		X		<1	(N)		1	mg/L	1b/D	NA	NA
2M. Arsenic, Total (7440-38-2)		X		2.9E-03			1	mg/L	1b/D	NA	NA
3M. Beryllium, Total (7440-41-7)			X	<2E-04	(N)		1	mg/L	1b/D	NA	NA
4M. Cadmium, Total (7440-43-9)			X	<1.1E-04	(N)		1	mg/L	1b/D	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.0099	(P)		1	mg/L	1b/D	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0011			1	mg/L	1b/D	NA	NA
7M. Lead, Total (7439-92-1)		X		<5E-04	(N)		1	mg/L	1b/D	NA	NA
8M. Mercury, Total (7439-97-6)		X		<2E-07			1	mg/L	1b/D	NA	NA
9M. Nickel, Total (7440-02-0)		X		6.1E-04			1	mg/L	1b/D	NA	NA
10M. Selenium, Total (7782-49-2)		X		8.09E-04	(Q)		1	mg/L	1b/D	NA	NA
11M. Silver, Total (7440-22-4)		X		<2E-04	(N)		1	mg/L	1b/D	NA	NA
12M. Thallium, Total (7440-28-0)		X		<4.5E-04	(N)		1	mg/L	1b/D	NA	NA
13M. Zinc, Total (7440-66-6)		X		<3.3E-03	(N)		1	mg/L	1b/D	NA	NA
14M. Cyanide, Total (57-12-5)		X		<1.5E-03	(N)		1	mg/L	1b/D	NA	NA
15M. Phenols, Total		X		2E-03			1	mg/L	1b/D	NA	NA
DIOXIN											
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1784-01-6)		X									

DESCRIBE RESULTS The result from the analytical laboratory is <1.16E-08 mg/L. This is above the limit of the MOL of 1.0E-08 mg/L but is likely due to the detection limit of the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (R) for additional information.

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
GC/MS FRACTION - VOLATILE COMPOUNDS											
1V. Acrolein (107-02-8)			X	<1.25E-03	<2E-04	(N)	1	mg/L	1b/D	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<1E-04	(N)	1	mg/L	1b/D	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<4E-04	(N)	1	mg/L	1b/D	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)			X	NA		(S)				NA	NA
5V. Bromoform (75-25-2)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
8V. Chlorodibromomethane (124-48-1)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<4E-5	(C)	1	mg/L	1b/D	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	<2E-4	(C)	1	mg/L	1b/D	NA	NA
11V. Chloroform (67-66-3)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
12V. Dichlorobromomethane (75-27-4)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
13V. Dichlorodifluoromethane (75-71-8)			X	NA		(S)				NA	NA
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	<4E-5	(C)	1	mg/L	1b/D	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
17V. 1,2-Dichloropropane (78-87-5)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
18V. 1,3-Dichloropropylene (542-75-6)			X	<2.5E-04	<3E-05	(N, T)	1	mg/L	1b/D	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<4E-5	(C)	1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
										(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)											
22V. Methylene Chloride (75-09-2)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	<4E-05	(N)	1	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<3E-05	(N)	1	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)			X	NA		(S)				NA	NA
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<6E-05	(N)	1	mg/L	1b/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS											
1A. 2-Chlorophenol (95-57-8)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<5E-03	<6E-04	(N)	1	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3E-03	<4E-04	(C)	1	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3E-03	<4E-04	(C)	1	mg/L	1b/D	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X	<3E-03	<4E-04	(C)	1	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3E-03	<4E-04	(N)	1	mg/L	1b/D	NA	NA

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CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED (if available)	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
										(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS											
1B. Acenaphthene (83-32-9)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
2B. Acenaphthylene (208-96-6)			X	<3E-04	(C)		1	mg/L	1b/D	NA	NA
3B. Anthracene (120-12-7)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	(N)		1	mg/L	1b/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3E-04	(C)		1	mg/L	1b/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3E-03	(C)		1	mg/L	1b/D	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<3E-03	(N)		1	mg/L	1b/D	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3E-03	(N)		1	mg/L	1b/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3E-03	(N)		1	mg/L	1b/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3E-03	(C)		1	mg/L	1b/D	NA	NA
15B. Butyl Benzyl Phthalate (65-68-7)			X	<3E-03	(N)		1	mg/L	1b/D	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	<3E-03	(C)		1	mg/L	1b/D	NA	NA
18B. Chrysene (218-01-9)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3E-04	(N)		1	mg/L	1b/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	(N)		1	mg/L	1b/D	NA	NA
21B. 1,3-Dichlorobenzene (541-73-1)			X	<2.5E-04	(N)		1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		b. NO. OF ANALYSES			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	(2) MASS CONCENTRATION				
				(1) CONCENTRATION	(2) MASS									
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)														
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	<3E-05	(N)			1	mg/L	1b/D	NA	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<3E-03	<4E-04	(C)			1	mg/L	1b/D	NA	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3E-03	<4E-04	(C)			1	mg/L	1b/D	NA	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
31B. Fluoranthene (206-44-0)			X	<3E-04	<4E-05	(N)			1	mg/L	1b/D	NA	NA	NA
32B. Fluorene (86-73-7)			X	<3E-04	<4E-05	(N)			1	mg/L	1b/D	NA	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
36B. Hexachloroethane (67-72-1)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
37B. Indeno (1,2,3-cd) Pylene (193-39-5)			X	<3E-04	<4E-05	(N)			1	mg/L	1b/D	NA	NA	NA
38B. Isophorone (78-59-1)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
39B. Naphthalene (91-20-3)			X	<3E-04	<4E-05	(C)			1	mg/L	1b/D	NA	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D	NA	NA	NA

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CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)											
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	<4E-04	(N, U)				NA	NA
44B. Phenanthrene (85-01-8)			X	<3E-04	<4E-05	(C)			1	mg/L	1b/D
45B. Pyrene (129-00-0)			X	<3E-04	<4E-05	(N)			1	mg/L	1b/D
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3E-03	<4E-04	(N)			1	mg/L	1b/D
GC/MS FRACTION - PESTICIDES											
1P. Aldrin (309-00-2)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
2P. α-BHC (319-84-6)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
3P. β-BHC (319-85-7)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
4P. γ-BHC (58-99-9)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
5P. δ-BHC (319-86-6)			X	<7.56E-06	<9E-07	(C)			1	mg/L	1b/D
6P. Chlordane (57-74-9)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
7P. 4,4'-DDT (50-29-3)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
8P. 4,4'-DDE (72-55-9)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
9P. 4,4'-DDD (72-54-8)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
10P. Dieldrin (60-57-1)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
11P. α-Endosulfan (115-29-7)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
12P. β-Endosulfan (115-29-7)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
13P. Endosulfan Sulfate (1031-07-8)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
14P. Endrin (72-20-8)			X	<1.14E-05	<1E-06	(N)			1	mg/L	1b/D
15P. Endrin Aldehyde (7421-93-4)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D
16P. Heptachlor (76-44-8)			X	<7.56E-06	<9E-07	(N)			1	mg/L	1b/D

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EPA I.D. NUMBER (copy from Item 1 of Form 1)
 NM0890019515

OUTFALL NUMBER
 03A181

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available)	c. LONG TERM AVG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - PESTICIDES (continued)											
17P. Heptachlor Epoxide (1024-57-3)			X	<7.56E-06	<9E-07	(N)		mg/L	1b/D	NA	NA
18P. PCB-1242 (53469-21-9)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
19P. PCB-1254 (11097-69-1)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
20P. PCB-1221 (11104-28-2)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
21P. PCB-1232 (11141-16-5)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
22P. PCB-1248 (12672-29-6)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
23P. PCB-1260 (11096-82-5)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
24P. PCB-1016 (12674-11-2)			X	<3.87E-05	<5E-06	(N)		mg/L	1b/D	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.7E-04	<2E-05	(N)		mg/L	1b/D	NA	NA

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FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A181

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rates data collected from August 2010 to July 2011. The data indicates that the outfall discharged 257 days during that time period.
- B. The pollutants identified in Section V.D are hazardous substances listed in the Table 2C-3 and Table 2C-4 of the Form 2C instructions. These pollutants are identified in Section V.D of the form because they are components of the chemicals used to treat the tower water and, therefore, may be present in the blow down discharged to the outfall.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The reported values are the maximum daily temperature observed in the summer and the minimum daily temperature observed in the winter from August 2010 to July 2011.
- H. The reported values are the minimum/maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform. Fecal Coliform is not suspected to be present due to the source discharging to the outfall. The positive result is likely due to the presence of wildlife living in the culvert.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. Boron was detected at a value less than the MQL of 0.1 mg/L.
- N. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A181

- O. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- P. Chromium was detected a value less than the MQL of 0.01 mg/L.
- Q. Selenium was detected at a value less than the MQL of 0.005 mg/L.
- R. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- S. EPA remanded the parameter.
- T. Result is for cis- and trans-1,3-dichloropropylene.
- U. The result provided is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)

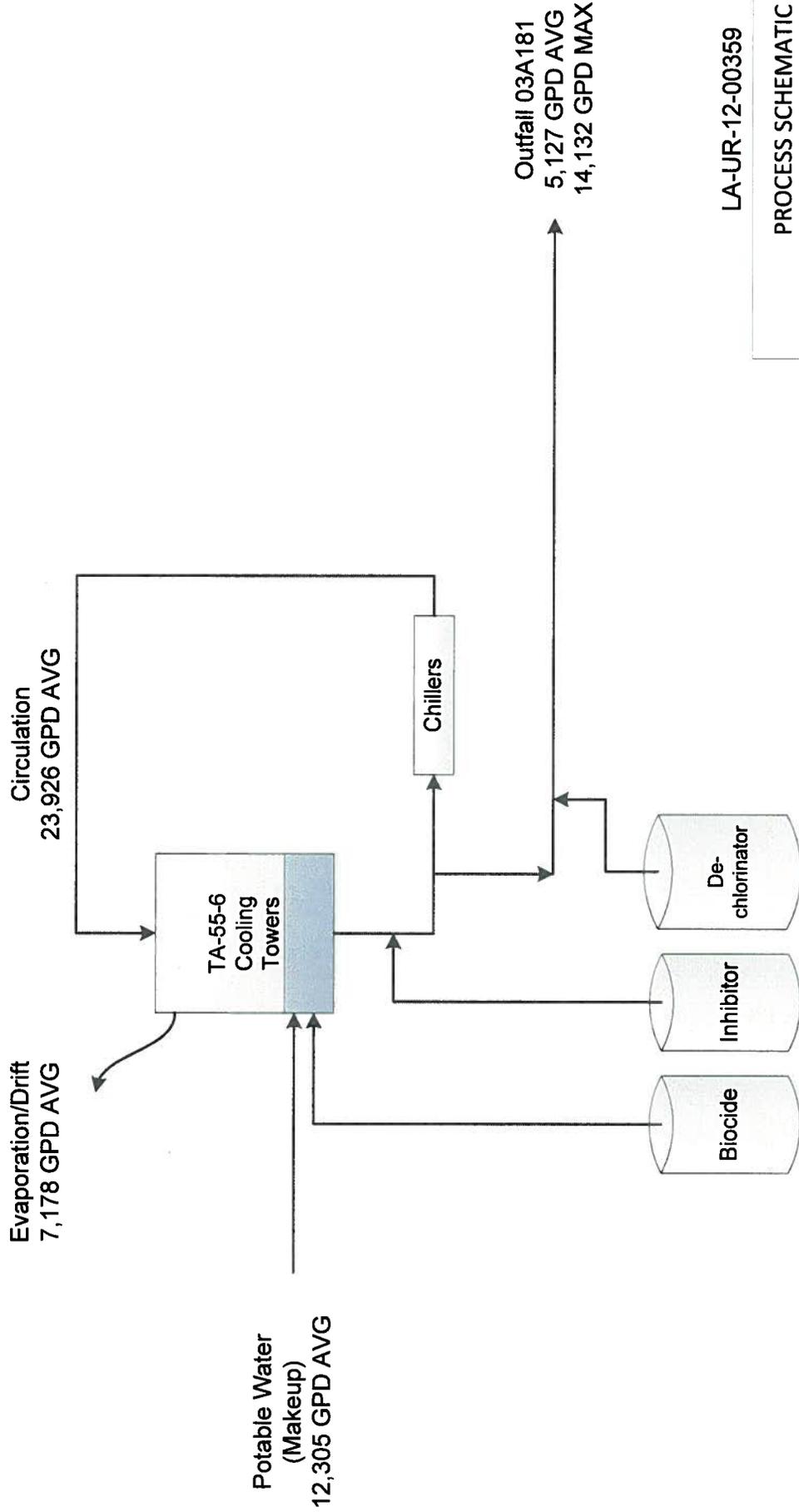
METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE			
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
2012 NPDES Permit Application Form 2C
Process Schematic and Water Balance of the TA-55-6 Cooling Towers, Water Treatment System, and Outfall 03A181



LA-UR-12-00359

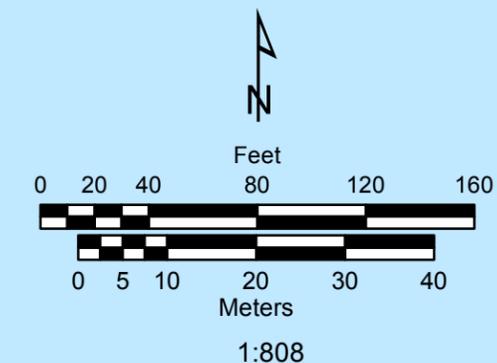
PROCESS SCHEMATIC
 TA-55-6 Cooling Towers, Water Treatment System, and Outfall
 January 26, 2012
 2012 NPDES Permit Re-Application
OUTFALL 03A181

Water balance calculation is based on 2.4 cycles.

NPDES Permit Re-Application Project TA-55 Building 6 Outfall #03A181



Legend	
● NPDES Outfall	— Paved Roads
▲ Springs	■ Source Structures
--- Drainages	■ Building Served by Source
— 100ft Contours	■ Structures
— 20ft Contours	□ LANL Boundary
— 10ft Contours	□ Technical Areas
— Fences	
--- Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-14 03 OCTOBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2011 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, APRIL 2011.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.

**MATERIAL SAFETY DATA SHEET****PRODUCT****3D TRASAR® 3DT288****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME : **3D TRASAR® 3DT288**APPLICATION : **COOLING WATER TREATMENT**COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198EMERGENCY TELEPHONE NUMBER(S) : **(800) 424-9300 (24 Hours) CHEMTREC**

NFPA 704M/HMIS RATING

HEALTH : 2 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Substituted aromatic amine	Proprietary	1.0 - 5.0
Phosphoric Acid	7664-38-2	5.0 - 10.0
Sulfuric Acid	7664-93-9	1.0 - 5.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******WARNING**

Irritating to eyes and skin.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

May evolve oxides of phosphorus (POx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause moderate irritation.

Nalco Company, 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000For additional copies of an MSDS visit www.nalco.com and request access



MATERIAL SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT288

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SKIN CONTACT :

Can cause moderate irritation.

INGESTION :

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract.

INHALATION :

Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If symptoms develop, seek medical advice.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If reflexive vomiting occurs, rinse mouth and repeat administration of water.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT :

Not applicable

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.



MATERIAL SAFETY DATA SHEET

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FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :

Buna-N, EPDM, Epoxy phenolic resin, HDPE (high density polyethylene), Hypalon, Polyethylene, Polypropylene, PVC

UNSUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Brass, Neoprene, Polyurethane, Viton, Stainless Steel 316L, 100% phenolic resin liner

**MATERIAL SAFETY DATA SHEET****PRODUCT****3D TRASAR® 3DT288****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****9. PHYSICAL AND CHEMICAL PROPERTIES**

PHYSICAL STATE	Liquid
APPEARANCE	Yellow
ODOR	None
SPECIFIC GRAVITY	1.15 @ 77 °F / 25 °C
DENSITY	9.56 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	1.4
VISCOSITY	4.7 cps @ 77 °F / 25 °C
INITIAL BOILING POINT	213 °F / 100.6 °C
VAPOR PRESSURE	0.5 mm Hg @ 100 °F / 37.8 °C

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY**STABILITY :**

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of sulfur, Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.



MATERIAL SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT288

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(800) 424-9300 (24 Hours) CHEMTREC

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	2,500 mg/l	Product
Rainbow Trout	96 hrs	1,211 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs		2,500 mg/l	Product

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 53,000 mg/l

Chemical Oxygen Demand (COD) : 150,000 mg/l

Biological Oxygen Demand (BOD) :

Incubation Period	Value	Test Descriptor
5 d	4,850 mg/l	Product

The organic portion of this preparation is expected to be readily biodegradable.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.



MATERIAL SAFETY DATA SHEET

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BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) :	PHOSPHORIC ACID, SULFURIC ACID
UN/ID No :	UN 3264
Hazard Class - Primary :	8
Packing Group :	III

Flash Point :	Not applicable
---------------	----------------

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) :	PHOSPHORIC ACID, SULFURIC ACID
UN/ID No :	UN 3264
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

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MATERIAL SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT288

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(800) 424-9300 (24 Hours) CHEMTREC

Proper Shipping Name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Technical Name(s) : PHOSPHORIC ACID, SULFURIC ACID
UN/ID No : UN 3264
Hazard Class - Primary : 8
Packing Group : III

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Substituted aromatic amine : Eye irritant
Phosphoric Acid : Corrosive
Sulfuric Acid : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance

Sulfuric Acid

RQ

53,648 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product contains the following substance(s) which is listed in Appendix A and B as an Extremely Hazardous Substance. Listed below are the statutory Threshold Planning Quantity (TPQ) for the substance(s) and the Reportable Quantity (RQ) of the product. If a reportable quantity of product is released, it requires notification to your State Emergency Response Commission. You may also be required to notify the National Response Center - See CERCLA/SUPERFUND, above.

Extremely Hazardous Substance

Sulfuric Acid

TPQ

1,000 lbs

RQ

53,648 lbs

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard



MATERIAL SAFETY DATA SHEET

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Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

<u>Hazardous Substance(s)</u>	<u>CAS NO</u>	<u>% (w/w)</u>
Sulfuric Acid	7664-93-9	1.0 - 5.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 136339

This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas. This product is acceptable for treating boilers, steam lines, and/or cooling systems (G7) where neither the treated water nor the steam produced may contact edible products in and around food processing areas.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

<u>Substance(s)</u>	<u>Citations</u>
<ul style="list-style-type: none"> • Phosphoric Acid • Sulfuric Acid 	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Substituted aromatic amine	Proprietary
Phosphoric Acid	7664-38-2
Sulfuric Acid	7664-93-9
Other ingredients determined not to be hazardous, including water	Proprietary



MATERIAL SAFETY DATA SHEET

PRODUCT

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NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material, D2A - Materials Causing Other Toxic Effects - Very Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

This product contains substance(s) which are found on the Non-Domestic Substances List (NDSL).

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

This product contains substance(s) which are not in compliance with the Law Regulating the Manufacture and Importation Of Chemical Substances and are not listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.



MATERIAL SAFETY DATA SHEET

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Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 02/14/2007

Version Number : 1.3

**MATERIAL SAFETY DATA SHEET**

PRODUCT

3D TRASAR® 3DTBR06

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : 3D TRASAR® 3DTBR06

APPLICATION : DIAGNOSTIC TRACER CHEMICAL

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 0/0 FLAMMABILITY : 0/0 INSTABILITY : 0/0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******CAUTION**

May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing.
Not flammable or combustible.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
No adverse effects expected.

SKIN CONTACT :
No adverse effects expected.

INGESTION :
Not a likely route of exposure. No adverse effects expected.



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INHALATION :

Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : Not applicable

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

Not flammable or combustible.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



MATERIAL SAFETY DATA SHEET

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6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Brass, Buna-N, Viton, Polyurethane, Polypropylene, Polyethylene, PVC, 100% phenolic resin liner, EPDM, HDPE (high density polyethylene), Hypalon, Epoxy phenolic resin

UNSUITABLE CONSTRUCTION MATERIAL :

Neoprene

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :

General ventilation is recommended.

RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Particulate filter - HEPA. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should



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be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

When handling this product, the use of chemical gloves is recommended., The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from, PVC, Gloves should be replaced immediately if signs of degradation are observed., Breakthrough time not determined as preparation, consult PPE manufacturers.

SKIN PROTECTION :

See general advice.

EYE PROTECTION :

Wear safety glasses with side-shields.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Consider the provision in the work area of a safety shower and eyewash. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Dark Blue
ODOR	None
SPECIFIC GRAVITY	1.0 @ 77.0 °F / 25.0 °C
DENSITY	8.3 lb/gal
SOLUBILITY IN WATER	Complete
VOC CONTENT	0.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

None known

MATERIALS TO AVOID :

None known

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HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: None known

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,250 mg/l	Similar Product
Rainbow Trout	96 hrs	2,656 mg/l	Similar Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs		4,773 mg/l	Similar Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.



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If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name(s) :	CUPRIC SULFATE
UN/ID No :	UN 3082
Hazard Class - Primary :	9
Packing Group :	III
Flash Point :	Not applicable
DOT Reportable Quantity (per package) :	20,000 lbs
DOT RQ Component :	CUPRIC SULFATE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name(s) :	CUPRIC SULFATE
UN/ID No :	UN 3082
Hazard Class - Primary :	9
Packing Group :	III
IATA Cargo Packing Instructions :	914
IATA Cargo Aircraft Limit :	NO LIMIT (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	PRODUCT IS NOT REGULATED DURING TRANSPORTATION
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**MATERIAL SAFETY DATA SHEET****PRODUCT****3D TRASAR® 3DTBR06****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****15. REGULATORY INFORMATION**

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :

If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802). This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance
Cupric Sulphate

RQ
20,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 136008

This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.



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MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Not considered a WHMIS controlled product.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.



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Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Prepared By :
Date issued : 09/14/2006
Version Number : 1.3



Product Bulletin

3D TRASAR[®] 3DTBR06

*Reporter 0.6% Liquid
Reagent for Microbio Control in Cooling Water*

PRODUCT DESCRIPTION AND APPLICATION

3DTBR06 is a proprietary reagent used to monitor the microbiological health of the cooling water system, including both planktonic and sessile bacteria. The "health" of a cooling water system, determined automatically with the use of 3DTBR06, is then reported back to the central 3D TRASAR 5000 unit that analyzes and interprets the information. The 3D TRASAR 5000 controller will subsequently provide an automated, demand-based biocide response for optimized control of microbial activity in an open recirculating water system.

3DTBR06 is used in conjunction with the "intelligent" sensors of 3D TRASAR 5000 that read and interpret live data and, using proprietary algorithms, provide for real-time response in a fully automated fashion.

The greatest benefit of 3DTBR06 is that it *directly* monitors the total health of the system, not just planktonic populations or the amount of biocide in the system. Use of the 3D TRASAR 5000 technology will enable biocide feed on demand. More is fed during peak microbiological activity and less is fed when microbiological activity is low. It responds to a wide spectrum of microbes. This means microbial activity is treated before it forms biofilm deposits (in existing clean systems). In systems with biofilm accumulation, 3D TRASAR Microbio Control should be used together with a biodegreaser to improve and track biofilm remediation, as part of cooling water control best practices. 3DTBR06 will respond immediately (within minutes) to stresses such as open dead-legs or process contamination. Use of 3DTBR06 will contribute to reduced corrosion, reduced phosphate reversion, and reduced environmental impact.

PHYSICAL & CHEMICAL PROPERTIES

Refer to SECTION 9 of the Material Safety Data Sheet (MSDS) for the most current data. These properties are typical.

Form	Liquid
Appearance	Dark blue, Opaque
Specific Gravity @ 21°C (70°F)	1.00
Solubility in Water	Complete
VOC Content	0.00%
Odor	None

ACTIVE CONSTITUENTS

Active	Function
BioReporter	Monitor microbial activity

REGULATORY APPROVALS

3DTBR06 is not a biocide and, therefore, is not regulated by the U.S. EPA under The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Refer to the Material Safety Data Sheet (MSDS), SECTION 15 for the most recent information on approvals.

MATERIALS OF COMPATIBILITY

Compatible*	Not Compatible*
304 Stainless Steel (RCC* 9014)	Neoprene O-rings
Brass	
Viton O-rings	
Buna-N O-rings	
Polyurethane O-rings	
Hypalon O-rings	
EPDM O-rings	
Polyethylene piping (rigid)	
Polypropylene piping (rigid)	
CPVC piping (rigid)	
Coated steel drum (phenolic, RCC* 635)	
PORTA-FEED® Liner (RCC* 9036)	
Blue Plastic Drum (HDPE, RCC* 625)	
Plasite 4300 Liner (vinyl ester resin)	
Plasite 7122 Liner (epoxy phenolic)	

material compatible test data are from the formulation without EDTA.

DOSAGE AND FEEDING

PRODUCT PACKAGING

Package Code	Description	Weights
.11	5 Gal Pail	42 lbs

PRODUCT FEEDING & DOSAGE

3DTBR06 is suitable for small cooling water systems (< 12,000 gallons). For larger systems (>12,000 gallons), solid BioReporter (3DTBR8, 3DTBR20, and 3DTBR40) are strongly recommended.

BioReporter	Cooling Tower System Size (Gallons)	Not Exceed (Gallons)
3DTBR06 (0.6% active)	< 12,000	30,000
3DTBR8 (8% active)	12,000 - 30,000	60,000
3DTBR20 (20% active)	30,000 - 60,000	250,000
3DTBR40 (40% active)	>60,000	N/A

Initial Start-Up

When starting up 3D TRASAR BioIndex control, wait until the total residual oxidant in the system is less than 0.1 ppm as measured by the Hach DPD test. The Bioreporter should be fed into a well-mixed region of the recirculating water, distant from the feed point of the halogen. The Bioreporter should not be introduced into the system shortly before the 3D TRASAR fluorometer. The 3D TRASAR controller will bring the BioReporter concentration to setpoint (initial setpoint should be higher than 20 ppb)

automatically on startup.

Subsequent (On-Going) Maintenance

After the initial dose, 3D TRASAR will control the BioReporter pump so as to discharge the appropriate amount into the system to maintain the setpoint. Normally, the active level in the system is kept at 20 ppb and the control is completely automated.

Pump Selection

For system sizes, 1000-3000 gal, the recommendation is to use the Grundfos pump, part number 6008505.

For system sizes, 3000-12000 gal, the recommendation is to use the Iwaki pump, part number 141-PJ4035.88.

ENVIRONMENTAL AND TOXICITY DATA

Refer to the Material Safety Data Sheet (MSDS), SECTIONS 11 and 12, for the most current data.

SAFETY AND HANDLING

Handling: Do not get in eyes, on skin, or on clothing. Do not take internally. Since 3DTBR06 is a strong dye, be careful on the disposal.

Refer to the Material Safety Data Sheet (MSDS), SECTIONS 3 and 8, for the most current data.

STORAGE

The recommended storage limit for 3DTBR06 is six months. Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

3D TRASAR, TRASAR, Nalco and the Logo are registered trademarks of Nalco Company (4-22-2009)

**MATERIAL SAFETY DATA SHEET**

PRODUCT

NALCO® 7408

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATIONPRODUCT NAME : **NALCO® 7408**

APPLICATION : CHLORINE SCAVENGER

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Bisulfite	7631-90-5	30.0 - 60.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******WARNING**

Harmful if swallowed. Contains Sulfite. Causes asthmatic signs and symptoms in hyper-reactive individuals. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Skin, Eye, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause mild irritation.

SKIN CONTACT :

Can cause mild irritation.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit www.nalco.com and request access



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INGESTION :

Not a likely route of exposure. May cause asthmatic-like attack.

INHALATION :

Irritant to respiratory system. Causes asthmatic signs and symptoms in hyper-reactive individuals.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

Ingestion of sulfite can cause a severe allergic reaction in asthmatics and some sulfite sensitive individuals. The resulting symptoms can include difficulty in breathing, flushed skin and a rash. Chronic exposure to sulfites may cause symptoms of upper respiratory disease and affect sense of taste and smell.

4. FIRST AID MEASURES

EYE CONTACT :

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

SKIN CONTACT :

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

INGESTION :

Induce vomiting if the patient is fully conscious. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :

Remove to fresh air, treat symptomatically. If breathing is difficult, administer oxygen. Get medical attention.

NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.



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FIRE AND EXPLOSION HAZARD :

May evolve oxides of sulfur (SO_x) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ensure adequate ventilation. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :

Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :

Protect product from freezing. Store the containers tightly closed. Store separately from acids. Store in suitable labelled containers. Amine and sulphite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., Brass, Neoprene, Polyurethane, Viton, Hypalon, EPDM, Polypropylene, Polyethylene, PVC

UNSUITABLE CONSTRUCTION MATERIAL :

Stainless Steel 304, Buna-N, Epoxy phenolic resin, 100% phenolic resin liner



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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below. Exposure limits are listed for sulfur dioxide (SO₂) since this product evolves SO₂ when open to the atmosphere.

ACGIH/TLV :

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³

Sulfur Dioxide TWA: 2 ppm , 5.2 mg/m³
STEL: 5 ppm , 13 mg/m³

OSHA/PEL :

Substance(s)

Sodium Bisulfite TWA: 5 mg/m³

Sulfur Dioxide TWA: 2 ppm , 5 mg/m³
STEL: 5 ppm , 13 mg/m³

ENGINEERING MEASURES :

General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. An approved respirator must be worn if the occupational exposure limit is likely to be exceeded.

HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :

Wear standard protective clothing.

EYE PROTECTION :

Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

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PRODUCT

NALCO® 7408

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9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Yellow
ODOR	Pungent
SPECIFIC GRAVITY	1.37 @ 77 °F / 25 °C
DENSITY	11.4 lb/gal
BULK DENSITY	11.4 lb/ft ³
SOLUBILITY IN WATER	Complete
pH (1 %)	4.1
VISCOSITY	2.8 cps @ 77 °F / 25 °C
FREEZING POINT	34 °F / 1.1 °C
BOILING POINT	219 °F / 104 °C
VAPOR PRESSURE	32 mm Hg @ 77 °F / 25 °C 76 mm Hg @ 99.9 °F / 37.7 °C
VAPOR DENSITY	2.2 (Air = 1)
VOC CONTENT	0.00 % EPA Method 24

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Freezing temperatures.

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. SO₂ may react with vapors from neutralizing amines and may produce a visible cloud of amine salt particles.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.



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CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	250 mg/l / 500 mg/l	Growth	Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	250 mg/l / 500 mg/l	Reproduction	Product

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Low

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**MATERIAL SAFETY DATA SHEET****PRODUCT****NALCO® 7408****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****LAND TRANSPORT :**

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III

Flash Point : None

DOT Reportable Quantity (per package) : 12,500 lbs
DOT RQ Component : SODIUM BISULFITE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III
IATA Cargo Packing Instructions : 820
IATA Cargo Aircraft Limit : 60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : BISULPHITES, AQUEOUS SOLUTION, N.O.S.
Technical Name(s) : SODIUM BISULPHITE
UN/ID No : UN 2693
Hazard Class - Primary : 8
Packing Group : III

15. REGULATORY INFORMATION**NATIONAL REGULATIONS, USA :**

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Bisulfite : Respiratory irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance
Sodium BisulfiteRQ
12,000 lbs



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SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :

When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 173.310 Boiler Water Additives, 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods.

Limitations: no more than required to produce intended technical effect.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Bisulfite	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.



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CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Bisulfite	7631-90-5
Water	7732-18-5

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND

This product complies with Parts XI - XV of the HSNO Act (1996).

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

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THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 05/03/2006

Version Number : 1.13

**MATERIAL SAFETY DATA SHEET**

PRODUCT

STABREX® ST20

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **STABREX® ST20**

APPLICATION : MICROORGANISM CONTROL CHEMICAL

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hydroxide	1310-73-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW******DANGER****CORROSIVE. CAUSES SEVERE EYE AND SKIN INJURY. HARMFUL IF INHALED. HARMFUL IF SWALLOWED.**

Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.

May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Corrosive. Will cause eye burns and permanent tissue damage.



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SKIN CONTACT :

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :

Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :

Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :

A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Get immediate medical attention. **PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT.** Immediately flush eye with water for at least 15 minutes while holding eyelids open.

SKIN CONTACT :

Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

Get immediate medical attention. **DO NOT INDUCE VOMITING.** If conscious, washout mouth and give water to drink.

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Call a physician.

IF ON SKIN: Immediately wash with soap and plenty of water. Remove contaminated clothing and wash before reuse. Get medical attention if irritation persists.

IF SWALLOWED: Drink large quantities of water. Do not induce vomiting. Call a physician or poison control immediately.

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NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :

May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies. **LARGE SPILLS:** Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Apply this pesticide only as specified on the label.



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7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :

Store the containers tightly closed. Store separately from acids. Store in a cool well ventilated area away from direct sunlight.

SUITABLE CONSTRUCTION MATERIAL :

Polyethylene, Polypropylene, Teflon, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

UNSUITABLE CONSTRUCTION MATERIAL :

This product is corrosive to mild steel., Brass, Stainless steel, Buna-N, EPDM

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)
Sodium Hydroxide CEILING: 2 mg/m³

OSHA/PEL :

Substance(s)
Sodium Hydroxide CEILING: 2 mg/m³

ENGINEERING MEASURES :

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :

If significant mists, vapors or aerosols are generated an approved respirator is recommended. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. A particulate cartridge may be used.

HAND PROTECTION :

PVC gloves, Rubber gloves, Neoprene gloves, Nitrile gloves, Butyl gloves, Viton[®] gloves

SKIN PROTECTION :

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.



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EYE PROTECTION :

Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :

Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Light yellow
ODOR	None
SPECIFIC GRAVITY	1.32 - 1.36 @ 77 °F / 25 °C
DENSITY	11.0 - 11.3 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	13
FREEZING POINT	17 °F / -8.3 °C
VAPOR PRESSURE	7.7 mm Hg @ 77 °F / 25 °C 115 mm Hg @ 115 °F / 46 °C
VOC CONTENT	0.00 %

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

High temperatures Direct sunlight

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent

**MATERIAL SAFETY DATA SHEET****PRODUCT****STABREX® ST20****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Chlorine gas, HCl, Bromine, Hydrogen bromide, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	> 5,000 mg/kg	Similar Product
Rating : Non-Hazardous		

PRIMARY SKIN IRRITATION :

Draize Score	Test Descriptor
7.9 / 8.0	Similar Product
Rating : Extremely irritating (Corrosive)	

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	4.5 mg/l	Product
Sheepshead Minnow	96 hrs	16 mg/l	Product
Fathead Minnow	96 hrs	8.3 mg/l	Product

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	4.2 mg/l	4.2 mg/l	Product
Mysid Shrimp (Mysidopsis)	96 hrs	27 mg/l		Product

**MATERIAL SAFETY DATA SHEET****PRODUCT****STABREX® ST20****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

bahia)				
Ceriodaphnia dubia	48 hrs	1.6 mg/l		Product

Rating : Toxic

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Selenastrum capricornutum)	72 hrs	3.66 mg/l	Product

Rating :

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	IC25	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	15.6 mg/l	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

**MATERIAL SAFETY DATA SHEET****PRODUCT****STABREX® ST20****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

Hazardous Waste: D002

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

METAL CONTAINERS: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities. **^PLASTIC CONTAINERS:** Do not reuse empty container. Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	None
DOT Reportable Quantity (per package) :	35,000 lbs
DOT RQ Component :	SODIUM HYDROXIDE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266



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Hazard Class - Primary :
Packing Group :

8
II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance

Sodium Hydroxide

RQ

35,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :

EPA Reg. No. 1706-179

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In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Hydroxide	Sec. 311

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :

None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :

This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

Sodium Hydroxide	1310-73-2
Sodium Hypochlorite	7681-52-9

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).



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CHINA

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Nalco: EHS2818, F105047/104688

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.



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IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 09/13/2004
Version Number : 1.10



Product Bulletin

STA·BR·EX[®] ST20

Microorganism Control Chemical

PRODUCT DESCRIPTION AND APPLICATION

General Description

Nalco's STA·BR·EX ST20 is a liquid biocide best described as an aqueous, one-drum, all-bromine stabilized product that is already active and ready to feed. STA·BR·EX ST20 is used to control bacteria and other organisms in recirculating cooling water, pasteurizers, air washers and other heat transfer systems. It should be considered for use wherever chlorine bleach, chlorine gas, bromine tablets and other chlorine-based products are used.

Program Benefits

STA·BR·EX ST20 is a part of a BIO-MANAGE[®] service program that helps provide microorganism control and clean systems. BIO-MANAGE is an approach to controlling biological fouling in industrial water systems that emphasizes system surveys, understanding the root cause of microbial growth and biofilm formation, and using an Engineering Approach to develop comprehensive programs for biological control. When an antimicrobial product such as STA·BR·EX ST20 is used as part of BIO-MANAGE, greater efficacy and efficiency can be gained and this should lead to greater satisfaction for our customers.

STA·BR·EX ST20 is stabilized, which provides the features of stable long-term storage, improved biological deposit penetration, improved compatibility with other treatment chemicals, lower production of disinfection by-product, and low volatility for improved usage. The stabilizer is sulfamate (H_2NSO_3^-).

Other Benefits:

- STA·BR·EX ST20 is a stable liquid bromine biocide in one package for easy dosing and control. Unlike liquid chlorine bleach, it does not lose its activity in a matter of days (see Figure 1). It reduces operator time and makes dosing easy.
- STA·BR·EX ST20 kills bacteria and helps prevent slime problems. Combined with Nalco services, it helps keep heat exchangers and tower fill clean for low maintenance and cost-efficient operation.
- Because STA·BR·EX ST20 is bromine-based, it will work effectively in systems where chlorine is challenged by amine or ammonia contamination.
- STA·BR·EX ST20 has low volatility that reduces product loss from the cooling

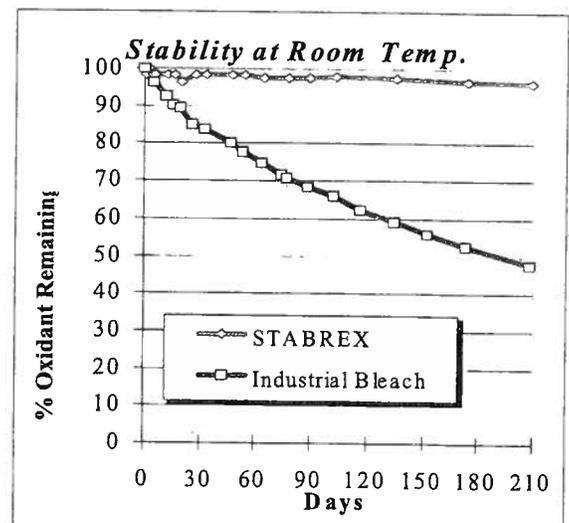


Figure 1 -- Stability of STA·BR·EX ST20 at 70° F (20° C)

tower. This results in more active product retained in the system to kill microorganisms. Equipment lasts longer because STA-BR-EX significantly reduces vapor-phase corrosion.

- STA-BR-EX ST20 is packaged and delivered in PORTA-FEED[®] units. Nalco's delivery specialist does all of the chemical handling. Operators have less chance of exposure and a safer work environment.
- STA-BR-EX ST20 generates less disinfection by-products as measured by the concentration of Adsorbable Organic Halide (AOX).

PHYSICAL & CHEMICAL PROPERTIES

Refer to SECTION 9 of the MSDS for the most current data. These properties are typical.

Form	Liquid
Color	Clear yellow to amber
Density	11.1 lb/gal [1.34 kg/l]
Specific Gravity @ 77°F [25°C]	1.34
pH (neat)	13.2
Freeze-Thaw Recovery	Complete
Freeze Point	16°F [-9°C]
Viscosity @ 20°F [-7°C]	21 cp
@ 75°F [24°C]	7 cp
Flash Point (PMCC)	> 200°F [93°C]
Odor	No odor, slight bromine odor when added to water

ACTIVE CONSTITUENTS

Sodium Hypochlorite	6.36% as available chlorine
Sodium Bromide	9.23% as NaBr

REGULATORY APPROVALS

STA-BR-EX ST20 must be applied according to appropriate national and local regulations.

As with all biocides applied in the United States, STA-BR-EX ST20 is regulated by the U.S. EPA under The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). It is a violation of federal law to use this product or any biocide in a manner inconsistent with its product label.

U.S. EPA Registration Number 1706-179 is approval for STA-BR-EX ST20 use in:

- Cooling ponds
- Reservoirs

- Decorative fountains
- Heat transfer systems (such as evaporative condensers, hydrostatic sterilizers and retorts, dairy sweetwater systems, and once-through cooling water systems)
- Industrial and commercial recirculating cooling water systems
- Industrial pasteurizers (such as food, beverage and industrial process pasteurizers)
- Air washers

STA-BR-EX ST20 is not approved for use in potable water, swimming pools or spas.

MATERIALS OF COMPATIBILITY

The following Materials of Compatibility information is available for the neat product exposed to containers, pumps, and feed lines:

Compatible	Not Compatible
Titanium	Brass
Vinyl	Carbon Steel
Polyethylene	Stainless Steel 304
Polypropylene	Stainless Steel 316
PVC	Buna-N
Hypalon	Aluminum
Viton	EPDM
Teflon	Plasite 9570
Kynar	Silicone
Chlorobutyl Rubber	
Derakane 411-45	
Derakane 470-36	
Polyurethane	
Neoprene	

Note: Do not use any metals except titanium on any parts that come in direct contact with product in its neat form.

DOSAGE AND FEEDING

The specific dosage of STA-BR-EX ST20 will vary depending on the characteristics of your system and the BIO-MANAGE objective for your microbio control program. Typically, a dose of 0.5 to 2.0 ppm total residual halogen as chlorine is effective. However, the effective dose can range from a detectable total residual of 0.05 ppm up to 4.0 ppm as chlorine, the US EPA application maximum.

ENVIRONMENTAL AND TOXICITY DATA

Biological Oxygen Demand (5-day BOD ₅)	Not Available
Chemical Oxygen Demand (COD)	Not Available
Total Organic Carbon (TOC)	Not Available

Refer to MSDS, SECTIONS 11 and 12, for all mammalian and aquatic information.

If fed beyond the product label recommendations, this product may be toxic to fish. Do not

discharge into lakes, streams, waterways, ponds or public waters unless in accordance with an NPDES permit. For guidance, contact your Nalco representative, your regional office of the EPA, or your local Environmental authority.

SAFETY AND HANDLING

Read and follow the label and MSDS for complete handling information before using this product.

STORAGE

STA-BR-EX ST20 has a freeze point of 16°F (-9°C) and should be stored appropriately. Recommended in-plant storage is six months.

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

PORTA-FEED, BIO-MANAGE, STA-BR-EX and NALCO are registered trademarks of Nalco Company (8-24-04)

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SAFETY DATA SHEET

PRODUCT

NALCO® 90005

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO® 90005**

COMPANY IDENTIFICATION :
Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Alkyl Alcohol	56-81-5	5.0 - 10.0
Dimethyl-Dioctyl-Ammonium Chloride	5538-94-3	30.0 - 60.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

Corrosive. May cause tissue damage. Harmful if swallowed.
Keep container tightly closed and in a well-ventilated place. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

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INGESTION :

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach. Harmful if swallowed.

INHALATION :

Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :

Acute :

Inhalation of high concentrations of organic solvents can cause nausea, dizziness, vomiting, stupor or unconsciousness.

Chronic :

A review of available data does not identify any symptoms from exposure not previously mentioned.

HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :

Get immediate medical attention. **PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT.** Immediately flush eye with water for at least 15 minutes while holding eyelids open.

SKIN CONTACT :

Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :

Get immediate medical attention. **DO NOT INDUCE VOMITING.** If conscious, washout mouth and give water to drink.

INHALATION :

Get medical attention. Remove to fresh air, treat symptomatically.

NOTE TO PHYSICIAN :

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 F / > 93.3 °C

EXTINGUISHING MEDIA :

Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.

Water mist may be used to cool closed containers.



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FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :

SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :

This product may pose a risk to the aquatic ecosystem if released., Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :

Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Store separately from reducing agents.

SUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Alkyl Alcohol (Mist)	ACGIH/TWA		10	

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Alkyl Alcohol (Respirable fraction.)
Alkyl Alcohol (Total dust.)

OSHA Z1/PEL
OSHA Z1/PEL

5
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ENGINEERING MEASURES :

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

RESPIRATORY PROTECTION :

Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge, with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :

When handling this product, the use of overalls, a chemical resistant apron and rubber boots is recommended. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :

Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless - Light yellow
ODOR	Alcoholic
SPECIFIC GRAVITY	0.96 @ 77.0 °F / 25.0 °C
DENSITY	8.0 lb/gal
SOLUBILITY IN WATER	Complete
pH (10 %)	6.5 - 9.0
VISCOSITY	< 100.0 cps @ 77.0 °F / 25.0 °C
MELTING POINT	10.4 °F / -12 °C
INITIAL BOILING POINT	203.0 °F / 95.0 °C

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VOC CONTENT 9.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :

Stable under normal conditions.

HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

CONDITIONS TO AVOID :

Extremes of temperature

MATERIALS TO AVOID :

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Reducing agents

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product, unless otherwise indicated.

ACUTE ORAL TOXICITY :

Species: Mouse
LD50: 360 - 375 mg/kg
Test Descriptor: Product

ACUTE DERMAL TOXICITY :

Species: Rabbit
LD50: 259 mg/kg
Test Descriptor: 80% Active Ingredient

ACUTE INHALATION TOXICITY :

Species: Rat
LD50: 10 mg/l (1 hrs)
Test Descriptor: Product

PRIMARY SKIN IRRITATION :

Species: Rabbit
Draize Score: /8.0
Test Descriptor:

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**SAFETY DATA SHEET**

PRODUCT

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Remarks: Severely irritating, US DOT CORROSIVITY TEST: Corrosive

PRIMARY EYE IRRITATION :

Species: Rabbit
Draize Score: /110.0
Test Descriptor:
Remarks: Extremely irritating (Corrosive)

SENSITIZATION :

This product is not expected to be a sensitizer.

CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

TERATOGENICITY AND EMBRYOTOXICITY :

No evidence of developmental or fetotoxic effects observed at exposure doses ranging from 10 to 50 mg/kg/day from day 6 through 15 of gestation.

HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	0.7 mg/l	Product (Static Results)
Bluegill Sunfish	48 hrs	0.1 mg/l	Product (Static Results)

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	0.1 mg/l		Product

AVIAN RESULTS :

Species	Exposure	LC50	Test Descriptor
Mallard Duck		240 mg/kg	Product
Bobwhite Quail	8 Days	2,625 mg/kg	Product

PERSISTENCY AND DEGRADATION :

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SAFETY DATA SHEET

PRODUCT

NALCO® 90005

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Total Organic Carbon (TOC) : 410,000 mg/l

Chemical Oxygen Demand (COD) : 1,100,000 mg/l

MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	10 - 30%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :
Technical Name(s) :

DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
QUATERNARY AMMONIUM CHLORIDE(S)

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

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**SAFETY DATA SHEET****PRODUCT****NALCO® 90005****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

UN/ID No : UN 1903
Hazard Class - Primary : 8
Packing Group : II

Flash Point : > 200 F/ > 93.3 °C

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) : QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No : UN 1903
Hazard Class - Primary : 8
Packing Group : II
IATA Cargo Packing Instructions : 812
IATA Cargo Aircraft Limit : 30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) : QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No : UN 1903
Hazard Class - Primary : 8
Packing Group : II

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :**OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Alkyl Alcohol : Target Organ Effect - Kidney, Exposure Limit
Dimethyl-Dioctyl-Ammonium Chloride : Corrosive, Toxic

CERCLA/SUPERFUND, 40 CFR 302 :

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :**SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.



SAFETY DATA SHEET

PRODUCT

NALCO® 90005

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

- X Immediate (Acute) Health Hazard
 Delayed (Chronic) Health Hazard
 Fire Hazard
 Sudden Release of Pressure Hazard
 Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :

NSF Registration number for this product is : 140607

This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :

EPA Reg. No. 6836-60-1706

In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use EXCEPT FOR THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Acetaldehyde	Sec. 311
• Dimethylnitrosoamine	Sec. 307

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

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Substance(s)	Citations
<ul style="list-style-type: none">AcetaldehydeDimethylnitrosoamine	Sec. 112

CALIFORNIA PROPOSITION 65 :

Substances known to the State of California to cause cancer and/or reproductive toxicity are present as an impurity or residue.

Substance(s)	Concentration	EFFECTS
<ul style="list-style-type: none">AcetaldehydeDimethylnitrosoamine	.0001 % < .0001 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :

The following substances are disclosed for compliance with State Right to Know Laws:

Alkyl Alcohol

56-81-5

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :

E - Corrosive Material, D1B - Materials Causing Immediate and Serious Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should

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be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 11/04/2009

Version Number : 2.3



Product Bulletin

NALCO[®] 90005

Microbicide-Low Foam Water Treatment

PRODUCT DESCRIPTION AND APPLICATION

General Description

NALCO 90005 is a non-oxidizing quaternary ammonium biocide effective for controlling algae and bacteria in recirculating cooling water systems, such as encountered within industrial and commercial building applications. Bacteria and algae set up conditions that promote deposition, corrosion and fouling. NALCO 90005 aids in cleaning and loosening slime deposits from cooling water systems and killing the microorganisms that form these deposits.

Program Benefits

- Broad-spectrum biocide, designed to control algae and bacteria:
 - increases system efficiency by maintaining clean heat exchangers and tower fill
 - minimizes repair and maintenance costs
 - avoids unsightly visible contamination
- Promotes a healthier operating environment by lowering system bacterial activity.
- Helps reduce overall biocide treatment costs.
- Functions over a wide pH range, either with or without halogens present, to ensure effective algae control in a broad range of applications.
- Helps reduce bacterial growth by minimizing nutrients that are produced from algae.
- Effective dispersant, which can remove slime deposits.

PHYSICAL & CHEMICAL PROPERTIES

Form	Liquid
Color	Clear, pale yellow
Density	7.76 lb/gal (0.93 kg/l)
Specific Gravity @ 25°C (77°F)	0.93
pH (10%)	6.5-9.0
pH (neat)	7.3
Freeze-Thaw Recovery	Complete
Freeze Point	5°C (41°F)
Flash Point (PMCC)	> 93°C (200°F)
Viscosity @ 25°C (77°F)	<100 cp
Odor	Slight

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

ACTIVE CONSTITUENTS

Component	Function
-----------	----------

DODMAC

Algicide / Slimicide

REGULATORY APPROVALS

NALCO 90005 must be applied according to appropriate national and local regulations. Refer to the Material Safety Data Sheet (MSDS), SECTION 15 for the most recent information on approvals.

As with all biocides applied in the United States, NALCO 90005 is regulated by the U.S. EPA under The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). It is a violation of federal law to use this product or any biocide in a manner inconsistent with its product label.

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
PVC	Natural Rubber
Polyethylene	Neoprene
Polypropylene	Buna-N
Teflon	Viton
Kynar	
Kalrez	
Vinyl ester	
Stainless Steel 316L	

DOSAGE AND FEEDING

For complete dosage and feeding recommendations, contact your Nalco sales engineer

ENVIRONMENTAL AND TOXICITY DATA

Refer to the Material Safety Data Sheet (MSDS), SECTIONS 11 and 12, for the most current data.

SAFETY AND HANDLING

HANDLING: Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame. Refer to the Material Safety Data Sheet (MSDS), SECTIONS 3 and 8, for the most current data.

STORAGE

STORAGE CONDITIONS: Store in suitable labeled containers. Store the containers tightly closed. Store away from heat and sources of ignition. Have appropriate fire extinguishers available in and near the storage area. Connections must be grounded to avoid electrical charges.

The recommended in-plant storage limit for NALCO 90005 is six months. Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

NALCO and the logo, TRASAR, 3D TRASAR, STA-BR-EX and ACTI-BROM are registered trademarks of Nalco Company (8-04-2006)

Product Name	Issue Date	Issue Title

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
03A199	TA-3-1837	03A, Treated Cooling Water Discharges	Perennial Reach of Sandia Canyon

SOURCE OF DISCHARGE

Outfall 03A199 is located at TA-3 and discharges treated cooling tower blow-down from the Laboratory Data Communications Center (LDCC) facility located at TA-3-1498 to a perennial reach of Sandia Canyon. The specific sources are identified in Table 1.

**Table 1
 Sources for Discharges to Outfall 03A199**

TA	Bldg	Description
3	1837	Laboratory Data Communications Center (LDCC) Cooling Tower Blow-Down

WATER TREATMENT PROCESS

The water treatment systems associated with the LDCC cooling towers are controlled by a process logic controller (PLC) that monitors the tower water using a chlorine detection system and a conductivity meter. It treats the water using chemicals that may include a corrosion inhibitor, biocide, a de-chlorination agent, and de minimus amounts of tracing agents. The water treatment codes provided in Table 2 have been assigned to this outfall.

**Table 2
 Water Treatment Codes Assigned to Outfall 03A199**

Treatment Code	Treatment Process	Description
2-L	Reduction	Chemicals that are Corrosion Inhibitors are added
2-H	Disinfection (other)	Chemicals are added to control Microorganisms
2-E	De-chlorination	Blow down is de-chlorinated prior to discharge

Figure 1 provides a process schematic.

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control corrosion, limit biological growth and de-chlorinate the water prior to discharge. The chemicals used to treat the water in the cooling towers are identified in Table 3.

**Table 3
 Treatment Chemicals Used in the LDCC Cooling Towers**

Chemical Name	Reason for Use	Hazardous Substances from NPDES Permit Application From 2C Table 2C-4
WEST C-358P	Corrosion Inhibitor for Well Water	Potassium Hydroxide
WEST C-552	Corrosion Inhibitor/Dispersant for SERF Makeup Water	Potassium Hydroxide

Table 3 (continued)
Treatment Chemicals Used in the LDCC Cooling Towers

Chemical Name	Reason for Use	Hazardous Substances from NPDES Permit Application Form 2C Table 2C-4
Purobrom Tablets	Biocide	Chlorine
WEST R-630	De-Chlorination	Sodium Bisulfite
WEST C-825	pH control (neutralization)	Sodium Bisulfite
HACH 2263411	Total Chlorine Indicator	Sulfuric Acid
HACH 1406428	DPD Total Chlorine Reagent	Sodium Phosphate (dibasic)
HACH 1407028	DPD Free Chlorine Reagent	Sodium Phosphate (dibasic), EDTA
HACH 2756549	pH Storage Solution	NA
HACH 2076053	Molybdovanadate Reagent	Sulfuric Acid
HACH 203832	Sulfuric Acid Solution 19.2 N	Sulfuric Acid
HACH 2297255	DPD Compound for Free and Total Chlorine Analyzers	NA
HACH 2314011	Free Chlorine Indicator Solution for CL-17 Analyzer	NA
HACH 2314111	Free Chlorine Buffer for CL-117 Analyzer	NA
HACH 2263511	Total Chlorine Buffer Solution	NA

POTENTIAL POLLUTANTS

The treatment chemicals used to treat the cooling water constitute the pollutant load of the discharge to Outfall 03A199. Table 4 identifies the Table 2C-4 constituents by discharge source. There were not any Table 2C-3 constituents identified.

Table 4
Potential Pollutants Discharged to Outfall 03A199

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
TA-3-1837 LDCC Cooling Tower Treatment Chemicals	Potassium Hydroxide, 1-bromo-3-chloro-5,5-dimethylhydantoin (chlorine), Sodium Bisulfite, Sodium Phosphate (dibasic), Sulfuric acid, EDTA, Chlorine

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the operational sources that discharge to Outfall 03A199 are provided in Table 5.

Table 5
Source Flow Rates/Frequencies to Outfall 03A199

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
TA-3-1837 LDCC Cooling Tower	32,764	2H, 2E, 2L

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A grab sample for the Form 2C constituents was collected from Outfall 03A199 for the Permit Re-Application on August 31, 2011.

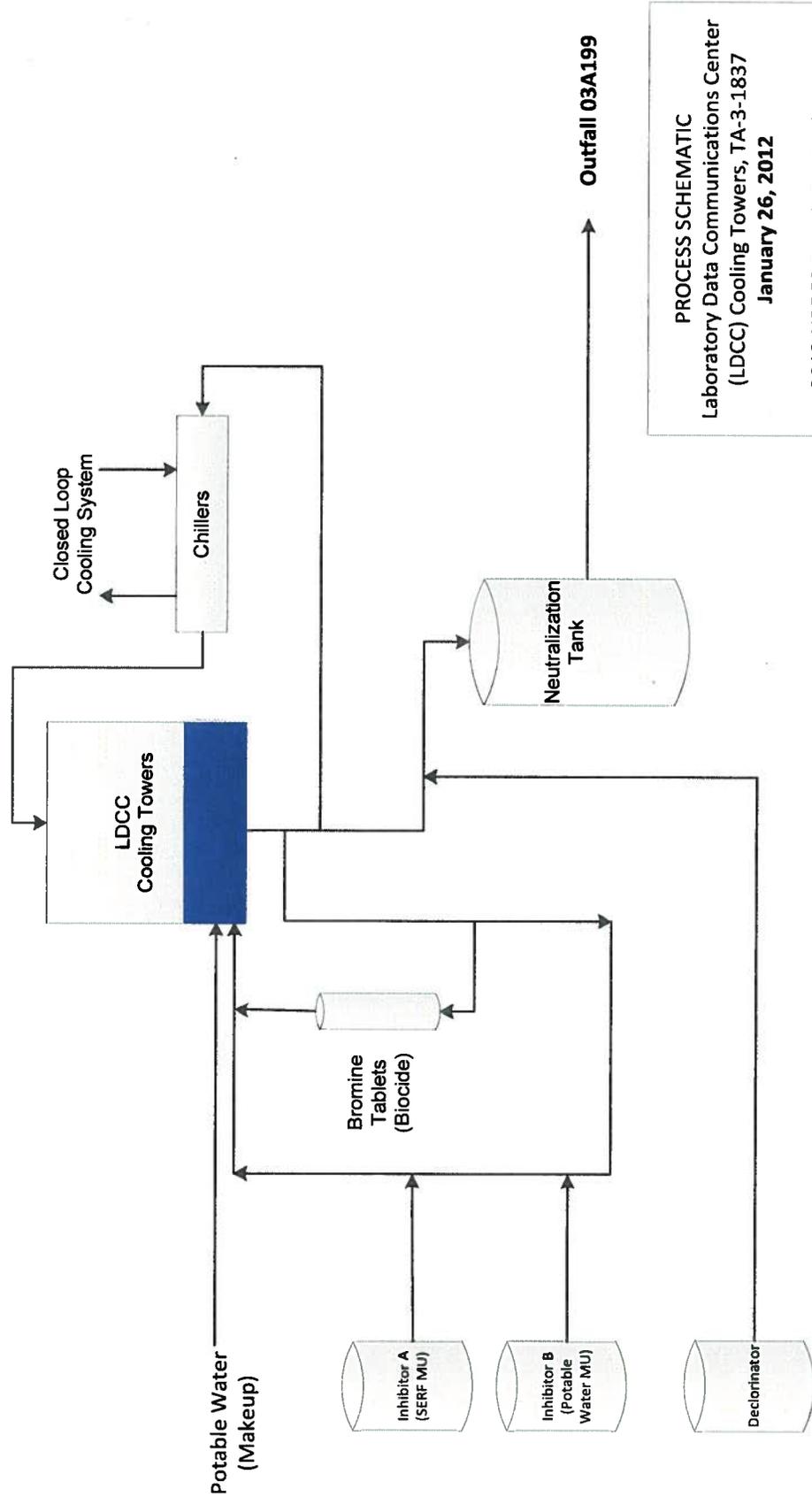
ANALYTICAL RESULTS PROVIDED

- Form 2C analytical data from a grab sample collected on August 31, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°52'34"N
- Longitude – 106°19'20"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 122 mg/L.

Figure 1
Process Schematic for the Laboratory Data Communications Center (LDCC) TA-3-1837 Cooling Towers, Water Treatment System, and Outfall 03A199



PROCESS SCHEMATIC
Laboratory Data Communications Center
(LDCC) Cooling Towers, TA-3-1837
January 26, 2012
2012 NPDES Permit Re-Application
OUTFALL 03A199

Photographs – LDCC Cooling Tower



**Photographs #1 – LDCC Cooling Towers & Water Treatment System
Outfall 03A199**



**Photograph #2 – LDCC Cooling Towers & Water Treatment System
LDCC Cooling Towers**



Photograph #3 – LDCC Cooling Towers & Water Treatment System
Corrosion Inhibitor Feed Tanks



Photograph #4 – LDCC Cooling Towers & Water Treatment System
Neutralization Tank



Photograph #5 – LDCC Cooling Towers & Water Treatment System
Bromonator



Photograph #6 – LDCC Cooling Towers & Water Treatment System
De-Chlorination Chemical Feed Tank

Form 2C Section IV.A and B - Improvements (Long Term – [2 to 5 years])

In December 2007 the Laboratory completed LA-UR-07-8312, *NPDES Permit Compliance and Outfall Reduction Strategy*, which provides recommendations and options for the treatment, reduction, and/or elimination of the outfalls at LANL. There are three (3) outfalls included in this 2012 Permit Re-Application document that have been identified for possible elimination/reduction over the next 2 – 5 years. Figure 2 provides a process schematic that shows the anticipated future configuration of the Outfall 03A199 with respect to SWWS, SERF, and Outfall 001. The implementation of the elimination/reduction projects for each of these outfalls is subject to funding.

DMR Outfall Data Summary - 03A199
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR											
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Maximum			Units		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	Minimum	Average	Maximum	Units	Permit Limit	Units
03A199	TA-3-1837	8/07	Flow (Totalized Est.)	0.02744	0.09032	MGD								0.02744	0.09032	MGD				1	
		9/07	Flow (Totalized Est.)	0.02777	0.08818	MGD								0.02777	0.08818	MGD				1	
		10/07	Flow (Totalized Est.)	0.026230	0.03812	MGD								0.02623	0.03812	MGD				1	
		11/07	Flow (Totalized Est.)	0.01755	0.06658	MGD								0.01755	0.06658	MGD				1	
		12/07	Flow (Totalized Est.)	0.01884	0.03649	MGD								0.01884	0.03649	MGD				1	
		1/08	Flow (Totalized Est.)	0.01785	0.03027	MGD								0.01785	0.03027	MGD				1	
		2/08	Flow (Totalized Est.)	0.02176	0.03572	MGD								0.02176	0.03572	MGD				1	
		3/08	Flow (Totalized Est.)	0.02176	0.03572	MGD								0.02176	0.03572	MGD				1	
		4/08	Flow (Totalized Est.)	0.02421	0.03697	MGD								0.02421	0.03697	MGD				1	
		5/08	Flow (Totalized Est.)	0.02624	0.03518	MGD								0.02624	0.03518	MGD				1	
		6/08	Flow (Totalized Est.)	0.02958	0.03520	MGD								0.02958	0.03520	MGD				1	
		7/08	Flow (Totalized Est.)	0.02961	0.03611	MGD								0.02961	0.03611	MGD				1	
		8/08	Flow (Totalized Est.)	0.02947	0.03588	MGD								0.02947	0.03588	MGD				1	
		9/08	Flow (Totalized Est.)	0.02793	0.04243	MGD								0.02793	0.04243	MGD				1	
		10/08	Flow (Totalized Est.)	0.02976	0.04515	MGD								0.02976	0.04515	MGD				1	
		11/08	Flow (Totalized Est.)	0.02470	0.03376	MGD								0.02470	0.03376	MGD				1	
		12/08	Flow (Totalized Est.)	0.02284	0.03832	MGD								0.02284	0.03832	MGD				1	
		1/09	Flow (Totalized Est.)	0.02145	0.03094	MGD								0.02145	0.03094	MGD				1	
		2/09	Flow (Totalized Est.)	0.02364	0.03523	MGD								0.02364	0.03523	MGD				1	
		3/09	Flow (Totalized Est.)	0.02368	0.04317	MGD								0.02368	0.04317	MGD				1	
		4/09	Flow (Totalized Est.)	0.02631	0.03057	MGD								0.02631	0.03057	MGD				1	
		5/09	Flow (Totalized Est.)	0.02989	0.03739	MGD								0.02989	0.03739	MGD				1	
		6/09	Flow (Totalized Est.)	0.03139	0.03802	MGD								0.03139	0.03802	MGD				1	
		7/09	Flow (Totalized Est.)	0.03424	0.04605	MGD								0.03424	0.04605	MGD				1	
		8/09	Flow (Totalized Est.)	0.034270	0.049828	MGD								0.03427	0.04983	MGD				1	
		9/09	Flow (Totalized Est.)	0.03147	0.04344	MGD								0.03147	0.04344	MGD				1	
		10/09	Flow (Totalized Est.)	0.02959	0.03719	MGD								0.02959	0.03719	MGD				1	
		11/09	Flow (Totalized Est.)	0.01990	0.02525	MGD								0.01990	0.02525	MGD				1	
		12/09	Flow (Totalized Est.)	0.02024	0.02469	MGD								0.02024	0.02469	MGD				1	
		1/10	Flow (Totalized Est.)	0.00210	0.00448	MGD								0.00210	0.00448	MGD				1	
		2/10	Flow (Totalized Est.)	0.01979	0.02553	MGD								0.01979	0.02553	MGD				1	
		3/10	Flow (Totalized Est.)	0.02145	0.02768	MGD								0.02145	0.02768	MGD				1	
		4/10	Flow (Totalized Est.)	0.02308	0.03030	MGD								0.02308	0.03030	MGD				1	
		5/10	Flow (Totalized Est.)	0.02703	0.05039	MGD								0.02703	0.05039	MGD				1	
		6/10	Flow (Totalized Est.)	0.02814	0.04095	MGD								0.02814	0.04095	MGD				1	
		7/10	Flow (Totalized Est.)	0.03089	0.07418	MGD								0.03089	0.07418	MGD				1	
		8/10	Flow (Totalized Est.)	0.03031	0.04313	MGD								0.03031	0.04313	MGD				1	
		9/10	Flow (Totalized Est.)	0.03373	0.05903	MGD								0.03373	0.05903	MGD				1	
		10/10	Flow (Totalized Est.)	0.03100	0.12600	MGD								0.03100	0.12600	MGD				1	
		11/10	Flow (Totalized Est.)	0.02195	0.04080	MGD								0.02195	0.04080	MGD				1	
		12/10	Flow (Totalized Est.)	0.03783	0.10510	MGD								0.03783	0.10510	MGD				1	
		1/11	Flow (Totalized Est.)	0.03110	0.04440	MGD								0.03110	0.04440	MGD				1	
		2/11	Flow (Totalized Est.)	0.02807	0.03340	MGD								0.02807	0.03340	MGD				1	

DMR Outfall Data Summary - 03A199

Biological Test Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)
03A199	5/19/2008	Grab	Ceriodaphnia dubia Pimephales promelas	3-brood chronic	47	P
	5/21/2008			7-day chronic	47	P
	5/23/2008					

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(s) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
03A199	TA-3-1837 LDCC (A) Cooling Tower Blow Down [Intermittent]	7	12	0.032764 mgal/d	0.126 mgal/d	32,764 Gallons	126,00 Gallons	344

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.

NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-3 Believed to be absent.			
Table 2C-4 (B)			
Potassium hydroxide	WEST C-358P Inhibitor; WEST C-552		
1-bromo-3-chloro-5,5-dimethylhydantoin (chlorine)	Purobrom tablets		
sodium bisulfite	WEST R-630, WEST C0825		
sulfuric acid	HACH 2263411, HACH 2076053, HACH 203832		
sodium phosphate (dibasic)	HACH 1406428, HACH 1407028		
EDTA	HACH 1407028		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

 YES (list all such pollutants below) NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Whole Effluent Toxicity 7 Day Chronic Toxicity - PASSED
 Ceriodaphnia dubia, 24-hr composite (3 samples, collected ~48 hours apart), 1 per 5 years
 Pimephales promelas, 24-hr composite (3 samples, collected ~48 hours apart), 1 per 5 years

See the DMR Outfall Data Summary Report for the detailed results.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section LX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print)

Kevin W. Smith, Manager, DOE/Los Alamos Site Office

B. PHONE NO. (area code & no.)

(505) 606-2004

C. SIGNATURE



D. DATE SIGNED

1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
03A199

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Biochemical Oxygen Demand (BOD)	<1	<1.05	(C)				1	mg/L	1b/D	NA	NA	NA
b. Chemical Oxygen Demand (COD)	37.4	39.3					1	mg/L	1b/D	NA	NA	NA
c. Total Organic Carbon (TOC)	11.5	12.1					1	mg/L	1b/D	NA	NA	NA
d. Total Suspended Solids (TSS)	3.0	3.155	3.0	0.9897	1.75	0.4785	4	mg/L	1b/D	NA	NA	NA
e. Ammonia (as N)	0.0301	0.0317					1	mg/L	1b/D	NA	NA	NA
f. Flow	VALUE 0.126 (D)		VALUE 0.039529 (E)		VALUE 0.032764 (F)		344	MGD	NA	VALUE NA	NA	NA
g. Temperature (winter)	VALUE 20.2 (G)		VALUE 18.8 (H)		VALUE 18.2		13	°C		VALUE NA	NA	NA
h. Temperature (summer)	VALUE 25.1 (G)		VALUE 23.9 (H)		VALUE 23.4		13	°C		VALUE NA	NA	NA
i. pH	MINIMUM 7.4 (I)	MAXIMUM 8.8 (I)	MINIMUM 7.9 (J)	MAXIMUM 8.5 (J)			50	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS						
a. Bromide (24959-67-9)	X		1.49	1.57					1	mg/L	1b/D	NA	NA	NA
b. Chlorine, Total Residual		X	0	0	0	0	0	0	50	mg/L	1b/D	NA	NA	NA
c. Color		X	<5	NA					1	mg/L	1b/D	NA	NA	NA
d. Fecal Coliform		X	<1.0/100	(K)					1	cfu/mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		0.445	0.468					1	mg/L	1b/D	NA	NA	NA
f. Nitrate-Nitrite (as N)	X		1.03	1.08					1	mg/L	1b/D	NA	NA	NA

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CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)	X		0.685	0.72				mg/L	1b/D	NA	NA	NA
h. Oil and Grease	X		1.86	1.96				mg/L	1b/D	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1	1.05	1	0.329	1.0	0.2734	mg/L	1b/D	NA	NA
j. Radioactivity												
(1) Alpha, Total		X	<3.15	NA					pCi/L	NA	NA	NA
(2) Beta, Total	X		7.25	NA					pCi/L	NA	NA	NA
(3) Radium, Total	X		<1.336	NA					pCi/L	NA	NA	NA
(4) Radium 226, Total	X		0.642	NA					pCi/L	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		8.97	9.43					mg/L	1b/D	NA	NA
l. Sulfide (as S)		X	<0.03	<0.0315	(C)				mg/L	1b/D	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		0.35	0.368					mg/L	1b/D	NA	NA
n. Surfactants		X	<0.016	<0.0168	(C)				mg/L	1b/D	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.0157	0.0165					mg/L	1b/D	NA	NA
p. Barium, Total (7440-39-3)	X		0.0781	0.0821	(L)				mg/L	1b/D	NA	NA
q. Boron, Total (7440-42-8)	X		0.0659	0.0693	(M)				mg/L	1b/D	NA	NA
r. Cobalt, Total (7440-48-4)		X	<1E-04	<1E-04	(N)				mg/L	1b/D	NA	NA
s. Iron, Total (7439-89-6)		X	<0.03	<0.0315	(C)				mg/L	1b/D	NA	NA
t. Magnesium, Total (7439-95-4)	X		11.9	12.5					mg/L	1b/D	NA	NA
u. Molybdenum, Total (7439-98-7)	X		0.0028	0.00294	(O)				mg/L	1b/D	NA	NA
v. Manganese, Total (7439-96-5)	X		0.0012	0.00126					mg/L	1b/D	NA	NA
w. Tin, Total (7440-31-5)		X	<1E-03	<1E-03	(C)				mg/L	1b/D	NA	NA
x. Titanium, Total (7440-32-6)	X		0.0075	0.00789					mg/L	1b/D	NA	NA

EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515** OUTFALL NUMBER **03A199**

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for each of these pollutants discharged in concentrations of 10 ppb or greater. If you mark column 2c for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)			X	<1E-03	<1E-03	(N)				1	mg/L	1b/D	NA	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.0037	0.0039					1	mg/L	1b/D	NA	NA	NA
3M. Beryllium, Total (7440-41-7)		X		<2E-04	<2E-04	(N)				1	mg/L	1b/D	NA	NA	NA
4M. Cadmium, Total (7440-43-9)		X		<1E-04	<1E-04	(N)				1	mg/L	1b/D	NA	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.0086	0.009	(P)				1	mg/L	1b/D	NA	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0132	0.0139					1	mg/L	1b/D	NA	NA	NA
7M. Lead, Total (7439-92-1)		X		6.7E-04	7E-04					1	mg/L	1b/D	NA	NA	NA
8M. Mercury, Total (7439-97-6)		X		1.06E-05	1E-05					1	mg/L	1b/D	NA	NA	NA
9M. Nickel, Total (7440-02-0)		X		7.3E-04	8E-04					1	mg/L	1b/D	NA	NA	NA
10M. Selenium, Total (7782-49-2)		X		0.0052	0.0055					1	mg/L	1b/D	NA	NA	NA
11M. Silver, Total (7440-22-4)		X		<2E-04	<2E-04	(N)				1	mg/L	1b/D	NA	NA	NA
12M. Thallium, Total (7440-28-0)		X		<4.5E-04	<5E-04	(N)				1	mg/L	1b/D	NA	NA	NA
13M. Zinc, Total (7440-66-6)		X		0.0043	0.0045	(Q)				1	mg/L	1b/D	NA	NA	NA
14M. Cyanide, Total (57-12-5)		X		<1.5E-03	<2E-03	(N)				1	mg/L	1b/D	NA	NA	NA
15M. Phenols, Total		X		3.36E-03	4E-03					1	mg/L	1b/D	NA	NA	NA

DIPOXIN

2,3,7,8-Tetra-chlorodibenzo-P-dioxin (1764-01-6)

DESCRIBE RESULTS The result from the analytical laboratory is <1.09E-08 mg/L. This is above the limit of the MGL 1.0E-08 mg/L but is likely due to discrepancies in the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (R) for additional information.

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)	a. MAXIMUM DAILY VALUE		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
					(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS													
1V. Acrolein (107-02-8)			X		<1.25E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA
2V. Acrylonitrile (107-13-1)			X		<1E-03	<1E-03	(N)		1	mg/L	1b/D	NA	NA
3V. Benzene (71-43-2)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA			(S)						
5V. Bromoform (75-25-2)		X			0.0261	0.0274			1	mg/L	1b/D	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
7V. Chlorobenzene (108-90-7)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
8V. Chloro-bromomethane (124-48-1)		X			0.00112	0.0012	(T)		1	mg/L	1b/D	NA	NA
9V. Chloroethane (75-00-3)			X		<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA
10V. 2-Chloro-ethylvinyl Ether (110-75-8)			X		<1.5E-03	<2E-03	(C)		1	mg/L	1b/D	NA	NA
11V. Chloroform (67-66-3)		X			<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
12V. Dichloro-bromomethane (75-27-4)		X			<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
13V. Dichloro-difluoromethane (75-71-8)				NA			(S)						
14V. 1,1-Dichloro-ethane (75-34-3)			X		<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA
15V. 1,2-Dichloro-ethane (107-06-2)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
16V. 1,1-Dichloro-ethylene (75-35-4)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
17V. 1,2-Dichloro-propane (78-87-5)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
18V. 1,3-Dichloro-propylene (542-75-6)			X		<2.5E-04	<3E-04	(N, U)		1	mg/L	1b/D	NA	NA
19V. Ethylbenzene (100-41-4)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
20V. Methyl Bromide (74-83-9)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
21V. Methyl Chloride (74-87-3)			X		<3E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA

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CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)	a. MAXIMUM DAILY VALUE		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
					(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)													
22V. Methylene Chloride (75-09-2)		X			0.00371	0.0039	(V)		1	mg/L	1b/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
25V. Toluene (108-88-3)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X		<3E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X		<3.25E-04	<3E-04	(C)		1	mg/L	1b/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
29V. Trichloroethylene (79-01-6)			X		<2.5E-04	<3E-04	(N)		1	mg/L	1b/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)					NA		(S)						
31V. Vinyl Chloride (75-01-4)			X		<5E-04	<5E-04	(N)		1	mg/L	1b/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS													
1A. 2-Chlorophenol (95-57-8)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
4A. 4,6-Dinitro-O-Cresol (534-52-1)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X		<5E-03	<5E-03	(N)		1	mg/L	1b/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X		<3E-03	<3E-03	(C)		1	mg/L	1b/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X		<3E-03	<3E-03	(C)		1	mg/L	1b/D	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X		<3E-03	<3E-03	(C)		1	mg/L	1b/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
10A. Phenol (108-95-2)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X		<3E-03	<3E-03	(N)		1	mg/L	1b/D	NA	NA

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS		
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS													
1B. Acenaphthene (83-32-9)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3E-04	<3E-04	(C)			1	mg/L	lb/D	NA	NA
3B. Anthracene (120-12-7)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
4B. Benzidine (92-87-5)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3E-04	<3E-04	(C)			1	mg/L	lb/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3E-03	<3E-03	(C)			1	mg/L	lb/D	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3E-03	<3E-03	(C)			1	mg/L	lb/D	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA
16B. 2-Chloro-naphthalene (91-58-7)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)			X	<3E-03	<3E-03	(C)			1	mg/L	lb/D	NA	NA
18B. Chrysene (218-01-9)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA
21B. 1,3-Di-chlorobenzene (541-73-1)			X	<2.5E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA

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CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)														
22B. 1,4-Dichlorobenzene (106-46-7)			X	<2.5E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	<3E-03	<3E-03	(C)			1	mg/L	lb/D	NA	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	<3E-03	<3E-03	(C)			1	mg/L	lb/D	NA	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
31B. Fluoranthene (206-44-0)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA	NA
32B. Fluorene (86-73-7)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
34B. Hexachlorobutadiene (87-68-3)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
36B. Hexachloroethane (67-72-1)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	<3E-04	<3E-04	(N)			1	mg/L	lb/D	NA	NA	NA
38B. Isophorone (78-59-1)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
39B. Naphthalene (91-20-3)			X	<3E-04	<3E-04	(C)			1	mg/L	lb/D	NA	NA	NA
40B. Nitrobenzene (98-95-3)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	<3E-03	<3E-03	(N)			1	mg/L	lb/D	NA	NA	NA

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS			5. INTAKE (optional)		
	a. TESTING REQUIRED (if available)	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM DAILY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3E-03	(N, W)			1	mg/L	1b/D	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	<3E-04	(C)			1	mg/L	1b/D	NA	NA	NA
45B. Pyrene (129-00-0)			X	<3E-04	(N)			1	mg/L	1b/D	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3E-03	(N)			1	mg/L	1b/D	NA	NA	NA
GC/MS FRACTION - PESTICIDES													
1P. Aldrin (309-00-2)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
2P. α-BHC (319-84-6)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
3P. β-BHC (319-85-7)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
4P. γ-BHC (58-99-9)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<7.07E-06	(C)			1	mg/L	1b/D	NA	NA	NA
6P. Chlordane (57-74-9)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
11P. α-Endosulfan (115-29-7)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
14P. Endrin (72-20-6)			X	<1.06E-05	(N)			1	mg/L	1b/D	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<7.07E-06	(N)			1	mg/L	1b/D	NA	NA	NA

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EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	03A199

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)					
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS CONCENTRATION	b. NO. OF ANALYSES
GCMS FRACTION - PESTICIDES (continued)															
17P. Heptachlor Epoxide (1024-57-3)			X	<7.07E-06		<7E-06	(N)			1	mg/L	lb/D	NA	NA	NA
18P. PCB-1242 (53469-21-9)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
19P. PCB-1254 (11097-69-1)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
20P. PCB-1221 (11104-28-2)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
21P. PCB-1232 (11141-16-5)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
22P. PCB-1248 (12672-29-6)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
23P. PCB-1260 (11096-82-5)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
24P. PCB-1016 (12674-11-2)			X	<3.51E-05		<4E-05	(N)			1	mg/L	lb/D	NA	NA	NA
25P. Toxaphene (8001-35-2)			X	<1.6E-04		<2E-04	(N)			1	mg/L	lb/D	NA	NA	NA

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FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 03A199

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from August 2010 to July 2011. The outfall discharged 344 days during that time period but is considered intermittent because it does not discharge 24 hours per day.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified because they are components of the chemicals used to treat the cooling tower water and, therefore, may be present in the effluent discharged to the outfall.
- C. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL
- D. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- E. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- F. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- G. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- H. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- I. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- J. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- K. The results for E. Coli are used as the indicator for Fecal Coliform.
- L. Barium was detected at a value less than the MQL of 0.1 mg/L.
- M. Boron was detected at a value less than the MQL of 0.1 mg/L.
- N. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- O. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- P. Chromium was detected a value less than the MQL of 0.01 mg/L.
- Q. Zinc was detected at a value less than the MQL of 0.02 mg/L.
- R. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- S. EPA remanded the parameter.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 03A199

- T. Chlorodibromomethane was detected at a value less than the MQL of 0.01 mg/L.
- U. Result is for cis- and trans-1,3-dichloropropylene.
- V. Methylene Chloride was detected at a value less than the MQL of 0.02 mg/L.
- W. Result is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

**EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)**

METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE

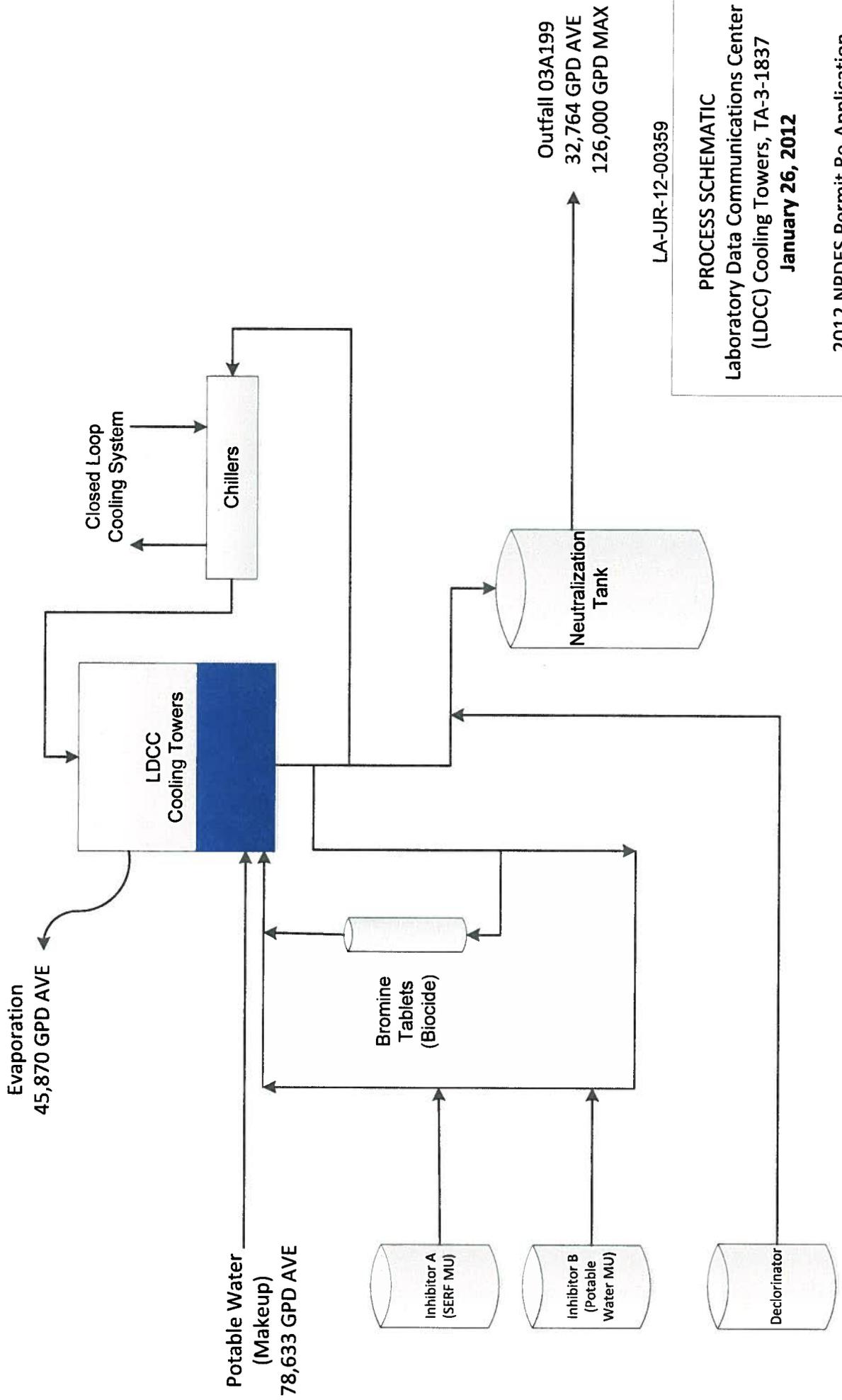
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
Process Schematic and Water Balance for the Laboratory Data Communications Center (LDCC) TA-3-1837 Cooling Towers, Water Treatment System, and Outfall 03A199



LA-UR-12-00359

PROCESS SCHEMATIC
 Laboratory Data Communications Center
 (LDCC) Cooling Towers, TA-3-1837
 January 26, 2012

2012 NPDES Permit Re-Application

OUTFALL 03A199

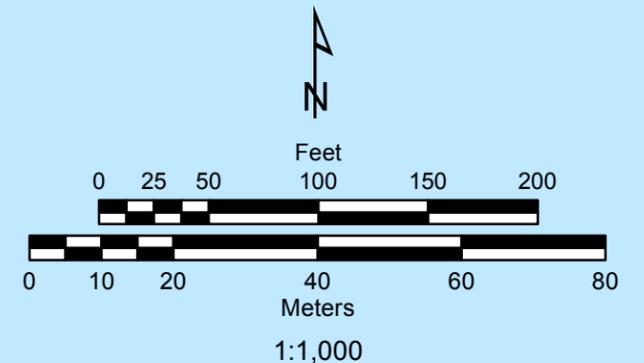
Water balance calculation is an estimate based on 2.4 cycles.

**NPDES Permit Re-Application Project
TA-03 Building 1498, 1837
Outfall #03A199**



Legend

NPDES Outfall	Paved Roads
Springs	Source Structures
Drainages	Building Served by Source
100ft Contours	Structures
20ft Contours	LANL Boundary
10ft Contours	Technical Areas
Fences	
Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-08 14 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2008 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, February 2009.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-358P Inhibitor (Well Water)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-358P Cooling Tower Inhibitor
PRODUCT DESCRIPTION: An aqueous corrosion and scale inhibitor. This product is designed specifically for the control of corrosion and mineral scales in open circulating cooling water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Potassium Hydroxide	1310-58-3	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET

WEST C-358P Inhibitor

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET
WEST C-358P Inhibitor

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 12.0
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.124
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET

WEST C-358P Inhibitor

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.

PRIMARY HAZARD CLASS/DIVISION: 8

UN/NA NUMBER: UN 1719

PACKING GROUP: II

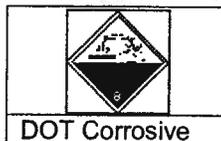
LABEL: Corrosive - 8

NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (POTASSIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: NO CHRONIC: NO

16. OTHER INFORMATION

DATE PREPARED: 7/14/2010

MSDS No: C358P

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER C

WEST C-552 Dispersant (Serf)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-552 Dispersant
PRODUCT DESCRIPTION: An aqueous dispersant, corrosion and scale inhibitor. This product is designed specifically for dispersion and corrosion control in water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER

Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Potassium Hydroxide	1310-58-3	2 mg/m ³ ceiling	2 mg/m ³ ceiling
Azole Salts	----	Not Established	

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Yellow liquid, bland odor.

IMMEDIATE CONCERNS: Substance may be harmful if swallowed. Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: Corrosive to the eyes and may cause severe damage including blindness.

SKIN: Substance may cause slight skin irritation.

SKIN ABSORPTION: Contact causes severe skin irritation and possible burns.

INGESTION: Harmful if swallowed. Results in severe burning and injury.

INHALATION: Harmful if inhaled. Mists may cause damage to the upper respiratory tract and even the lung tissue proper.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None Known.

ACUTE EFFECTS: Multiple small burns can result from exposure.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: Death may occur if penetration into vital areas occurs. Scarring may so constrict or destroy damaged tissue that extensive corrective surgery may be required.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

MATERIAL SAFETY DATA SHEET

WEST C-552 Dispersant

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.

SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

EXPLOSION HAZARDS: No unusual fire or explosion hazards

FIRE FIGHTING PROCEDURES: No special fire fighting procedures

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Clean up spills immediately, observing precautions in Protective Equipment section. Flush with a water spray. Pick up wash liquid with absorbent or vacuum and place in a disposable container.

LARGE SPILL: Large spills should be handled according to a predetermined plan.

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Do not flush to sewer.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Use with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

Always add water with constant stirring to avoid generation of excessive amounts of heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their PELs (TLVs) during the use of this product.

PERSONAL PROTECTION

EYES AND FACE: Wear safety glasses with side shields (or goggles) and a face shield.

SKIN: Nitrile rubber, PVC or Neoprene gloves are suitable protective materials.

RESPIRATORY: NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited.

PROTECTIVE CLOTHING: Where splashing is possible, full chemically resistant protective clothing, rubber apron and boots are required.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

MATERIAL SAFETY DATA SHEET
WEST C-552 Dispersant

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
ODOR: Bland odor.
COLOR: Amber or yellow
pH: 10.8
PERCENT VOLATILE: None
VAPOR DENSITY: Not determined
BOILING POINT: >212°F
EVAPORATION RATE: <1
SPECIFIC GRAVITY: 1.103
WATER SOLUBILITY: Soluble
EVAPORATION RATE: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

STABLE: YES
HAZARDOUS POLYMERIZATION: NO
CONDITIONS TO AVOID: Generation of heat by reaction with water or acids.
HAZARDOUS DECOMPOSITION: Carbon monoxide, carbon dioxide, ammonia, and oxides of nitrogen.
INCOMPATIBLE MATERIALS: Acids, oxidizing materials, halogen compounds, copper, zinc and galvanized metals.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with federal, state, and local regulations.

MATERIAL SAFETY DATA SHEET

WEST C-552 Dispersant

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: CAUSTIC ALKALI LIQUID, N.O.S.

PRIMARY HAZARD CLASS/DIVISION: 8

UN/NA NUMBER: UN 1719

PACKING GROUP: II

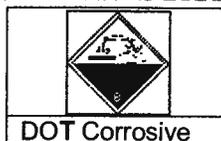
LABEL: Corrosive - 8

NAERG: 154

OTHER SHIPPING INFORMATION: CONTAINS (POTASSIUM HYDROXIDE, LIQUID)

15. REGULATORY INFORMATION

DOT LABEL SYMBOL AND STATEMENT OF HAZARD:



SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: NO PRESSURE GENERATING: NO REACTIVITY: NO ACUTE: NO CHRONIC: NO

16. OTHER INFORMATION

DATE PREPARED: 3/3/2010

MSDS No: C552

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.

The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2556900	2297255	Hach Company	OSHA	English	1
2556900	2314011	Hach Company	OSHA	English	1
2556900	2314111	Hach Company	OSHA	English	1

Total Enclosures: 3

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M01127

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Compound for Free and Total Chlorine Analyzers
Catalog Number: 2297255

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01127
Chemical Name: Confidential
CAS No.: Confidential
Chemical Formula: Confidential
Chemical Family: Confidential
Hazard: May cause irritation. May cause sensitization.
Date of MSDS Preparation:
Day: 16
Month: November
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 100.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White powder
Odor: None
MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2
Flammability: 1
Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: May cause irritation May cause allergic reaction

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine

Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.

Cancer / Reproductive Toxicity Information:

O.S.H.A. Listed: No

IARC Listed: No

NTP Listed: No

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Dusts at sufficient concentrations can form explosive mixtures with air. Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide. nitrogen oxides.

Fire / Explosion Hazards: May react violently with: strong oxidizers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable
304 EHS RQ (40 CFR 355): Not applicable
D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light moisture Keep away from: oxidizers

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Use with adequate ventilation. Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White powder

Physical State: Solid

Molecular Weight: Confidential

Odor: None

pH: 1.99 (5% sol'n)

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 180°C (356°F)

Specific Gravity (water = 1): 1.226

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Completely soluble

Acid: Not determined

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Excess moisture Exposure to light.

Reactivity/Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Toxic fumes of: nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat LD₅₀ = 970 mg/kg.

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: Reversible conjunctivitis was reported in animal studies.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: --
Not applicable

12. ECOLOGICAL INFORMATION

Product Ecological Information: Daphnia magna EC50 at 48 hrs: 10.8: NOEC 12.5 mg/L at 24 hrs, 3.1 mg/L at 48 hrs;
Ready Biodegradability To 60% in 21 days

Ingredient Ecological Information: --
Not applicable

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of Illinois. This product complies with Pennsylvania Trade Secret Regulations. New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

TSCA CAS Number: Confidential

16. OTHER INFORMATION

Intended Use: Laboratory Reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. In-house information. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Revision Summary: Updates in Section(s) 2, 11, 12,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00598

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Free Chlorine Indicator Solution for CL-17 Analyzer
Catalog Number: 2314011

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00598
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns.
Date of MSDS Preparation:
Day: 02
Month: November
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

p-Toluenesulfonic Acid

CAS No.: 104-15-4
TSCA CAS Number: 104-15-4
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2480 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes burns.

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 85.0 - 95.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

3. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance: Clear, colorless liquid
Odor: Irritating
CAUSES BURNS

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: Causes burns.

Skin Absorption: None reported

Target Organs: None reported

Ingestion: May cause: gastrointestinal irritation burns of the mouth and esophagus

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions

Chronic Effects: None reported

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: sulfur oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment. Absorb spilled liquid with non-reactive sorbent material.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up spilled material into a large beaker and dissolve with water. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Product is regulated as RCRA hazardous waste.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Protect from: freezing heat Keep away from: oxidizers Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have a safety shower nearby. Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: neoprene latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Protect from: freezing heat Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: Irritating

pH: 0.34

Vapor Pressure: Not available

Vapor Density (air = 1): Not available

Boiling Point: 99°C; 210°F

Melting Point: -3°C; 27°F

Specific Gravity (water = 1): 1.027

Evaporation Rate (water = 1): 0.80

Volatile Organic Compounds Content: Not available

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: 2.05 in/yr

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures
Reactivity / Incompatibility: Incompatible with: oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: p-Toluenesulfonic acid: Oral rat LD50 = 2480 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulfonic Acid Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1760

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulphonic Acid Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1760

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, N.O.S.

(Aryl sulphonic Acid Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1760

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. In-house information. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
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Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00599

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Free Chlorine Buffer for CL-17 Analyzer
Catalog Number: 2314111

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00599
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Toxic. May cause eye irritation.
Date of MSDS Preparation:
Day: 26
Month: September
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 65.0 - 75.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Lithium Bimaleate

CAS No.: 85796-96-9
TSCA CAS Number: 85796-96-9
Percent Range: 1.0 - 10.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

Lithium Maleate

CAS No.: 50977-65-6
TSCA CAS Number: 50977-65-6

Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, yellow liquid
Odor: Bland
HARMFUL IF SWALLOWED MAY CAUSE EYE IRRITATION

HMIS:

Health: 3
Flammability: 0
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2
Flammability: 0
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation
Skin Contact: No effects are anticipated
Skin Absorption: None reported
Target Organs: None reported
Ingestion: Toxic May cause: drowsiness weakness anorexia nausea central nervous system effects
coma death

Target Organs: Central nervous system

Inhalation: No data reported.

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Central nervous system diseases

Chronic Effects: Lithium compounds have been implicated in development of aplastic anemia. Signs of lithium poisoning include dehydration, extreme weight loss, fine tremor of hands, nausea, vomiting and diarrhea, Chronic overexposure may cause central nervous system effects

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Give large quantities of water. Call physician immediately.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment. Absorb spilled liquid with non-reactive sorbent material.

Clean-up Technique: Absorb spilled liquid with non-reactive sorbent material. Sweep up material. Place material in a plastic bag. Mark bag 'Non-hazardous trash', and dispose of as normal refuse. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: a gallon or more of liquid is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: None

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Wash thoroughly after handling.

Storage: Store between 10° and 25°C. Protect from: heat freezing

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes Wash thoroughly after handling. Protect from: heat freezing
TLV: Not established
PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, yellow liquid
Physical State: Liquid
Molecular Weight: Not applicable
Odor: Bland
pH: 7.06
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Boiling Point: 99°C; 210°F
Melting Point: -65°C; -85°F
Specific Gravity (water = 1): 1.21
Evaporation Rate (water = 1): 0.53
Volatile Organic Compounds Content: Not available
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Miscible
Acid: Miscible
Other: Not determined
Metal Corrosivity:
Steel: 0.00 in/yr
Aluminum: 0.00 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures
Reactivity / Incompatibility: None reported
Hazardous Decomposition: Heating to decomposition releases toxic fumes of carbon monoxide and carbon dioxide.
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: --
No toxicological data available for the ingredients of this product.

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None

Special Instructions (Disposal): Open cold water tap completely, slowly pour the material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33: Not applicable

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Gosselin, R. E. et al. Clinical Toxicology of Commercial Products, 5th Ed. Baltimore: The Williams and Wilkins Co., 1984. In-house information. Technical Judgment.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2557000	2263411	Hach Company	OSHA	English	1
2557000	2263511	Hach Company	OSHA	English	1
2557000	2297255	Hach Company	OSHA	English	1

Total Enclosures: 3

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00469

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Indicator
Catalog Number: 2263411

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00469
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes eye burns. Carcinogen.
Date of MSDS Preparation:
Day: 13
Month: March
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 90.0 - 100.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: None

CAUSES EYE BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:

Health: 4

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: No effects are anticipated

Skin Absorption: Not applicable

Target Organs: Not applicable

Ingestion: Causes: burns of the mouth and esophagus May cause: circulatory disturbances diarrhea nausea vomiting rapid pulse and respirations

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Respiratory conditions Eye conditions

Chronic Effects: Chronic overexposure may cause erosion of the teeth chronic irritation or inflammation of the lungs cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: May emit toxic and corrosive fumes.
Fire / Explosion Hazards: May react violently with: oxidizers reducers
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Dry chemical.
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant. Product is regulated as RCRA hazardous waste.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Do not breathe mist or vapors. Use with adequate ventilation. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: reducers alkalies Protect from: heat Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: lab coat disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin Do not breathe: mist/vapor Use with adequate ventilation. Wash thoroughly after handling. Protect from: heat Keep away from: oxidizers reducers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable
Odor: None
pH: < 0.5
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: 100°C (212°F)
Melting Point: Not determined
Specific Gravity (water = 1): 1.056
Evaporation Rate (water = 1): 0.811
Volatile Organic Compounds Content: None
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
 Water: Soluble
 Acid: Soluble
 Other: Not determined
Metal Corrosivity:
 Steel: 0.7725
 Aluminum: 0.290

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: reducers alkalies oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
 LD50: None reported
 LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Skin testing of a 10% sulfuric acid solution shows no irritation to skin.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Sulfuric acid: Oral rat LD₅₀ = 2140 mg/kg, Inhalation rat LC50 = 87 ppm/4H

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002
Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN3264

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN3264

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Total chlorine analyzer reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. In-house information. Technical Judgment. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans: World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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(970) 669-3050

MSDS No: M00470

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Buffer Solution

Catalog Number: 2263511

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00470

Chemical Name: Not applicable

CAS No.: Not applicable

Chemical Formula: Not applicable

Chemical Family: Not applicable

Hazard: Causes burns.

Date of MSDS Preparation:

Day: 08

Month: January

Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Potassium Iodide

CAS No.: 7681-11-0

TSCA CAS Number: 7681-11-0

Percent Range: 5.0 - 15.0

Percent Range Units: weight / volume

LD50: Oral Mouse LD50 = 1862 mg/kg

LC50: None reported

TLV: Not established

PEL: Not established

Hazard: Causes irritation.

Sodium Hydroxide

CAS No.: 1310-73-2

TSCA CAS Number: 1310-73-2

Percent Range: 1.0 - 5.0

Percent Range Units: weight / weight

LD50: Oral rat LDLo = 500 mg/kg.

LC50: None reported

TLV: 2 mg/m³ Ceiling/STEL

PEL: 2 mg/m³

Hazard: Causes severe burns. Toxic.

Demineralized Water

CAS No.: 7732-18-5

TSCA CAS Number: 7732-18-5
Percent Range: 50.0 - 60.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other components, each

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Sodium Citrate

CAS No.: 68-04-2
TSCA CAS Number: 68-04-2
Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 >8 g/Kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid
Odor: None

CAUSES BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: Causes burns.

Skin Absorption: None reported

Target Organs: None reported

Ingestion: Can cause: burns of the mouth and esophagus nausea vomiting abdominal pain

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions

Chronic Effects: Iodine overdose, 'iodism', may cause skin rash, runny nose, headaches, fever and bronchitis.

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Contains: an experimental teratogen. Maternal ingestion of potassium iodide during pregnancy may cause congenital goiter and hyperthyroidism in the newborn infant.

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not available

Hazardous Combustion Products: Toxic fumes of: iodine compounds carbon monoxide, carbon dioxide.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with a dry acid, such as citric or boric. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a weak acid solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: a gallon or more of liquid is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Keep away from: acids Protect from: heat

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Keep away from: acids/acid fumes Protect from: heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: 11.9

Vapor Pressure: Not available

Vapor Density (air = 1): Not available

Boiling Point: 106°C; 223°F

Melting Point: Not available

Specific Gravity (water = 1): 1.246

Evaporation Rate (water = 1): 0.605

Volatile Organic Compounds Content: Not available

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: 0.010 in/yr

Aluminum: 29.71 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Heat

Reactivity / Incompatibility: Incompatible with: acids oxidizers

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sodium oxides iodine compounds

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: Potassium Iodide oral human TDLo = 2700 mg/kg endocrine abnormalities in an offspring

Ingredient Toxicological Data: Sodium Hydroxide Oral rabbit LDLo = 500 mg/kg; Sodium Citrate Oral rat LD50 > 8 g/kg; Potassium Iodide Oral mouse LDLo = 1862 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: None

Special Instructions (Disposal): Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Sodium Hydroxide Solution

--

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1824

DOT Packing Group: II

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Sodium Hydroxide Solution

--

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1824

ICAO Packing Group: II

I.M.O.:

I.M.O. Proper Shipping Name: Sodium Hydroxide Solution

--

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1824

I.M.O. Packing Group: II

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Sodium Hydroxide 1000 lbs.

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium Hydroxide - RQ = 1000 lbs. (454 kgs.)

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Buffer

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment. In-house information. Gosselin, R. E. et al. Clinical Toxicology of Commercial Products, 5th Ed. Baltimore: The Williams and Wilkins Co., 1984.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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MSDS No: M01127

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Compound for Free and Total Chlorine Analyzers
Catalog Number: 2297255

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01127
Chemical Name: Confidential
CAS No.: Confidential
Chemical Formula: Confidential
Chemical Family: Confidential
Hazard: May cause irritation. May cause sensitization.
Date of MSDS Preparation:
Day: 16
Month: November
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 100.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White powder

Odor: None

MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2

Flammability: 1

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 2

Flammability: 1

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: May cause irritation May cause allergic reaction

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation

Target Organs: None reported

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine

Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.

Cancer / Reproductive Toxicity Information:

O.S.H.A. Listed: No

IARC Listed: No

NTP Listed: No

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Dusts at sufficient concentrations can form explosive mixtures with air. Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide. nitrogen oxides.

Fire / Explosion Hazards: May react violently with: strong oxidizers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light moisture Keep away from: oxidizers

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Use with adequate ventilation. Keep away from: oxidizers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White powder

Physical State: Solid

Molecular Weight: Confidential

Odor: None

pH: 1.99 (5% sol'n)

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 180°C (356°F)

Specific Gravity (water = 1): 1.226

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Completely soluble

Acid: Not determined

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Excess moisture Exposure to light.

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Toxic fumes of: nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat LD₅₀ = 970 mg/kg.

LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: Reversible conjunctivitis was reported in animal studies.
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: --
Not applicable

12. ECOLOGICAL INFORMATION

Product Ecological Information: Daphnia magna EC50 at 48 hrs: 10.8: NOEC 12.5 mg/L at 24 hrs, 3.1 mg/L at 48 hrs;
Ready Biodegradability To 60% in 21 days

Ingredient Ecological Information: --
Not applicable

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of Illinois. This product complies with Pennsylvania Trade Secret Regulations. New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: TSCA Listed: Yes

TSCA CAS Number: Confidential

16. OTHER INFORMATION

Intended Use: Laboratory Reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. In-house information. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992.

Revision Summary: Updates in Section(s) 2, 11, 12,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY ©2009

Houghton Chemical Corporation

52 Cambridge Street
P.O. Box 307
Allston (Boston), Massachusetts 02134

Tel: (617) 254-1010 Fax: (617) 254-2713

June 28, 2005

**LESLIE BAKER
WEST INCORPORATED**



HOUGHTON

We enclose material safety data sheets for the products listed below, a Shell publication on flammable solvents storage and handling, an article on liquid flow control, and a warning on the care and handling of empty drums which may contain residues of hazardous materials.

PUROBROM TABLETS(25 LB/PAIL)

The above products involve potential hazards. If you use, package or repackage them, you must affix a label to warn everyone of the contents and possible hazards, including what to do in case of spills, eye or skin contact, inhalation, ingestion, or fire, as well as empty drum handling and disposal.

You must provide clear warnings to instruct all personnel concerned not to store the product in unlabeled or unmarked containers. Also, if the item becomes all or part of a consumer product, the label should clearly provide instructions for use, with appropriate warnings, as well as comply with all applicable federal and state regulations.

Please read the Material Safety Data Sheet for each product carefully, paying particular attention to the health and hazard information as well as to the emergency and first aid procedures. Also, do not fail to provide instructions and precautions to your employees, agents, contractors, customers and any others whom you can reasonably foresee may be involved with this product. Review all data in your files, discarding outdated literature and replacing it with current information. If you are not directly responsible for the distribution of this warning and use information, please forward them to the appropriate person.

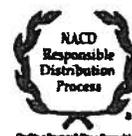
We may have supplemental information available on a range of health and safety subjects such as grounding equipment, regulatory requirements, hazardous materials training programs and other outside resources through consultants and chemical producers, and all this is available at no charge. We are eager to help you in whatever way possible towards your ongoing efforts to operate a safe and healthy environment for your employees, agents, contractors, customers and any others who may come in contact with your plant, services or products. We extend to you an open invitation for a tour of our plant facilities in the hopes that it might also provide you with operational insights and the opportunity to meet our staff.

We appreciate your business and look forward to a long and continuing relationship. Please call with any questions regarding this information.

Sincerely,
Bruce E. Houghton,
President

E:\Work\FORMS\MSDS Cover Letter #2 haz non flam.doc
Date Revised June 13, 2001
Distributors of Solvents and Chemicals
Manufacturers of Automotive Chemicals
Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



Houghton Chemical Corporation

52 Cambridge Street
P.O. Box 307
Allston (Boston), Massachusetts 02134

Tel: (617) 254-1010 Fax: (617) 254-2713



HOUGHTON

IMPORTANT EMPTY DRUM HAZARD WARNING

This is to alert you to a serious safety problem with emptied product drums. You may incur a legal liability as a result of any accident or injury from the misuse of such drums.

As you know, emptied chemical drums can be diverted into other uses such as trash barrels, barbeque grills, staging or flotation aids of one kind or another. This is a dangerous practice, because supposedly "empty" drums may contain residual liquid and or vaporized amounts of the original (or any other) product. Exposure of these empty drums to any source of spark or flame, especially welding torches or a static electric discharge, can cause fire, violent explosion, or the release of toxic vapors. The danger is very real and in the recent past there have been several "empty drum" accidents which have caused severe injuries. In addition, careless handling can expose individuals to hazardous residues unless all the precautions for the container's original contents are observed. Dispose of empty drums by sending to a professional drum reconditioner.

In recognition of this danger, we inform you and anyone who possesses full or "empty" drums to affix a special hazard warning on them next to or on the product label. A suggested text might be:

ATTENTION!

THIS CONTAINER IS DANGEROUS WHEN EMPTIED.

MAY STILL CONTAIN VAPORS OR LIQUIDS THAT ARE FLAMMABLE OR TOXIC OR BOTH.

KEEP CLOSED.

AVOID BREATHING OR TOUCHING CONTENTS.

KEEP ALL HEAT, SPARKS AND FLAMES AWAY.

DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

DO NOT REFILL UNTIL CLEANED AND DRIED BY A PROFESSIONAL DRUM RECONDITIONER.

Also, there is available a pre-printed empty drum warning label from "Labelmaster" in Chicago, Illinois. Their telephone number is 1-800-621-5808. Request information related to their empty drum label.

Although we cannot guarantee that such a warning will prevent accidents or release you from liability, we strongly recommend that, in addition to product labels which contain appropriate hazard warning and precautionary information, you begin using an empty drum warning statement on the containers you fill, distribute or use.

We also urge you, and it is your duty, to inform your customers, employees, especially plant personnel, warehousemen, and shippers of the dangers inherent in the handling and misuse of empty containers, and that such containers be reused only after cleaning and processing by an experienced drum reclaimer.

E:\Work\FORMS\Empty Drum Warning Letter.doc

Distributors of Solvents and Chemicals
Manufacturers of Automotive Chemicals
Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



HCC ID: 750413-G30-031216

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MATERIAL SAFETY DATA SHEET

MSDS

Purobrom Tablets

Date-Issued: 12/01/1997
MSDS Ref. No: BHCH22027
Date-Revised: 12/16/2003
Revision No: 8

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Purobrom Tablets
GENERAL USE: Industrial water treatment.
CHEMICAL FAMILY: Halogenated hydantoin

MANUFACTURER

Manufactured by BioLab, Inc
For Houghton Chemical Corporation
52 Cambridge Street
Allston, MA 02134
Customer SERVICE: (617) 254-1010

24 HR. EMERGENCY TELEPHONE NUMBERS

Poison Control Center (Medical): (877) 800 - 5553
CHEMTREC (US Transportation): (800) 424 - 9300

COMMENTS: EPA Registration Number: 5185-420-65199

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt.%</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	96

COMMENTS: (BCDMH)

3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

PHYSICAL APPEARANCE: White tablets with halogen odor.

IMMEDIATE CONCERNS: DANGER. Corrosive. Causes irreversible eye damage and skin burns. Harmful if swallowed. Irritating to nose and throat. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear protective clothing and rubber gloves when handling this product. Avoid breathing dust and fumes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

POTENTIAL HEALTH EFFECTS

EYES: Causes irreversible eye damage. Do not get in eyes.

SKIN: Causes severe skin burns. Do not get on skin.

INGESTION: Harmful if swallowed.

INHALATION: Irritating to nose and throat. Avoid breathing dust or fumes.

CHRONIC: There are no known chronic hazards.

MEDICAL CONDITIONS AGGRAVATED: Existing dermatitis may be aggravated by exposure.

ROUTES OF ENTRY: Skin Contact, Inhalation, Ingestion, Eye Contact.

4. FIRST AID MEASURES

EYES: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes,

Purobrom Tablets

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then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for treatment advice.

NOTES TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

GENERAL HAZARD: In large fires fueled by other materials, this product may smolder for prolonged periods emitting a dense black smoke. Any spilled material should be considered contaminated. Neutralize to a non-oxidizing material for safe disposal. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the material is damp, it should be neutralized to a non-oxidizing material for safe disposal.

EXTINGUISHING MEDIA: In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include, but are not limited to, carbon monoxide, carbon dioxide, hydrogen bromide, bromine, hydrogen chloride or chlorine.

EXPLOSION HAZARDS: A dust explosion severity determination was performed using the Hartmann Dust Explosibility Bomb designed at the U.S. Bureau of Mines. The product was determined not to be ignitable.

FIRE FIGHTING PROCEDURES: Fires fueled by other materials may release hydrogen bromide, bromine, hydrogen chloride or chlorine. Wear self-contained breathing apparatus. Ammonium phosphate (ABC) fire extinguishers should not be used.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal. Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Avoid contact with eyes, skin or clothing. Avoid breathing dust.

HANDLING: STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not reseal container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE: Keep this product dry in original tightly closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Moisture may decompose this product and cause a violent reaction leading to fire and explosion. In case of decomposition, isolate container if possible and flood area with large amounts of water to dissolve all material before discarding this container. Do not contaminate food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Purobrom Tablets

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

EXPOSURE LIMITS

	<u>OSHA PEL</u>		<u>ACGIH TLV</u>		<u>SUPPLIER OEL</u>	
	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>	<u>ppm</u>	<u>mg/m³</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	TWA	N/E ⁽¹⁾				N/E

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS: General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.

PERSONAL PROTECTIVE EQUIPMENT:

EYES AND FACE: Wear goggles or safety glasses with side shields when handling this product.

SKIN: Wear rubber gloves when handling this product. Avoid contact with skin.

RESPIRATORY: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

WORK HYGIENIC PRACTICES: Remove and wash contaminated clothing before reuse.

OTHER USE PRECAUTIONS: Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid

ODOR: Faint halogen odor.

APPEARANCE: Tablet

COLOR: White

pH: 4.5(0.1% solution in DI water)

VAPOR PRESSURE: Not Applicable

VAPOR DENSITY: Not Applicable

BOILING POINT: Not Determined

MELTING POINT: With Decomposition

THERMAL DECOMPOSITION: 145°C to 150°C

SOLUBILITY IN WATER: 0.15g/100g water

DENSITY: 60.1 lb/ft³

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: High temperature. Poor ventilation. Contamination. Moisture/high humidity.

STABILITY: This product is stable under normal conditions.

POLYMERIZATION: Hazardous polymerization will not occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen bromide, bromine, hydrogen chloride, chlorine.

INCOMPATIBLE MATERIALS: Avoid contact with water on concentrated material in the container. Avoid contact with easily oxidizable material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; cyanic acid containing compounds; calcium hypochlorite; alkalis. Avoid contact with all other chemicals.

11. TOXICOLOGICAL INFORMATION

ACUTE

EYES: Toxicological studies indicate this product to be corrosive to eyes.

Purobrom Tablets

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DERMAL LD₅₀: The dermal LD₅₀ is greater than 2.0 g/kg (rabbit). The primary skin irritation index is 6.1 and the product is considered corrosive to skin.

ORAL LD₅₀: 578 mg/kg (rat).

EYE EFFECTS: This product causes irreversible eye damage.

SKIN EFFECTS: This product causes skin burns.

CARCINOGENICITY:

This product is not listed as a carcinogen by IARC.

This product is not listed as a carcinogen by NTP.

This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER: Do not reuse container. Rinse thoroughly before discarding in trash.

14. TRANSPORT INFORMATION**DOT (DEPARTMENT OF TRANSPORTATION)**

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

CANADA TRANSPORT OF DANGEROUS GOODS

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

15. REGULATORY INFORMATION**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****311/312 HAZARD CATEGORIES:**

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** NO

313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: This product or its components are not listed.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Purobrom Tablets

TSCA REGULATORY: This product or its components are not subject to export notification.

TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE: Product is hazardous by definition of the Hazardous Communication Standard.

CLEAN WATER ACT: Not Listed.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT): This product is a registered pesticide.

SDWA (SAFE DRINKING WATER ACT): Not listed.

CLEAN AIR ACT

40 CFR PART 68—RISK MANAGEMENT FOR CHEMICAL ACCIDENT RELEASE PREVENTION: Not listed.

CANADA

WHMIS CLASS: C - Oxidizer; E - Corrosive

CANADIAN ENVIRONMENTAL PROTECTION ACT: Pesticide Control Product Registration Number: 16857

DOMESTIC SUBSTANCE LIST (INVENTORY): Listed

CALIFORNIA PROPOSITION 65: This product or its components are not listed on any Proposition 65 lists of carcinogens or reproductive toxicants.

COMMENTS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

PREPARED BY: Regulatory Information Specialist

REVISION SUMMARY Revision #: 8 This MSDS replaces the July 14, 2003 MSDS. Any changes in information are as follows: In Section 1 MSDS Number Prepared By [] Print CHEMTREC Phone Number Section 1 Footnotes 24 Hour Emergency Phone Numbers In Section 1 [] Print CHEMTREC Phone Number 24 Hour Emergency Phone Numbers In Section 3 Emergency Overview - Immediate Concerns Physical Appearance Chronic Effects Potential Health Effects - Eyes Potential Health Effects - Skin Potential Health Effects - Ingestion Comments Health In Section 4 Firstaid - Eyes Firstaid - Skin Firstaid - Ingestion Firstaid - Inhalation In Section 5 Combustion Products In Section 7 Storage General Procedures In Section 9 Appearance Density (lbs) Density In Section 11 Eye Effects Skin Effects

HMIS RATING

HEALTH:	3
FLAMMABILITY:	1
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	H

NFPA RATING

HEALTH:	3
FIRE:	1
REACTIVITY:	1

Key

- 4 = Severe
- 3 = Serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

NFPA STORAGE CLASSIFICATION: NFPA Oxidizer Class 2

COMMENTS: The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard, National Fire Protection Association (NFPA), Hazardous Materials Identification System (HMIS), and Canada's Workplace Hazardous Information System (WHMIS) and Environmental Protection Agency (EPA). **MANUFACTURER DISCLAIMER: IMPORTANT:** The information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This

Purobrom Tablets

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information is true and accurate to the best of our knowledge.

The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

<u>Product</u>	<u>MSDS</u>	<u>Distributor</u>	<u>Format</u>	<u>Language</u>	<u>Quantity</u>
2263411	N/A	Hach Company	OSHA	English	1
1406428	N/A	Hach Company	OSHA	English	1
1407028	N/A	Hach Company	OSHA	English	1
2756549	N/A	Hach Company	OSHA	English	1
2076053	N/A	Hach Company	OSHA	English	1
203832	N/A	Hach Company	OSHA	English	1

Total Enclosures: 6

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00469

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Total Chlorine Indicator
Catalog Number: 2263411

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00469
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes eye burns. Carcinogen.
Date of MSDS Preparation:
Day: 05
Month: August
Year: 2011

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 90.0 - 100.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 5.0 - 15.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid
Odor: None

CAUSES EYE BURNS MAY CAUSE RESPIRATORY TRACT IRRITATION

HMS:

Health: 4

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: No effects are anticipated

Skin Absorption: Not applicable

Target Organs: Not applicable

Ingestion: Causes: burns of the mouth and esophagus May cause: circulatory disturbances diarrhea nausea vomiting rapid pulse and respirations

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Respiratory conditions Eye conditions

Chronic Effects: Chronic overexposure may cause erosion of the teeth chronic irritation or inflammation of the lungs cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: May emit toxic and corrosive fumes.

Fire / Explosion Hazards: May react violently with: oxidizers reducers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Dry chemical.

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant in the U. S. . Product is regulated as RCRA hazardous waste in the U.S.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Do not breathe mist or vapors. Use with adequate ventilation. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: reducers alkalies Protect from: heat Store between 10° and 25°C.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: lab coat disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin Do not breathe: mist/vapor Use with adequate ventilation. Wash thoroughly after handling. Protect from: heat Keep away from: oxidizers reducers

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: < 0.5

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: 100°C (212°F)

Melting Point: Not determined

Specific Gravity/ Relative Density (water = 1; air =1): 1.056

Evaporation Rate (water = 1): 0.811

Volatile Organic Compounds Content: None

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 0.7725
Aluminum: 0.290

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: Incompatible with: reducers alkalies oxidizers
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: Skin testing of a 10% sulfuric acid solution shows no irritation to skin.

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: Sulfuric acid: Oral rat LD₅₀ = 2140 mg/kg, Inhalation rat LC50 = 87 ppm/4H

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN3264

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN3264

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<10% Sulphuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Total chlorine analyzer reagent

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. In-house information. Technical Judgment. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE.
HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA
OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

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(970) 669-3050

MSDS No: M00110

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Total Chlorine Reagent
Catalog Number: 1406428

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00110
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause sensitization. May cause irritation.
Date of MSDS Preparation:
Day: 15
Month: October
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Potassium Iodide

CAS No.: 7681-11-0
TSCA CAS Number: 7681-11-0
Percent Range: 20.0 - 30.0
Percent Range Units: weight / weight
LD50: Oral Mouse LD50 = 1862 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: Causes irritation.

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

Sodium Phosphate, Dibasic

CAS No.: 7558-79-4
TSCA CAS Number: 7558-79-4
Percent Range: 20.0 - 30.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 17 g/kg.
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: May cause irritation.

Other component

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: 0.1 - 1.0
Percent Range Units: weight / weight
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Carboxylate Salt

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 40.0 - 50.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White or light pink powder
Odor: None
MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation
Skin Contact: May cause irritation May cause allergic reaction
Skin Absorption: No effects anticipated
Target Organs: Not applicable
Ingestion: Causes: lethargy loss of strength loss of coordination difficult breathing diarrhea May cause iodism, which symptoms include skin rash, conjunctivitis, runny nose, sneezing, bronchitis, headache, fever and irritation of mucous membranes. DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: Liver

Inhalation: May cause: respiratory tract irritation Effects similar to those of ingestion.

Target Organs: Liver

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine Pre-existing: Eye conditions Skin conditions Respiratory conditions Persons with pre-existing respiratory conditions may be more susceptible to the effects of Potassium Iodide exposure.

Chronic Effects: Chronic overexposure may cause allergic skin reactions hypothyroidism liver damage DPD may cause allergic skin reactions in some people causing severe skin rashes and itching. Iodines overdose, 'iodism', may cause skin rash, runny nose, headaches, fever and bronchitis.

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Maternal ingestion of potassium iodide during pregnancy may cause congenital goiter and hyperthyroidism in the newborn infant.

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Call physician if irritation develops.

Ingestion (First Aid): Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, this product decomposes to form toxic gases.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide. iodine compounds phosphorus oxides potassium oxides sodium monoxide nitrogen oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Scoop up spilled material into a large beaker and dissolve with water. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light heat moisture

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Use general ventilation to minimize exposure to mist, vapor or dust.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Protect from: light heat moisture

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White or light pink powder

Physical State: Solid

Molecular Weight: Not applicable

Odor: None

pH: of 1% soln = 6.35 @ 20°C

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 145° C

Specific Gravity (water = 1): 1.79

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not determined

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 0.038 in/yr

Aluminum: 0.006 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Exposure to light. Excess moisture Extreme temperatures

Reactivity / Incompatibility: Incompatible with: oxidizers

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: carbon dioxide carbon monoxide iodine compounds phosphorus oxides potassium oxide nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat (female) LD₅₀ = 4700 mg/kg; Oral rat (male) LD₅₀ = 7000 mg/kg.

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: DPD Oral rat LD50 = 970 mg/kg; Potassium Iodide Oral mouse LDLo = 1862 mg/kg; Sodium Phosphate, Dibasic Oral rat LD50 = 17 g/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Sodium phosphate, dibasic 5000 lbs.

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium phosphate, dibasic - RQ 5000 lbs.

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): Not applicable

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Indicator for total chlorine

References: CCINFO MSDS/FTSS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. The Merck Index, 11th Ed. Rahway, New Jersey: Merck and Co., Inc., 1989. Outside Testing. Technical Judgment. In-house information. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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MSDS No: M00109

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Free Chlorine Reagent
Catalog Number: 1407028

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00109
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause sensitization. May cause irritation.
Date of MSDS Preparation:
Day: 15
Month: October
Year: 2009

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

Carboxylate Salt

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 55.0 - 65.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation. Toxic properties unknown.

Sodium Phosphate Dibasic, Heptahydrate

CAS No.: 7782-85-6
TSCA CAS Number: 7558-79-4
Percent Range: 30.0 - 40.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 12930 mg/kg.
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: May cause irritation.

Ethylenediaminetetraacetic Acid, Disodium Salt

CAS No.: 6381-92-6
TSCA CAS Number: 139-33-3
Percent Range: 1.0 - 10.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 2000 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White or light pink powder
Odor: None
MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2
Flammability: 1
Reactivity: 0
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 1
Flammability: 1
Reactivity: 0
Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation
Skin Contact: May cause irritation May cause allergic reaction
Skin Absorption: None reported
Target Organs: None reported
Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.
Target Organs: None reported
Inhalation: May cause: respiratory tract irritation Effects similar to those of ingestion.
Target Organs: None reported
Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine Pre-existing: Eye conditions Skin conditions Respiratory conditions
Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with soap and plenty of water. Call physician if irritation develops.

Ingestion (First Aid): Call physician immediately. Give 1-2 glasses of water under medical supervision. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide, phosphorus oxides, nitrogen oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Scoop up spilled material into a large beaker and dissolve with water. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes, skin, clothing. Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light, moisture, heat

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mist, vapor, or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves, lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes, skin, clothing. Do not breathe: dust. Wash thoroughly after handling. Protect from: light, moisture, heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White or light pink powder

Physical State: Solid
Molecular Weight: Not applicable
Odor: None
pH: of 1% soln. = 6.35 @ 25°C
Vapor Pressure: Not applicable
Vapor Density (air = 1): Not applicable
Boiling Point: Not applicable
Melting Point: 110 C decomp
Specific Gravity (water = 1): 1.76
Evaporation Rate (water = 1): Not applicable
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Soluble
Acid: Soluble
Other: Not determined
Metal Corrosivity:
Steel: Not determined
Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Exposure to light. Excess moisture Heating to decomposition.
Reactivity / Incompatibility: None reported
Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: carbon dioxide carbon monoxide phosphorus oxides nitrogen oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Salt of DPD Oral rat LD50 = 970 mg/kg; Sodium Phosphate Dibasic Oral Rat LD50 = 17 g/kg; EDTA Disodium Salt Oral Rat LD50 = 2000 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: --
No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable
Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.
Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.
NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): 5000 lbs. Sodium phosphate, dibasic

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium phosphate, dibasic - RQ 5000 lbs.

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Outside Testing. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
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Loveland, CO USA 80539
(970) 669-3050

MSDS No: M01702

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: pH Storage Solution
Catalog Number: 2756549

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M01702
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Practically non-toxic.
Date of MSDS Preparation:
Day: 01
Month: October
Year: 2010

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 85.0 - 95.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other components, each

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Potassium Chloride

CAS No.: 7447-40-7
TSCA CAS Number: 7447-40-7
Percent Range: 20.0 - 30.0
Percent Range Units: weight / volume
LD50: Oral rat LD₅₀ = 2600 mg/kg

LC50: None reported.
TLV: Not established.
PEL: Not established.
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: None

HMIS:

Health: 0

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 0

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause mild irritation

Skin Contact: No effects are anticipated

Skin Absorption: No effects anticipated

Target Organs: Not applicable

Ingestion: Very large doses may cause: anorexia blood pressure changes cardiac depression fever gastroenteritis

Target Organs: Cardiovascular system

Inhalation: No effects anticipated

Target Organs: Not applicable

Medical Conditions Aggravated: Pre-existing: Cardiovascular diseases Kidney conditions

Chronic Effects: None reported

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water.

Ingestion (First Aid): Give 1-2 glasses of water. If you feel unwell, contact a physician.

Inhalation: None required.

5. FIRE FIGHTING MEASURES

Flammable Properties: Material will not burn. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: This material will not burn.

Fire / Explosion Hazards: This product will not burn or explode.

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Dilute with a large excess of water. Flush the spilled material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Keep container tightly closed when not in use.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes Wash thoroughly after handling.

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: 6.4

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: ~ 100°C

Melting Point: Not determined

Specific Gravity/ Relative Density (water = 1; air =1): Not determined

Evaporation Rate (water = 1): Not determined

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Miscible

Acid: Miscible

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Heating to decomposition.

Reactivity / Incompatibility: Incompatible with: bromine trifluoride

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: chlorides potassium oxide

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: Potassium Chloride: eye irritation rabbit (Std. Draize): 500 mg/24 hrs = MILD.

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: Potassium Chloride: oral rat LD₅₀ = 2600 mg/kg.

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute material with excess water making a weaker than 5% solution. Open cold water tap completely, slowly pour the material to the drain. Flush system with plenty of water.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: NA

I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product does not meet the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--

302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): Not applicable

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Not applicable

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): --

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Electrode storage solution

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Technical Judgment.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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(970) 669-3050

MSDS No: M00297

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Molybdovanadate Reagent
Catalog Number: 2076053

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00297
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Harmful if inhaled. Carcinogen. Causes eye burns.
Date of MSDS Preparation:
Day: 20
Month: April
Year: 2010

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ammonium Molybdate

CAS No.: 12054-85-2
TSCA CAS Number: 12027-67-7
Percent Range: 1.0 - 5.0
Percent Range Units: weight / volume
LD50: None reported.
LC50: None reported.
TLV: 5 mg/m³ as Mo
PEL: 5 mg/m³ as Mo
Hazard: Toxic. May cause irritation.

Ammonium Metavanadate

CAS No.: 7803-55-6
TSCA CAS Number: 7803-55-6
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 160 mg/kg; Oral rat LD50 = 58,100 µg/kg
LC50: Inhalation rat LC50 = 7800 µg/m³/4H
TLV: 0.05 mg/m³ as V₂O₅
PEL: Ceiling 0.05 mg/m³ as V₂O₅
Hazard: Toxic. May cause irritation.

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 50.0 - 60.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established

PEL: Not established
Hazard: No effects anticipated.

Other component

CAS No.: Not applicable
TSCA CAS Number: Not applicable
Percent Range: < 1.0
Percent Range Units: weight / volume
LD50: Not applicable
LC50: Not applicable
TLV: Not established
PEL: Not established
Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 35.0 - 45.0
Percent Range Units: weight / volume
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, yellow liquid
Odor: None
CAUSES EYE BURNS HARMFUL IF INHALED CAUSES SKIN IRRITATION

HMIS:

Health: 3
Flammability: 0
Reactivity: 2
Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3
Flammability: 0
Reactivity: 2
Symbol: Water Reactive

Potential Health Effects:

Eye Contact: Causes severe burns
Skin Contact: Causes irritation
Skin Absorption: None reported
Target Organs: None reported
Ingestion: Causes: severe burns May cause: loss of coordination copper deficiency gout May effect enzyme activity. Molybdenum compounds may cause loss of coordination, enzyme activity effects, copper deficiency and gout.
Target Organs: None reported
Inhalation: Causes: severe burns May cause: difficult breathing mouth soreness teeth erosion
Target Organs: Lungs
Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions Gout
Chronic Effects: Molybdenum poisoning signs include loss of appetite, listlessness and reduced growth rate. Excessive exposure to molybdenum compounds may cause gout and anemia. Chronic overexposure may cause erosion of the teeth enzyme activity effects copper deficiency chronic irritation or inflammation of the lungs cancer
Cancer / Reproductive Toxicity Information:
This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen
Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.
This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: Contains: an experimental teratogen. an experimental mutagen.
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.
Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.
Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: During a fire, corrosive and toxic gases may be generated by thermal decomposition. Not Flammable, but reacts with most metals to form flammable hydrogen gas.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: Toxic fumes of: ammonia nitrogen oxides, sulfur oxides.
Fire / Explosion Hazards: May react violently with: reducers
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Dry chemical. Do NOT use water.
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:
Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.
Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.
Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.
Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.
Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant in the U. S. . Product is regulated as RCRA hazardous waste in the U.S.
304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.
D.O.T. Emergency Response Guide Number: 154

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light Store away from: oxidizers reducers metals
Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: chemical splash goggles

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: light

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, yellow liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: None

pH: < 0.5

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: 100°C (212°F)

Melting Point: Not determined

Specific Gravity (water = 1): 1.375

Evaporation Rate (water = 1): 0.06

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol/water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 11.273 in/yr

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Extreme temperatures Heating to decomposition.

Reactivity / Incompatibility: May react violently in contact with: oxidizers reducers Incompatible with: metals

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: ammonia nitrogen oxides sulfur oxides Contact with metals may release flammable hydrogen gas.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: This product is not corrosive to skin. Slight to well defined erythema. Absent to slight edema. (OECD Number 404, Acute Dermal Irritation/Corrosion)

Mutation Data: Ammonium Metavanadate: DNA damage - Human lymphocytes and ovary - 200 µmol/L; Mutation in somatic cells - hamster - lung - 5 µmol/L

Reproductive Effects Data: Intraperitoneal hamster TDLo = 2820 µg/kg - Musculoskeletal abnormalities; Intraperitoneal hamster TDLo = 11280 µg/kg - Post-implantation mortality
Ingredient Toxicological Data: Sulfuric Acid: Oral rat LD50 = 2140 mg/kg, Inhalation rat LC50 = 347 ppm/1 hr; Ammonium Metavanadate: Oral rat LD50 = 58 mg/kg, Ammonium Molybdate (anhydrous): Oral rat LD50 = 333 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: Sulfuric Acid: The 48-Hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN3264

DOT Packing Group: III

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN3264

ICAO Packing Group: III

I.M.O.:

I.M.O. Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, N.O.S.
(<45% Sulfuric Acid in Solution)

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN3264

I.M.O. Packing Group: III

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Reactive
Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Ammonium compounds; Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid Ammonium vanadate 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: The label for this product bears the signal word "POISON" because the concentration of Sulfuric Acid in the product is greater than/equal to 10%.

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): Not applicable

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Indicator for phosphate

References: 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. In-house information. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987.

Revision Summary: Updates in Section(s) 15,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY ©2010

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No: M00471

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sulfuric Acid Solution 19.2 N
Catalog Number: 203832

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00471
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns. Harmful if inhaled. Carcinogen.
Date of MSDS Preparation:
Day: 20
Month: April
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 40.0 - 50.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Sulfuric Acid

CAS No.: 7664-93-9
TSCA CAS Number: 7664-93-9
Percent Range: 50.0 - 60.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 2140 mg/kg.
LC50: Inhalation rat LC50 = 87 ppm/4 hr
TLV: 1 mg/m³ (TWA); 3 mg/m³ (STEL)
PEL: 1 mg/m³
Hazard: Causes severe burns. Harmful if inhaled. Recognized carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Clear, colorless liquid

Odor: Acidic

CAUSES SEVERE BURNS HARMFUL IF INHALED

HMIS:

Health: 3

Flammability: 0

Reactivity: 2

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 2

Symbol: Water Reactive

Potential Health Effects:

Eye Contact: Causes severe burns

Skin Contact: Causes severe burns

Skin Absorption: No effects anticipated

Target Organs: None reported

Ingestion: Causes: severe burns May cause: nausea vomiting ulceration of the digestive tract

Target Organs: None reported

Inhalation: Causes: severe burns May cause: teeth erosion mouth soreness difficult breathing

Target Organs: Lungs

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions

Chronic Effects: Chronic overexposure may cause chronic irritation or inflammation of the lungs erosion of the teeth cancer

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported

Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not applicable

Hazardous Combustion Products: May emit toxic and corrosive fumes.

Fire / Explosion Hazards: May react violently with: strong acids strong bases alkali metals metal nitrates oxidizers reducers

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Dry chemical. Do NOT use water.

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Dilute with a large excess of water. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Product is regulated as RCRA hazardous waste. Product is regulated as a hazardous water pollutant.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

D.O.T. Emergency Response Guide Number: 137

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

Storage: Store away from: alkalis oxidizers reducers metals Keep container tightly closed when not in use.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use a fume hood to avoid exposure to dust, mist or vapor. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: laboratory fume hood

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Physical State: Liquid
Molecular Weight: Not applicable
Odor: Acidic
pH: <0.5
Vapor Pressure: Not determined
Vapor Density (air = 1): Not determined
Boiling Point: Not determined
Melting Point: Not determined
Specific Gravity (water = 1): 1.535
Evaporation Rate (water = 1): Not determined
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not applicable
Solubility:
Water: Soluble
Acid: Soluble
Other: Not determined
Metal Corrosivity:
Steel: 0.70 in/yr
Aluminum: 0.50 in/yr

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.
Conditions to Avoid: Evaporation Extreme temperatures Heating to decomposition.
Reactivity / Incompatibility: May react violently in contact with: alkalies oxidizers reducers Incompatible with: metals
Hazardous Decomposition: Contact with metals may release flammable hydrogen gas. Heating to decomposition releases toxic and/or corrosive fumes of: sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: None reported
LC50: None reported
Dermal Toxicity Data: None reported
Skin and Eye Irritation Data: None reported
Mutation Data: None reported
Reproductive Effects Data: None reported
Ingredient Toxicological Data: Sulfuric Acid: Oral rat LD50 = 2140 mg/kg; Inhalation rat LC50 = 87 ppm/4h, Inhalation Guinea Pig LC50 = 18 mg/m³

12. ECOLOGICAL INFORMATION

Product Ecological Information: --
No ecological data available for this product.
Ingredient Ecological Information: Sulfuric Acid: The 48-hour TLm in flounder is 100-300 ppm.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002

Special Instructions (Disposal): Work in an approved fume hood. Dilute material with excess water making a weaker than 5% solution. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Sulphuric Acid

--

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1830

DOT Packing Group: II

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Sulphuric Acid

--

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1830

ICAO Packing Group: II

I.M.O.:

I.M.O. Proper Shipping Name: Sulphuric Acid

--

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1830

I.M.O. Packing Group: II

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard Reactive

S.A.R.A. Title III Section 313 (40 CFR 372): This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size.)

302 (EHS) TPQ (40 CFR 355): Sulfuric Acid 1000 lbs.

304 CERCLA RQ (40 CFR 302.4): Sulfuric Acid 1000 lbs.

304 EHS RQ (40 CFR 355): Sulfuric Acid - RQ 1000 lbs.

Clean Water Act (40 CFR 116.4): Sulfuric acid - RQ 1000 lbs.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: The label for this product bears the signal word "POISON" because the concentration of Sulfuric Acid in the product is greater than/equal to 10%.

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Standard solution

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Sax, N. Irving and Richard J. Lewis, Sr., revised by. Hawley's Condensed Chemical Dictionary, Eleventh Ed. New York: Van Nostrand Reinhold Co., 1987. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards. Cincinnati: Department of Health and Human Services, 1981. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. NIOSH Registry of Toxic Effects of Chemical Substances, 1985-86. Cincinnati: U.S. Department of Health and Human Services, April, 1987.

Revision Summary: Updates in Section(s) 14, 15,

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Houghton Chemical Corporation

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Tel: (617) 254-1010 Fax: (617) 254-2713

June 28, 2005

**LESLIE BAKER
WEST INCORPORATED**



HOUGHTON

We enclose material safety data sheets for the products listed below, a Shell publication on flammable solvents storage and handling, an article on liquid flow control, and a warning on the care and handling of empty drums which may contain residues of hazardous materials.

PUROBROM TABLETS(25 LB/PAIL)

The above products involve potential hazards. If you use, package or repackage them, you must affix a label to warn everyone of the contents and possible hazards, including what to do in case of spills, eye or skin contact, inhalation, ingestion, or fire, as well as empty drum handling and disposal.

You must provide clear warnings to instruct all personnel concerned not to store the product in unlabeled or unmarked containers. Also, if the item becomes all or part of a consumer product, the label should clearly provide instructions for use, with appropriate warnings, as well as comply with all applicable federal and state regulations.

Please read the Material Safety Data Sheet for each product carefully, paying particular attention to the health and hazard information as well as to the emergency and first aid procedures. Also, do not fail to provide instructions and precautions to your employees, agents, contractors, customers and any others whom you can reasonably foresee may be involved with this product. Review all data in your files, discarding outdated literature and replacing it with current information. If you are not directly responsible for the distribution of this warning and use information, please forward them to the appropriate person.

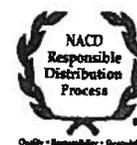
We may have supplemental information available on a range of health and safety subjects such as grounding equipment, regulatory requirements, hazardous materials training programs and other outside resources through consultants and chemical producers, and all this is available at no charge. We are eager to help you in whatever way possible towards your ongoing efforts to operate a safe and healthy environment for your employees, agents, contractors, customers and any others who may come in contact with your plant, services or products. We extend to you an open invitation for a tour of our plant facilities in the hopes that it might also provide you with operational insights and the opportunity to meet our staff.

We appreciate your business and look forward to a long and continuing relationship. Please call with any questions regarding this information.

Sincerely,
Bruce E. Houghton,
President

E:\Work\FORMS\MSDS Cover Letter #2 haz non flam.doc
Date Revised: June 13, 2001
Distributors of Solvents and Chemicals
Manufacturers of Automotive Chemicals
Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



Quality • Responsibility • Sustainability

Houghton Chemical Corporation

52 Cambridge Street
 P.O. Box 307
 Allston (Boston), Massachusetts 02134

Tel: (617) 254-1010 Fax: (617) 254-2713



HOUGHTON

IMPORTANT EMPTY DRUM HAZARD WARNING

This is to alert you to a serious safety problem with emptied product drums. You may incur a legal liability as a result of any accident or injury from the misuse of such drums.

As you know, emptied chemical drums can be diverted into other uses such as trash barrels, barbecue grills, staging or flotation aids of one kind or another. This is a dangerous practice, because supposedly "empty" drums may contain residual liquid and or vaporized amounts of the original (or any other) product. Exposure of these empty drums to any source of spark or flame, especially welding torches or a static electric discharge, can cause fire, violent explosion, or the release of toxic vapors. The danger is very real and in the recent past there have been several "empty drum" accidents which have caused severe injuries. In addition, careless handling can expose individuals to hazardous residues unless all the precautions for the container's original contents are observed. Dispose of empty drums by sending to a professional drum reconditioner.

In recognition of this danger, we inform you and anyone who possesses full or "empty" drums to affix a special hazard warning on them next to or on the product label. A suggested text might be:

ATTENTION!

THIS CONTAINER IS DANGEROUS WHEN EMPTIED.

MAY STILL CONTAIN VAPORS OR LIQUIDS THAT ARE FLAMMABLE OR TOXIC OR BOTH.

KEEP CLOSED.

AVOID BREATHING OR TOUCHING CONTENTS.

KEEP ALL HEAT, SPARKS AND FLAMES AWAY.

DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

DO NOT REFILL UNTIL CLEANED AND DRIED BY A PROFESSIONAL DRUM RECONDITIONER.

Also, there is available a pre-printed empty drum warning label from "Labelmaster" in Chicago, Illinois. Their telephone number is 1-800-621-5808. Request information related to their empty drum label.

Although we cannot guarantee that such a warning will prevent accidents or release you from liability, we strongly recommend that, in addition to product labels which contain appropriate hazard warning and precautionary information, you begin using an empty drum warning statement on the containers you fill, distribute or use.

We also urge you, and it is your duty, to inform your customers, employees, especially plant personnel, warehousemen, and shippers of the dangers inherent in the handling and misuse of empty containers, and that such containers be reused only after cleaning and processing by an experienced drum reclaimer.

E:\Work\FORMS\Empty Drum Warning Letter.doc

Distributors of Solvents and Chemicals
 Manufacturers of Automotive Chemicals
 Importers of Raw Materials

Founded in 1927 by Philip A. Houghton



HCC ID: 750413-G30-031216

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MATERIAL SAFETY DATA SHEET

MSDS

Purobrom Tablets

Date-Issued: 12/01/1997
 MSDS Ref. No: BHCH22027
 Date-Revised: 12/16/2003
 Revision No: 8

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Purobrom Tablets
GENERAL USE: Industrial water treatment.
CHEMICAL FAMILY: Halogenated hydantoin

MANUFACTURER

Manufactured by BioLab, Inc
 For Houghton Chemical Corporation
 52 Cambridge Street
 Allston, MA 02134
Customer SERVICE: (617) 254-1010

24 HR. EMERGENCY TELEPHONE NUMBERS

Poison Control Center (Medical): (877) 800-5553
CHEMTREC (US Transportation): (800) 424-9300

COMMENTS: EPA Registration Number: 5185-420-65199

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>Wt.%</u>
1-bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	96

COMMENTS: (BCDMH)

3. HAZARDS IDENTIFICATION**EMERGENCY OVERVIEW**

PHYSICAL APPEARANCE: White tablets with halogen odor.

IMMEDIATE CONCERNS: DANGER. Corrosive. Causes irreversible eye damage and skin burns. Harmful if swallowed. Irritating to nose and throat. Do not get in eyes, on skin or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear protective clothing and rubber gloves when handling this product. Avoid breathing dust and fumes. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash clothing before reuse.

POTENTIAL HEALTH EFFECTS

EYES: Causes irreversible eye damage. Do not get in eyes.

SKIN: Causes severe skin burns. Do not get on skin.

INGESTION: Harmful if swallowed.

INHALATION: Irritating to nose and throat. Avoid breathing dust or fumes.

CHRONIC: There are no known chronic hazards.

MEDICAL CONDITIONS AGGRAVATED: Existing dermatitis may be aggravated by exposure.

ROUTES OF ENTRY: Skin Contact, Inhalation, Ingestion, Eye Contact.

4. FIRST AID MEASURES

EYES: If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after 5 minutes,

Purobrom Tablets

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then continue rinsing eye. Call a poison control center or doctor for treatment advice.

SKIN: If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

INGESTION: If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call poison control center or doctor for treatment advice.

NOTES TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

GENERAL HAZARD: In large fires fueled by other materials, this product may smolder for prolonged periods emitting a dense black smoke. Any spilled material should be considered contaminated. Neutralize to a non-oxidizing material for safe disposal. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the material is damp, it should be neutralized to a non-oxidizing material for safe disposal.

EXTINGUISHING MEDIA: In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

HAZARDOUS COMBUSTION PRODUCTS: Combustion products may include, but are not limited to, carbon monoxide, carbon dioxide, hydrogen bromide, bromine, hydrogen chloride or chlorine.

EXPLOSION HAZARDS: A dust explosion severity determination was performed using the Hartmann Dust Explosibility Bomb designed at the U.S. Bureau of Mines. The product was determined not to be ignitable.

FIRE FIGHTING PROCEDURES: Fires fueled by other materials may release hydrogen bromide, bromine, hydrogen chloride or chlorine. Wear self-contained breathing apparatus. Ammonium phosphate (ABC) fire extinguishers should not be used.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES: STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal. Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Avoid contact with eyes, skin or clothing. Avoid breathing dust.

HANDLING: STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not reseal container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE: Keep this product dry in original tightly closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Moisture may decompose this product and cause a violent reaction leading to fire and explosion. In case of decomposition, isolate container if possible and flood area with large amounts of water to dissolve all material before discarding this container. Do not contaminate food or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Purobrom Tablets

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EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

	EXPOSURE LIMITS					
	OSHA PEL		ACGIH TLV		SUPPLIER OEL	
	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
1-bromo-3-chloro-5,5-dimethylhydantoin	TWA	N/E ^[1]			N/E	

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS: General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.**PERSONAL PROTECTIVE EQUIPMENT:****EYES AND FACE:** Wear goggles or safety glasses with side shields when handling this product.**SKIN:** Wear rubber gloves when handling this product. Avoid contact with skin.**RESPIRATORY:** A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.**WORK HYGIENIC PRACTICES:** Remove and wash contaminated clothing before reuse.**OTHER USE PRECAUTIONS:** Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.**9. PHYSICAL AND CHEMICAL PROPERTIES****PHYSICAL STATE:** Solid**ODOR:** Faint halogen odor.**APPEARANCE:** Tablet**COLOR:** White**pH:** 4.5(0.1% solution in DI water)**VAPOR PRESSURE:** Not Applicable**VAPOR DENSITY:** Not Applicable**BOILING POINT:** Not Determined**MELTING POINT:** With Decomposition**THERMAL DECOMPOSITION:** 145°C to 150°C**SOLUBILITY IN WATER:** 0.15g/100g water**DENSITY:** 60.1 lb/ft³**10. STABILITY AND REACTIVITY****CONDITIONS TO AVOID:** High temperature. Poor ventilation. Contamination. Moisture/high humidity.**STABILITY:** This product is stable under normal conditions.**POLYMERIZATION:** Hazardous polymerization will not occur under normal conditions.**HAZARDOUS DECOMPOSITION PRODUCTS:** Hydrogen bromide, bromine, hydrogen chloride, chlorine.**INCOMPATIBLE MATERIALS:** Avoid contact with water on concentrated material in the container. Avoid contact with easily oxidizable material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; cyanuric acid containing compounds; calcium hypochlorite; alkalis. Avoid contact with all other chemicals.**11. TOXICOLOGICAL INFORMATION****ACUTE****EYES:** Toxicological studies indicate this product to be corrosive to eyes.

Purobrom Tablets

Page 4 of 6

DERMAL LD₅₀: The dermal LD₅₀ is greater than 2.0 g/kg (rabbit). The primary skin irritation index is 6.1 and the product is considered corrosive to skin.

ORAL LD₅₀: 578 mg/kg (rat).

EYE EFFECTS: This product causes irreversible eye damage.

SKIN EFFECTS: This product causes skin burns.

CARCINOGENICITY:

This product is not listed as a carcinogen by IARC.

This product is not listed as a carcinogen by NTP.

This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER: Do not reuse container. Rinse thoroughly before discarding in trash.

14. TRANSPORT INFORMATION**DOT (DEPARTMENT OF TRANSPORTATION)**

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

CANADA TRANSPORT OF DANGEROUS GOODS

PROPER SHIPPING NAME: Oxidizing Solid, N.O.S. (Bromo-chloro-dimethylhydantoin)

PRIMARY HAZARD CLASS/DIVISION: 5.1

UN/NA NUMBER: 1479

PACKING GROUP: II

15. REGULATORY INFORMATION**UNITED STATES****SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)****311/312 HAZARD CATEGORIES:**

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** NO

313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: This product or its components are not listed.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Purobrom Tablets

TSCA REGULATORY: This product or its components are not subject to export notification.

TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE: Product is hazardous by definition of the Hazardous Communication Standard.

CLEAN WATER ACT: Not Listed.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT): This product is a registered pesticide.

SDWA (SAFE DRINKING WATER ACT): Not listed.

CLEAN AIR ACT

40 CFR PART 68—RISK MANAGEMENT FOR CHEMICAL ACCIDENT RELEASE PREVENTION: Not listed.

CANADA

WHMIS CLASS: C - Oxidizer; E - Corrosive

CANADIAN ENVIRONMENTAL PROTECTION ACT: Pesticide Control Product Registration Number: 16857

DOMESTIC SUBSTANCE LIST (INVENTORY): Listed

CALIFORNIA PROPOSITION 65: This product or its components are not listed on any Proposition 65 lists of carcinogens or reproductive toxicants.

COMMENTS: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

PREPARED BY: Regulatory Information Specialist

REVISION SUMMARY Revision #: 8 This MSDS replaces the July 14, 2003 MSDS. Any changes in information are as follows: In Section 1 MSDS Number Prepared By [] Print CHEMTREC Phone Number Section 1 Footnotes 24 Hour Emergency Phone Numbers In Section 1 [] Print CHEMTREC Phone Number 24 Hour Emergency Phone Numbers In Section 3 Emergency Overview - Immediate Concerns Physical Appearance Chronic Effects Potential Health Effects - Eyes Potential Health Effects - Skin Potential Health Effects - Ingestion Comments Health In Section 4 Firstaid - Eyes Firstaid - Skin Firstaid - Ingestion Firstaid - Inhalation In Section 5 Combustion Products In Section 7 Storage General Procedures In Section 9 Appearance Density (lbs) Density In Section 11 Eye Effects Skin Effects

HMIS RATING

HEALTH:	3
FLAMMABILITY:	1
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	D

NFPA RATING

HEALTH:	3
FIRE:	1
REACTIVITY:	1

Key

- 4 = Severe
- 3 = Serious
- 2 = Moderate
- 1 = Slight
- 0 = Minimal

NFPA STORAGE CLASSIFICATION: NFPA Oxidizer Class 2

COMMENTS: The contents and format of this MSDS are in accordance with OSHA Hazard Communication Standard, National Fire Protection Association (NFPA), Hazardous Materials Identification System (HMIS), and Canada's Workplace Hazardous Information System (WHMIS) and Environmental Protection Agency (EPA). **MANUFACTURER DISCLAIMER: IMPORTANT:** The information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This

Purobrom Tablets

Page 6 of 6

information is true and accurate to the best of our knowledge.



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 1
OTHER C

WEST R-603 Bisulfite (Well Water)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST R-603 Bisulfite
PRODUCT DESCRIPTION: An aqueous solution of sodium metabisulfite. This product is designed specifically for halogen removal in water systems.

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium Metabisulfite	7681-57-4		5 mg/m ³

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING! Harmful if swallowed or inhaled. Causes irritation to skin eyes and respiratory tract. May cause allergic respiratory reaction.

PHYSICAL APPEARANCE: Clear, pink liquid, sulfur dioxide odor.

POTENTIAL HEALTH EFFECTS

Inhalation:

Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May cause allergic reaction in sensitive individuals.

Ingestion:

May cause gastric irritation by the liberation of sulfurous acid. An asthmatic reaction may occur after ingestion. Large doses may result in nausea, vomiting, diarrhea, abdominal pains, circulatory disturbance, and central nervous system depression. Estimated fatal dose is 10 gm.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain.

Eye Contact:

Causes irritation, redness, and pain. Contact may cause irreversible eye damage. Symptoms may include stinging, tearing, redness, swelling, corneal damage and blindness.

Chronic Exposure:

No information found.

MATERIAL SAFETY DATA SHEET

WEST R-603 Bisulfite

4. FIRST AID MEASURES

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. FIRE FIGHTING MEASURES

Fire:

Not considered to be a fire hazard.

Explosion:

Not considered to be an explosion hazard.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Cautiously spray residue with plenty of water, providing ventilation to clear sulfur dioxide fumes generated from water contact.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from incompatibilities. Releases toxic sulfur dioxide gas. Keep away from oxidizing agents. Use only with appropriate protective equipment. Do not use in unventilated areas such as confined spaces. Containers of this material may be hazardous when empty since they retain product residues; observe all warnings and precautions listed for the product.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

MATERIAL SAFETY DATA SHEET
WEST R-603 Bisulfite

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Airborne Exposure Limits: (Sodium Metabisulfite)

ACGIH Threshold Limit Value (TLV): 5mg/m³ (TWA), A4 Not classifiable as a human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with an acid gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. (neoprene, polyvinyl chloride).

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

WORK HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOR:	Sulfur dioxide odor.
COLOR:	Clear, colorless to pale yellow
pH:	~ 4.3
PERCENT VOLATILE:	Not determined
VAPOR DENSITY:	Not determined
BOILING POINT:	212°F
SPECIFIC GRAVITY:	1.327
WATER SOLUBILITY:	Complete
EVAPORATION RATE (butyl acetate = 1):	<1

10. STABILITY AND REACTIVITY

Stability:

Strength diminishes somewhat with age. Gradually decomposes in air to sulfate, generating sulfurous acid gas. Contact with acids will release toxic sulfur dioxide gas.

Hazardous Decomposition Products:

Oxides of sulfur and sodium may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Acids, alkalis, sodium nitrite, oxidizers, aluminum powder.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

MATERIAL SAFETY DATA SHEET

WEST R-603 Bisulfite

11. TOXICOLOGICAL INFORMATION

Sodium Metabisulfite has been investigated as a tumorigen, mutagen, reproductive effector.

CARCINOGENICITY COMMENTS:

Ingredient	NTP Carcinogen		IARC Category
	Known	Anticipated	
Sodium Metabisulfite (7681-57-4)	No	No	3

12. ECOLOGICAL INFORMATION

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: BISULFITES, AQUEOUS SOLUTION, N.O.S.

UN/NA NUMBER: UN 2693

PACKING GROUP: II

LABEL: Corrosive - 8

NAERG: 154

15. REGULATORY INFORMATION

Federal, State & International Regulations							
Ingredient	SARA 302		SARA 313		CERCLA	RCRA 261.33	TSCA 8(d)
	RQ	TPQ	List	Chemical Catg.			
Sodium Metabisulfite (7681-57-4)	No	No	No	No	No	No	Yes

SARA 311/312:

Sodium Metabisulfite (7681-57-4):

Acute: Yes **Chronic:** No **Fire:** No **Pressure:** No **Reactivity:** Yes

MATERIAL SAFETY DATA SHEET

WEST R-603 Bisulfite

16. OTHER INFORMATION

DATE PREPARED: 7/14/2010

MSDS No: R603

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.

West Inc. (Water and Energy Systems Technology)

Brent Chettle, chettle@sginet.com; 213-247-6191,
Matthew "Matt" Copthorne, mcoptorne@yahoo.com; 702-449-9698
Steve MacCarthy, carthac@earthlink.net; 213-500-0168

West Chemicals:

C-358P Inhibitor: Potassium Hydroxide and Azole Salts; an aqueous corrosion and scale inhibitor; for use with well water.

HMIS RATING

Health: 2

Flammability: 0

Reactivity: 0

C-552 Dispersant: Potassium Hydroxide and Azole Salts; an aqueous dispersant, corrosion and scale control and inhibitor; for use with SERF water.

HMIS RATING

Health: 2

Flammability: 0

Reactivity: 0

R-603 Bisulfite: An aqueous solution of sodium metabisulfite specifically for halogen removal in water. (For well water, currently not being used) Strong sulfur odor and irritant

HMIS RATING

Health: 2

Flammability: 1

Reactivity: 1

R-630: Sulfite; an aqueous solution of sodium metabisulfite designed for oxygen removal in water systems.

HMIS RATING

Health: 1

Flammability: 0

Reactivity: 0

Purobbrom Tablets: biocide; Halogenated hydrantoin; chlorine

HMIS RATING

Health: 3

Flammability: 1

Physical Hazard: 1

Personal Protection: B

NFPA RATING

Health: 3

Fire: 1

Reactivity: 1

C-825, Sodium Bisulfate, pH control; currently not being used; pH 1.147 @ 68°F

HMIS RATING

Health: 2

Flammability: 0

Reactivity: 0

(Purobbrom film for pH)
2011



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 2
FLAMMABILITY 0
REACTIVITY 0
OTHER B

WEST C-825

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST C-825

MANUFACTURER:
Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Sodium bisulfate	7681-38-1	Not Determined	Not Determined

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION: May cause severe irritation to eyes. May be irritating to respiratory tract.

PHYSICAL APPEARANCE: Clear colorless liquid, odorless

POTENTIAL HEALTH EFFECTS

Signs and Symptoms of Acute Overexposure: Contact with mist, or vapor may cause skin irritation. Contact with eyes will cause immediate pain. May be corrosive to corneal tissue. May cause irritation to nose and throat. May be corrosive to esophageal linings and mucous membranes if ingested.

Signs and Symptoms of Chronic overexposure: Repeated exposure may cause chronic bronchitis or respiratory inflammation. Repeated or extended skin contact may be corrosive. Repeated eye contact may cause conjunctivitis and photosensitization

Medical Conditions Generally Aggravated by Exposure: No Data Available

4. FIRST AID MEASURES

Inhalation: Remove victim to fresh air. Get prompt medical attention

Ingestion: Do not induce vomiting. Give victim large amounts of milk or water to drink. Get victim to hospital promptly.

Skin Contact: Remove contaminated clothing and footwear. Wash skin for 15 minutes with soap and water. Wash clothing before reuse. If irritation persists, get medical attention.

Eye Contact: Immediately flush eyes with water for 15 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye and eyelid tissue. Do not allow victim to rub or keep eyes closed. Get immediate medical attention.

Note to Physician: Treat symptomatically. No specific antidote.

MATERIAL SAFETY DATA SHEET
WEST C-825

5. FIRE FIGHTING MEASURES

FIRE

Flash point: Not Applicable
Autoignition temperature: Not Applicable
Flammable limits in air % by volume:
lcl: ND; ucl: ND

UNUSUAL FIRE OR EXPLOSION HAZARDS

Not Combustible.

FIRE EXTINGUISHING MEDIA

Not combustible. Use extinguishing method suitable for surrounding fire.

SPECIAL FIRE FIGHTING PRECEDURES:

None.

HAZARDOUS DECOMPOSITION MATERIALS (Under Fire Conditions):

Sulfur dioxide and/or sulfur trioxide may be released in fire, if water is allowed to evaporate. Wear SCBA if in fire situation.

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:

Ventilate closed spaces before entering. Wear appropriate protective gear for situation. See Personal Protection information in Section 8.

Containment of Spill:

Follow procedure described below under Cleanup and Disposal of Spill

Cleanup and Disposal of Spill:

Scrape up and place in appropriate closed container (see Section 7: Handling and Storage). Collect washings for disposal. Decontaminate tools and equipment following cleanup. Clean up residual material by washing area with water. Avoid creation of dusty conditions.

Environmental and Regulatory Reporting:

Do not flush to drain. If spilled on the ground, the affected area should be scraped clean placed in an appropriate container for disposal. Prevent material from entering public sewer system or any waterways. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact with the WEST Inc. using the Customer Service phone number in Section 1.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:

Protect against physical damage. Normal precautions common to safe manufacturing practice should be followed in handling and storage. Do not get in eyes. Do not breathe dusts. Avoid direct or prolonged contact with skin. Containers of this material may be hazardous when empty since they retain product residues; observe all warnings and precautions listed for the product.
Store in an area that is cool, dry, well-ventilated

FOR INDUSTRY USE ONLY.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Introductory Remarks:

These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

MATERIAL SAFETY DATA SHEET

WEST C-825

OSHA Final PELs: NDA
OSHA Vacated PELs: NDA

Engineering Controls:

Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures.

Respiratory Protection:

When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the latest OSHA standard (29 CFR 1910.134) and/or ANSI Z88.2 recommendations. Under normal conditions, in the absence of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by OSHA/ANSI: Air-purifying (half-mask / full-face) respirator with cartridges / canister approved for use against dusts, mists and fumes.

Eye/Face Protection:

Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. It is generally regarded as good practice to wear a minimum of safety glasses with side shields when working in industrial environments.

Skin Protection:

Skin contact should be minimized through use of gloves and suitable long-sleeved clothing (i.e., shirts and pants). Consideration must be given both to durability as well as permeation resistance.

Work Practice Controls:

Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- 1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- 3) Wash exposed skin promptly to remove accidental splashes of contact with this material.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear Colorless Liquid
Odor:	Odorless
Solubility:	Water-soluble
Specific Gravity:	1.147 at 20°C (68 F)
pH:	1.0-2.0
Boiling Point:	~ 212 °F
Melting Point:	Not Applicable
Vapor Density (Air=1):	Not Applicable
Vapor Pressure (kPa):	Not Applicable

10. STABILITY AND REACTIVITY

Stability: Product is stable under normal conditions of storage and handling.

Hazardous Decomposition Products: Sulphur dioxide and sulphur trioxide gases.

Hazardous Polymerization: will not occur.

Incompatibility: Strong oxidizers, nitric acid, chlorine. Solution is acidic and reacts with bases.

Conditions to Avoid: Incompatible substances.

MATERIAL SAFETY DATA SHEET
WEST C-825

11. TOXICOLOGICAL INFORMATION

Toxicological Data:

Considered GRAS by FDA. Carcinogenicity: Sodium bisulfate and water are not listed by ACGIH, IARC, NIOSH, NTR, or OSHA

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

No data found for product.

Chemical Fate Information:

No data found for product.

13. DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. State and local disposal regulations may differ from federal disposal regulations. Empty containers may contain residues. Thoroughly clean empty container, then offer for recycling, reuse or disposal in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

DOT Proper Shipping Name: CORROSIVE LIQUID, N.O.S., 8, UN1760, PG III

CONTAINS (INORGANIC ACID SOLUTION)

DOT Hazard Class: 8 (Corrosive)

UN Number: 1760

15. REGULATORY INFORMATION

TSCA: All chemical ingredients are listed on TSCA inventory, with no special reporting regulations

CERCLA Reportable Quantity: Not subject to CERCLA reporting

SARA TITLE III:

.....Section 302/304 Extremely Hazardous Substances: None

.....Section 311 Hazard Categorization: Acute Health

.....Section 313 Toxic Chemicals: NDA

Not subject to Proposition 65 labeling requirements (California)

CAA: Ingredients not listed as hazardous pollutants under CAA

OSHA: None of the ingredients are considered Extremely Hazardous by OSHA.

16. OTHER INFORMATION

DATE PREPARED: 2/23/2011

MSDS No: C-825

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.



MATERIAL SAFETY
DATA SHEET

WEST R-630 SULFITE
(DeChlorinator)

HMIS RATING

HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0
OTHER: C

1. PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME: **WEST R-630 SULFITE**
PRODUCT DESCRIPTION: An aqueous solution of sodium & potassium sulfites, bisulfites, and metabisulfites. This product is designed specifically for halogen removal in process water systems.

MANUFACTURER: 24 HR EMERGENCY TELEPHONE NUMBER
Water & Energy Systems Technology, Inc
13109 Arctic Circle Chem-Tel (U.S.): (800) 255-3924
Santa Fe Springs, CA 90670
Customer Service: (562) 921-5191

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV

This product does not contain any hazardous materials under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, nearly colorless liquid with very little odor.
IMMEDIATE CONCERNS: Poses little or no immediate hazard.

POTENTIAL HEALTH EFFECTS

EYES: May cause irritation or redness on contact with eye.
SKIN: Substance may cause slight skin irritation.
SKIN ABSORPTION: None.
INGESTION: Small amounts swallowed during normal handling operations are not likely to cause injury; swallowing larger amounts may cause serious injury.
INHALATION: Poses little or no immediate hazard. Vapor and mists may cause allergic reactions in persons sensitive to sulfite compounds.
ACUTE EFFECTS: May cause local irritation from exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Person with pre-existing skin disorders, eye problems, or impaired respiratory function may be more susceptible to the effects of this substance.

SUBCHRONIC/CHRONIC TOXICITY

CHRONIC: No specific information is available.
CARCINOGENICITY: This product's ingredients are not found in the Federal, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

4. FIRST AID MEASURES

EYES: Flush eye with water for 15 minutes. Get medical attention.
SKIN: Immediately remove clothing under safety shower. Flush skin with large amounts of soap and water. Wash clothing separately before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not applicable.
AUTO IGNITION & TEMPERATURE: Not applicable.
UNUSUAL FIRE & EXPLOSION HAZARDS: Sulfur dioxide gas may result from incineration.
FIRE FIGHTING PROCEDURES: Full protective clothing, plus self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Small spills should be flushed with a water spray.
LARGE SPILL: Contain by diking with soil or other absorbent material.
ENVIRONMENTAL PRECAUTIONS: Keep out of sewers, drains, and surface waters.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Follow all MSDS and Label precautions even after container is emptied as container may retain product residues.

Contents may develop pressure upon prolonged storage. Loosen closure cautiously before opening.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Normal area ventilation should be adequate.

PERSONAL PROTECTION

EYES AND FACE: Wear chemical goggles or safety glasses with side shields.
SKIN: Nitrile rubber, PVC, or Neoprene apron and gloves.
RESPIRATORY: None required under normal conditions.
PROTECTIVE CLOTHING: Where splashing is possible, chemical resistant clothing, rubber apron, and boots should be worn.
HYGIENIC PRACTICES: Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.
ODOR: Mild sulfur.
COLOR: Colorless.
pH: ~ 6.5 units.
PERCENT VOLATILE: Not determined.
VAPOR DENSITY: Not determined.
BOILING POINT: 212 °F
SPECIFIC GRAVITY: 1.251
WATER SOLUBILITY: Complete
EVAPORATION RATE: < 1 (butyl acetate = 1.00)

10. STABILITY AND REACTIVITY

STABLE: Yes
HAZARDOUS POLYMERIZATION: No
CONDITIONS TO AVOID: High ambient temperatures in storage areas.
HAZARDOUS DECOMPOSITION: Decomposes at high temperatures to form sulfur dioxide gas.
INCOMPATIBLE MATERIALS: Strong oxidizers, acids, alkali's, amines, halogens, halogen compounds, anhydrides, and aldehydes.

11. TOXICOLOGICAL INFORMATION

CARCINOGENICITY COMMENTS: This product's ingredients are not found in the Federal OSHA, Cal OSHA, NTP, or IARC lists of suspected cancer causing agents.

Note: California employers using Cal OSHA regulated carcinogens must register with Cal OSHA.

12. ECOLOGICAL INFORMATION

No data is available at this time regarding the environmental impacts of this product.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose of all wastes in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: D.O.T. NONREGULATED WATER TREATMENT COMPOUND

15. REGULATORY INFORMATION

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

FIRE: No PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: No

16. OTHER INFORMATION

DATE PREPARED: 12/31/2010
MSDS NUMBER: R630

MANUFACTURER DISCLAIMER:

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of, or reliance upon such information. No representations, or warranties, either express or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set forth herein or to the product to which the information refers.

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
05A055	TA-16-1508	05A, High Explosives Wastewater Treatment Facility	Tributary to Canon de Valle

SOURCE OF DISCHARGE

Outfall 05A055 is located at TA-16 and can potentially discharge treated wastewater from the High Explosive Wastewater Treatment Facility (HEWTF) at TA-16-1508 to a tributary of Cañon de Valle. The specific sources are identified in Table 1.

**Table 1
 Sources for Discharges to Outfall 05A055**

TA	Bldg	Description
16	1508	High Explosives Wastewater Treatment Facility (HEWTF)

WATER TREATMENT PROCESS

The HEWTF treats high explosive (HE) contaminated waste water, storm water, and cooling tower blow down that is collected in a pumper truck from various sumps, tanks, and facilities at TA-9, 11, and 16. All waste water treated at the HEWTF must comply with the facility WAC, have a completed/approved WPF, and is tracked in a water treatment log book (Appendix N). The waste water treated at the HEWTF is collected by pumper truck and discharged to one of two sand filters located at the burn ground. The sand filters are used to filter large particles of HE prior to treatment at the HEWTF. The filtered water is collected in a belowground storage tank and then pumped up to an equalization tank at the HEWTF where it is circulated through Granular Activated Carbon (GAC) filters and Ion Exchange (IX). The GAC and IX remove residual HE, perchlorate, and other contaminants. The system is designed to circulate the water multiple times. The treated water is stored in post treatment tanks prior to being pumped to an electric evaporator or to the outfall. Normal operations since November 2007 have utilized the electric evaporator and eliminated the discharge to Outfall 05A055. The applicant intends to continue to operate the HEWTF using the evaporator except under abnormal operating conditions (i.e., malfunction of the evaporator). The water treatment codes provided in Table 2 have been assigned to this outfall.

**Table 2
 Water Treatment Codes Assigned to Outfall 05A055**

Treatment Code	Treatment Process	Description
1V	Slow Sand Filtration	Sand filters are used to remove larger particulates of HE from the wastewater prior to treatment.
2A	Carbon Adsorption	Carbon adsorption to remove HE
2J	Ion Exchange	Carbon adsorption to remove anions and cations
1F	Evaporation	Zero liquid discharge by evaporation

Figure 1 provides a process schematic.

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

There are no chemicals used at the HEWTF. The filter media is identified in Table 3.

Table 3
Treatment Chemicals Used at the HEWTF

Chemical Name	Reason for Use/Frequency	Hazardous Substances from Form 2C, Table 2C-4
IONAC SR-7	Ion Exchange Resin to remove perchlorate, barium, and other anions/cations	None
Granular Activated Carbon (GAC)	Filter	None

POTENTIAL POLLUTANTS

The treated HEWTF effluent constitutes the pollutant load of the discharge to Outfall 05A055. Table 4 identifies the Table 2C-4 constituents by discharge source.

Table 4
Potential Pollutants Discharged to Outfall 05A055

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C
HEWTF Effluent	Dinitrotoluene

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the sources that discharge to Outfall 05A055 are provided in Table 5.

Table 5
Source Flow Rates/Frequencies to Outfall 05A055

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
HEWTF	No Discharge Outfall (Potential Capacity is 1,250 GPD)	1V, 2A, 2J, 1F

SAMPLING AND ANALYSIS FOR RE-APPLICATION

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the Effluent Evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or increase in treatment capacity caused by changes in LANL scope/mission.

A grab sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

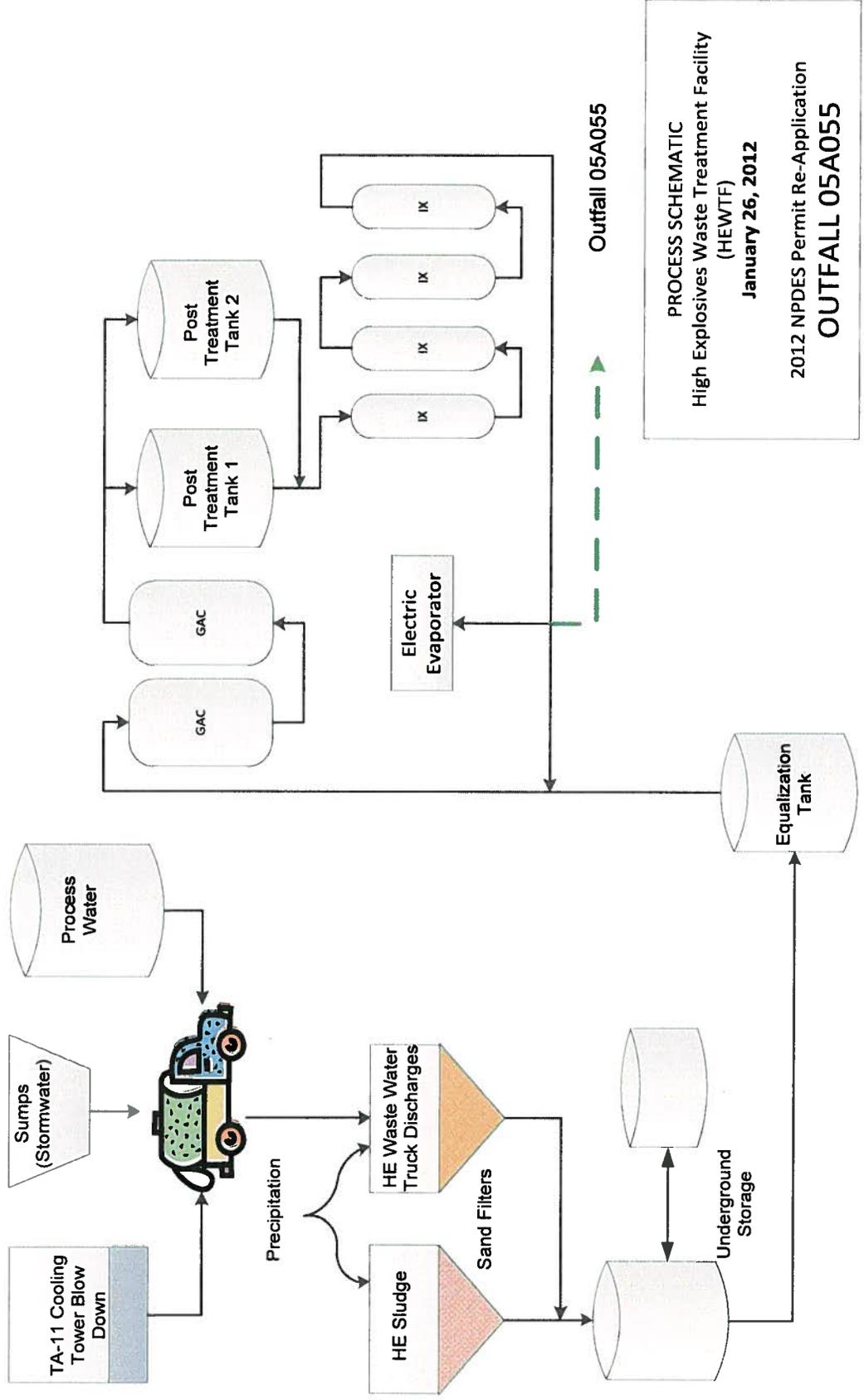
ANALYTICAL RESULTS PROVIDED

- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°50'49"
- Longitude – 106°19'52"N

Figure 1
Process Schematic for the High Explosives Wastewater Treatment Facility (HEWTF), TA-16-1508 and Outfall 05A055



PROCESS SCHEMATIC
 High Explosives Waste Treatment Facility
 (HEWTF)
 January 26, 2012
 2012 NPDES Permit Re-Application
OUTFALL 05A055

Photographs: High Explosives Waste Treatment Facility (HEWTF)



**Photograph 1 - High Explosives Waste Water Treatment Facility
Outfall Discharge Location – A Hose is Attached Here If Needed and Routed to the Outfall**



**Photograph 2 - High Explosives Waste Water Treatment Facility
Outfall Discharge Area**



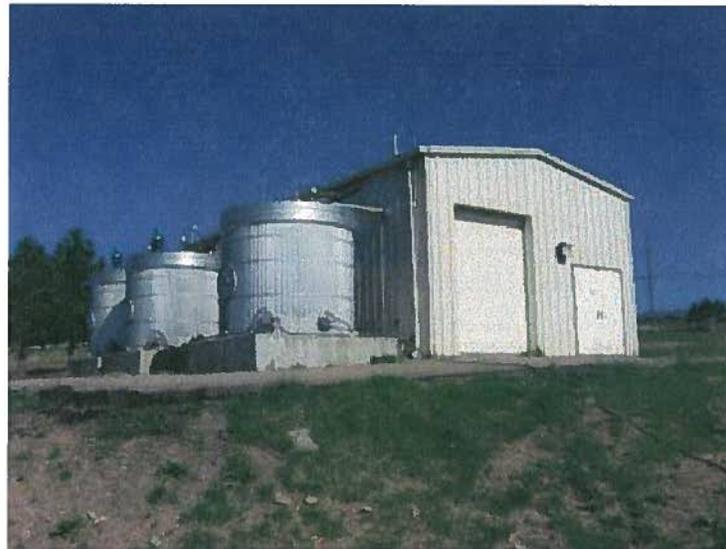
Photograph 3 - High Explosives Waste Water Treatment Facility
Sand Filter at the Burn Grounds



Photograph 4 - High Explosives Waste Water Treatment Facility
HE Wastewater Pumper Truck



Photograph 5 - High Explosives Waste Water Treatment Facility
HE Wastewater Underground Influent Storage Tank



Photograph 6 - High Explosives Waste Water Treatment Facility
HE Wastewater Treatment Facility



Photograph 7 - High Explosives Waste Water Treatment Facility
Granular Activated Carbon Filters



Photograph 8 - High Explosives Waste Water Treatment Facility
Ion Exchange



Photograph 9 - High Explosives Waste Water Treatment Facility
HEWTF Evaporator

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(s) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
05A055	TA-16-1508, HEWTF [INTERMITTENT] - Process (47%) - Cooling (5%) - Environmental Restoration (3%) - Stormwater (45%)	7	12	0.00125 MGD	0.006 MGD	1,250 GALLONS	6,000 GALLONS	365

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.
 MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.

NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
<p>Table 2C-3 Believed to be Absent.</p> <p>Table 2C-4 Dinitrotoluene</p>	<p>Process water contaminated with HE is treated at the HEWTF.</p>		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

YES (list all such pollutants below)

NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

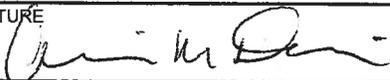
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C) OUTFALL NO. 05A055

PART A -- You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES		a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES	
	CONCENTRATION (1)	(2) MASS	CONCENTRATION (1)	(2) MASS	(1) CONCENTRATION	(2) MASS	a. CONCENTRATION	b. MASS	CONCENTRATION (1)	(2) MASS	
a. Biochemical Oxygen Demand (BOD)											
b. Chemical Oxygen Demand (COD)											
c. Total Organic Carbon (TOC)											
d. Total Suspended Solids (TSS)											
e. Ammonia (as N)											
f. Flow	VALUE										
g. Temperature (winter)	VALUE										
h. Temperature (summer)	VALUE										
i. pH	MINIMUM	MAXIMUM									

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

PART B -- Mark "X" in column 2-a for each pollutant directly, or indirectly but expressly, in a quantitative data or an explanation of the

A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. MAXIMUM DAILY VALUE (if available)				4. NO. OF ANALYSES		5. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	a. CONCENTRATION	b. MASS	(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)		X									
b. Chlorine, Total Residual	X										
c. Color		X									
d. Fecal Coliform		X									
e. Fluoride (16984-48-8)	X										
f. Nitrate-Nitrite (as N)	X										

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (if available)		b. MAXIMUM 30 DAY VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
g. Nitrogen, Total Organic (as N)	X									
h. Oil and Grease	X									
i. Phosphorus (as P), Total (7723-14-0)	X									
j. Radioactivity										
(1) Alpha, Total		X								
(2) Beta, Total	X									
(3) Radium, Total	X									
(4) Radium 226, Total	X									
k. Sulfate (as SO ₄) (14808-79-8)	X									
l. Sulfide (as S)	X									
m. Sulfite (as SO ₃) (14265-45-3)	X									
n. Surfactants		X								
o. Aluminum, Total (7429-90-5)	X									
p. Barium, Total (7440-39-3)	X									
q. Boron, Total (7440-42-8)	X									
r. Cobalt, Total (7440-48-4)	X									
s. Iron, Total (7439-89-6)	X									
t. Magnesium, Total (7439-95-4)	X									
u. Molybdenum, Total (7439-98-7)	X									
v. Manganese, Total (7439-96-5)	X									
w. Tin, Total (7440-31-5)	X									
x. Titanium, Total (7440-32-6)	X									

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515** OUTFALL NUMBER **05A055**

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GCIMS fractions you must test for. Mark "X" in column 2-a for all such GCIMS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GCIMS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES		
					(1) MASS	(2) MASS							(1) MASS	(2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS														
1M. Antimony, Total (7440-36-0)			X											
2M. Arsenic, Total (7440-38-2)			X											
3M. Beryllium, Total (7440-41-7)			X											
4M. Cadmium, Total (7440-43-9)			X											
5M. Chromium, Total (7440-47-3)			X											
6M. Copper, Total (7440-50-8)			X											
7M. Lead, Total (7439-92-1)			X											
8M. Mercury, Total (7439-97-6)			X											
9M. Nickel, Total (7440-02-0)			X											
10M. Selenium, Total (7782-49-2)			X											
11M. Silver, Total (7440-22-4)			X											
12M. Thallium, Total (7440-28-0)			X											
13M. Zinc, Total (7440-66-6)			X											
14M. Cyanide, Total (57-12-5)			X											
15M. Phenols, Total		X												
DIOXIN														
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X											
DESCRIBE RESULTS														

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

EPA Form 3510-2C (8-90)

PAGE V-3

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'			3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			
GC/MS FRACTION - VOLATILE COMPOUNDS												
1V. Acrolein (107-02-8)			X									
2V. Acrylonitrile (107-13-1)			X									
3V. Benzene (71-43-2)			X									
4V. Bis (Chloromethyl) Ether (542-88-1)												
5V. Bromoform (75-25-2)			X									
6V. Carbon Tetrachloride (56-23-5)			X									
7V. Chlorobenzene (108-90-7)			X									
8V. Chlorodibromomethane (124-48-1)			X									
9V. Chloroethane (75-00-3)			X									
10V. 2-Chloroethyvinyl Ether (110-75-8)			X									
11V. Chloroform (67-66-3)			X									
12V. Dichlorobromomethane (75-27-4)			X									
13V. Dichlorodifluoromethane (75-71-8)												
14V. 1,1-Dichloroethane (75-34-3)			X									
15V. 1,2-Dichloroethane (107-06-2)			X									
16V. 1,1-Dichloroethylene (75-35-4)			X									
17V. 1,2-Dichloropropane (78-87-5)			X									
18V. 1,3-Dichloropropylene (542-75-6)			X									
19V. Ethylbenzene (100-41-4)			X									
20V. Methyl Bromide (74-83-9)			X									
21V. Methyl Chloride (74-87-3)			X									

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A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

CONTINUED FROM PAGE V-4

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS					
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)										
22V. Methylene Chloride (75-09-2)			X							
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X							
24V. Tetrachloroethylene (127-18-4)			X							
25V. Toluene (108-88-3)			X							
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X							
27V. 1,1,1-Trichloroethane (71-55-6)			X							
28V. 1,1,2-Trichloroethane (79-00-5)			X							
29V. Trichloroethylene (79-01-6)			X							
30V. Trichlorofluoromethane (75-69-4)			X							
31V. Vinyl Chloride (75-01-4)			X							
GC/MS FRACTION - ACID COMPOUNDS										
1A. 2-Chlorophenol (95-57-8)			X							
2A. 2,4-Dichlorophenol (120-83-2)			X							
3A. 2,4-Dimethylphenol (105-67-9)			X							
4A. 4,6-Dinitro-Cresol (534-52-1)			X							
5A. 2,4-Dinitrophenol (51-28-5)			X							
6A. 2-Nitrophenol (88-75-5)			X							
7A. 4-Nitrophenol (100-02-7)			X							
8A. p-Chloro-M-Cresol (59-50-7)			X							
9A. Pentachlorophenol (87-86-5)			X							
10A. Phenol (108-95-2)			X							
11A. 2,4,6-Trichlorophenol (88-05-2)			X							

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

EPA Form 3510-2C (8-90)

PAGE V-5

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS											
1B. Acenaphthene (83-32-9)			X								
2B. Acenaphthylene (208-96-6)			X								
3B. Anthracene (120-12-7)			X								
4B. Benzidine (92-87-5)			X								
5B. Benzo (a) Anthracene (56-55-3)			X								
6B. Benzo (a) Pyrene (50-32-8)			X								
7B. 3,4-Benzofluoranthene (205-99-2)			X								
8B. Benzo (ghi) Perylene (191-24-2)			X								
9B. Benzo (k) Fluoranthene (207-08-9)			X								
10B. Bis (2-Chloroethoxy) Methane (111-91-1)			X								
11B. Bis (2-Chloroethyl) Ether (111-44-4)			X								
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X								
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X								
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X								
15B. Butyl Benzyl Phthalate (85-68-7)			X								
16B. 2-Chloronaphthalene (91-58-7)			X								
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X								
18B. Chrysene (218-01-9)			X								
19B. Dibenzo (a,h) Anthracene (53-70-3)			X								
20B. 1,2-Dichlorobenzene (95-50-1)			X								
21B. 1,3-Di-chlorobenzene (541-73-1)			X								

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EPA Form 3510-2C (8-90)

PAGE V-6

CONTINUE ON PAGE V-7

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)											
22B. 1,4-Dichloro-benzene (106-46-7)			X								
23B. 3,3-Dichloro-benzidine (91-94-1)			X								
24B. Diethyl Phthalate (84-66-2)			X								
25B. Dimethyl Phthalate (131-11-3)			X								
26B. Di-N-Butyl Phthalate (84-74-2)			X								
27B. 2,4-Dinitro-toluene (121-14-2)			X								
28B. 2,6-Dinitro-toluene (606-20-2)			X								
29B. Di-N-Octyl Phthalate (117-84-0)			X								
30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-56-7)			X								
31B. Fluoranthene (206-44-0)			X								
32B. Fluorene (86-73-7)			X								
33B. Hexachloro-benzene (118-74-1)			X								
34B. Hexachloro-butadiene (87-68-3)			X								
35B. Hexachloro-cyclopentadiene (77-47-4)			X								
36B. Hexachloro-ethane (67-72-1)			X								
37B. Indeno (1,2,3-cd) Pyrene (193-38-5)			X								
38B. Isophorane (78-59-1)			X								
39B. Naphthalene (91-20-3)			X								
40B. Nitrobenzene (98-95-3)			X								
41B. N-Nitro-sodimethylamine (62-75-9)			X								
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X								

The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 05A055 when/if the HEWTF discharges effluent to it.

EPA Form 3510-2C (8-90)

PAGE V-7

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available) (1)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
				CONCENTRATION	(2) MASS	CONCENTRATION	(2) MASS						
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
43B. N-Nitrosodiphenylamine (86-30-6)			X										
44B. Phenanthrene (85-01-8)			X										
45B. Pyrene (129-00-0)			X										
46B. 1,2,4-Trichlorobenzene (120-82-1)			X										
GC/MS FRACTION - PESTICIDES													
1P. Aldrin (309-00-2)			X										
2P. α-BHC (319-84-6)			X										
3P. β-BHC (319-85-7)			X										
4P. γ-BHC (58-89-9)			X										
5P. δ-BHC (319-86-8)			X										
6P. Chlordane (57-74-9)			X										
7P. 4,4'-DDT (50-29-3)			X										
8P. 4,4'-DDE (72-55-9)			X										
9P. 4,4'-DDD (72-54-8)			X										
10P. Dieldrin (60-57-1)			X										
11P. α-Endosulfan (115-29-7)			X										
12P. β-Endosulfan (115-29-7)			X										
13P. Endosulfan Sulfate (1031-07-8)			X										
14P. Endrin (72-20-8)			X										
15P. Endrin Aldehyde (7421-93-4)			X										
16P. Heptachlor (76-44-8)			X										

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EPA Form 3510-2C (8-90)

PAGE V-8

CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	05A055

CONTINUED FROM PAGE V-8

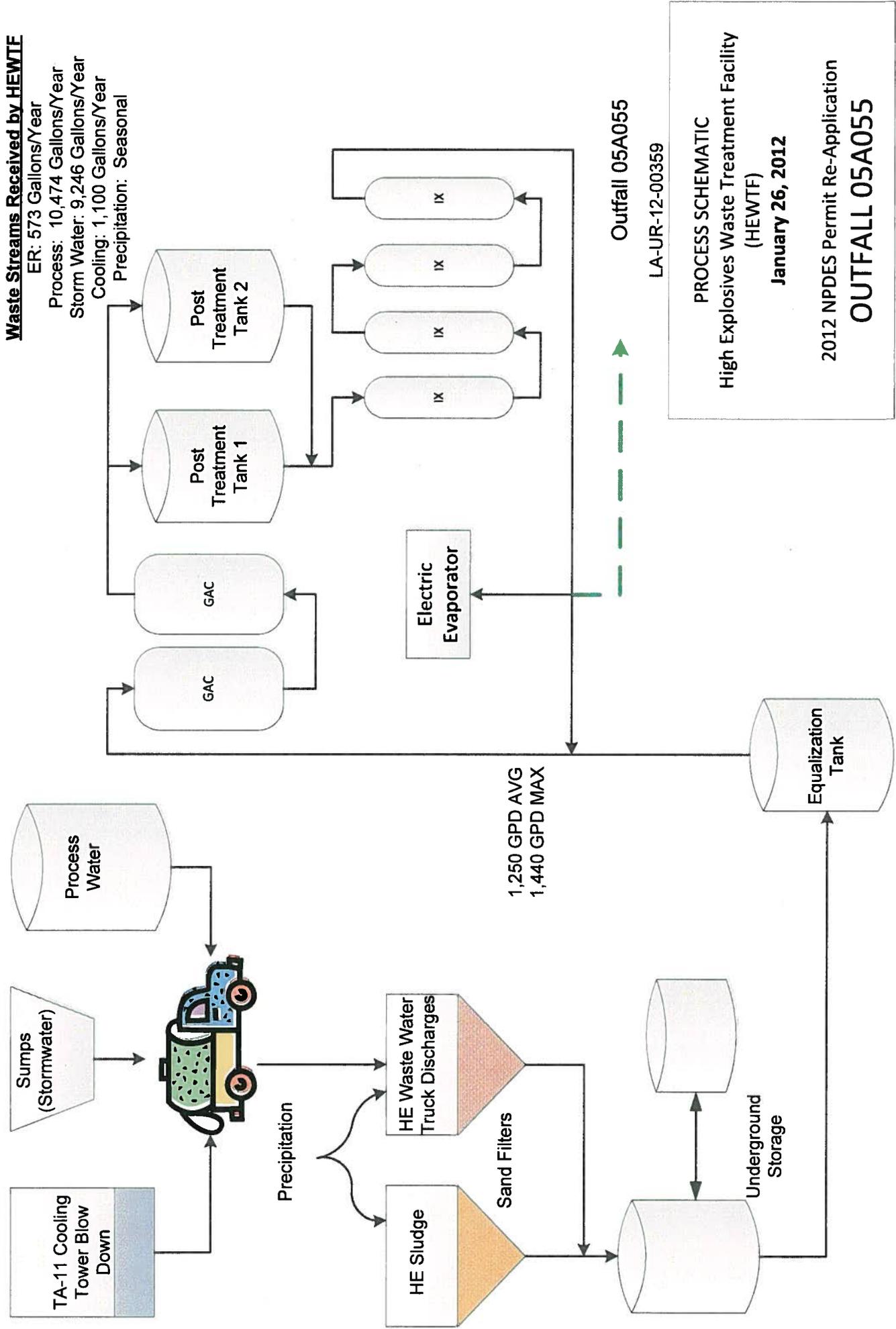
1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available) (1)	c. LONG TERM AVRG. VALUE (if available) (1)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
GCMS FRACTION - PESTICIDES (continued)											
17P. Heptachlor Epoxide (1024-57-3)			X								
18P. PCB-1242 (53469-21-9)			X								
19P. PCB-1254 (11097-69-1)			X								
20P. PCB-1221 (11104-28-2)			X								
21P. PCB-1232 (11141-16-5)			X								
22P. PCB-1248 (12672-29-6)			X								
23P. PCB-1260 (11096-82-5)			X								
24P. PCB-1016 (12674-11-2)			X								
25P. Toxaphene (8001-35-2)			X								

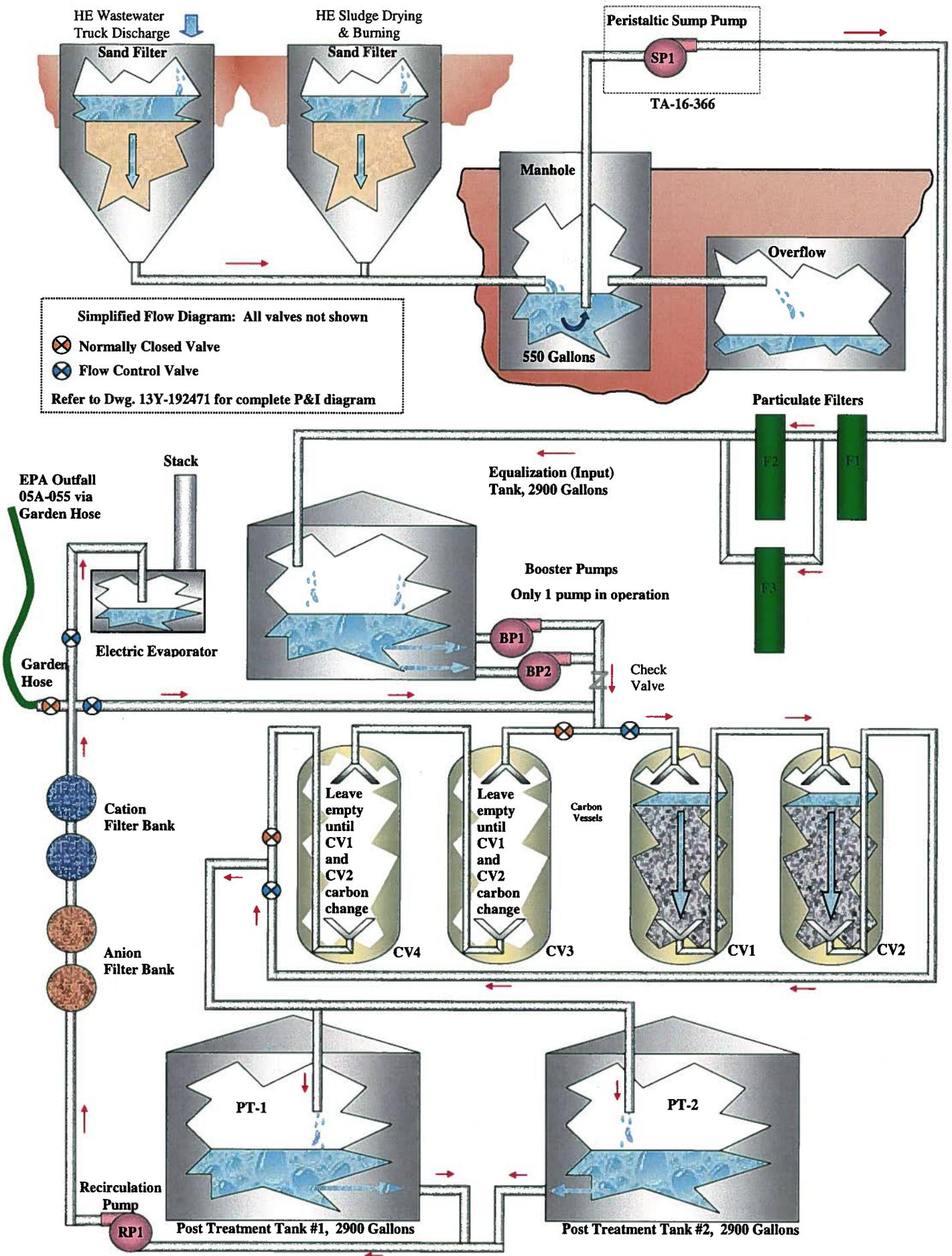
The HEWTF has not discharged to Outfall 05A055 since November 2007, when the effluent evaporator became operational. LANL requests to re-permit the outfall so that the HEWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator become unavailable due to maintenance, malfunction, and/or an increase in treatment capacity caused by changes in LANL scope/mission.

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EPA Form 3510-2C (8-90)

Figure II.A
Process Schematic and Water Balance for the High Explosives
Wastewater Treatment Facility (HEWTF), TA-16-1508 and Outfall 05A055





Simplified Flow Diagram: All valves not shown

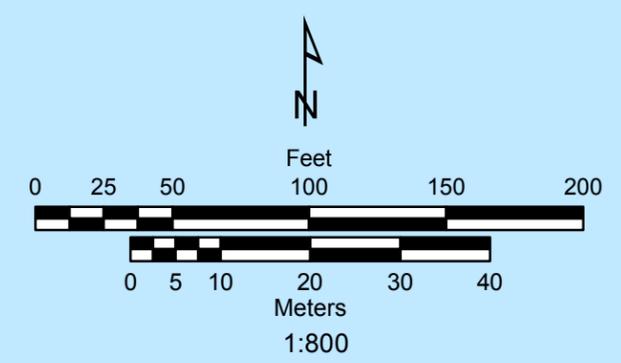
- ⊗ Normally Closed Valve
- ⊗ Flow Control Valve

Refer to Dwg. 13Y-192471 for complete P&I diagram

**NPDES Permit Re-Application Project
TA-16 Building 1508, 363, 401, 406
Outfall #05A055**



Legend	
● NPDES Outfall	Paved Roads
▲ Springs	Source Structures
Drainages	Building Served by Source
100ft Contours	Structures
20ft Contours	LANL Boundary
10ft Contours	Technical Areas
Fences	
Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-13 27 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2011 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, APRIL 2011.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.

Material Safety Data Sheet



Date: 08/24/2007

Product: 19751030 - F300

SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: Calgon Carbon Corporation

P.O. Box 717

Pittsburgh, PA 15230-0717

Emergency Phone Number: (412) 787-6700

Date Prepared: 6/24/2002

Prepared By: S. Liller

Chemical Name and Synonyms: Carbon

Formula: C

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

Nonhazardous components are listed at 3% or greater; acute hazards are listed when present at 1% or greater and chronic hazards are listed when present at 0.01% or greater. This is not intended to be a complete compositional disclosure.

<u>INGREDIENT</u>	<u>% (BY WEIGHT)</u>	<u>CAS#</u>
CARBON	100	7440-44-0

SECTION III - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Black particulate solid, pellet or powder. Contact may cause eye irritation. Dust may be slightly irritating to eyes and respiratory tract.

CAUTION!!! Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels and enclosed or confined spaces. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state and federal regulations.

POTENTIAL HEALTH EFFECTS:

Effects and Hazards of Eye Contact: The physical nature of the product may produce eye irritation.

Effects and Hazards of Skin Contact: The product is not a primary skin irritant. The primary skin irritation index (Rabbit) is 0.

Effects and Hazards of Inhalation (Breathing): The product is practically non-toxic through inhalation. The acute inhalation LC₅₀ (Rat) is >64.4 mg/l (nominal concentration) for activated carbon.

Effects and Hazards of Ingestion (Swallowing): The product is non-toxic through ingestion. The acute oral LD₅₀ (RAT) is >10g/kg.

Primary Routes of Entry: Inhalation, ingestion, skin contact, eye contact.

Chronic Effects: The effects of long-term, low-level exposures to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the avoidance of all effects from repetitive acute exposures.

CARCINOGENICITY: NTP: N/A IARC: N/A OSHA REGULATED: NO

Material Safety Data Sheet



SECTION IV - FIRST AID MEASURES

Treatment for Eye Contact: Flush with plenty of water for at least 15 minutes.

Treatment for Skin Contact: Wash with soap and water.

Treatment for Inhalation (Breathing): N/A

Treatment for Ingestion (Swallowing): N/A

SECTION V - FIRE FIGHTING MEASURES

Flash Point: N/A

Limits Lel: N/A

Uel: N/A

Extinguishing Media: FLOOD WITH PLENTY OF WATER.

Special Firefighting Procedures: NONE

Unusual Fire and Explosion Hazards: Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc., may result in fire.

NFPA RATING: HEALTH = 0 REACTIVITY = 0 FLAMMABILITY = 1

SECTION VI - ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Released or Spilled: Sweep up unused carbon and discard in refuse container or repackage.

Waste Disposal Method: Dispose of unused carbon in refuse container. Dispose of in accordance with local, state, and federal regulations.

SECTION VII - HANDLING AND STORAGE

Precautions for Handling and Storage: **CAUTION!!** Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels and enclosed or confined spaces. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal or national regulations.

Other Precautions: Wash thoroughly after handling. Exercise caution in the storage and handling of all chemical substances.

Material Safety Data Sheet



SECTION VIII - EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Guidelines:

OSHA PEL* 5 mg/M³ (Respirable)

ACGIH TLV* 10 mg/M³ (Total)

*PELs and TLVs are 8-hour TWAs unless otherwise noted.

Respiratory Protection: A NIOSH approved particulate filter respirator is recommended if excessive dust is generated.

Ventilation: Local Exhaust Ventilation: Recommended

Mechanical Ventilation: Recommended

Protective Gloves: Recommended

Eye Protection: Safety Glasses or Goggles Recommended

Other Protective Equipment: Not Required

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: N/A

Specific Gravity: 2.3 g/cc real density

Vapor Pressure: N/A

Melting Point: N/A

Vapor Density: N/A

Evaporation Rate: N/A

Solubility in Water: NEGLIGIBLE

Packing Density: 0.4 to 0.7 g/cc

Appearance and Odor: Black particulate solid, pellet, or powder

SECTION X - STABILITY AND REACTIVITY

Stability: STABLE

Conditions to avoid: NONE

Incompatibility (Materials to avoid): Strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc.

Hazardous Decomposition Products: Carbon monoxide may be generated in the event of a fire.

Polymerizing Conditions to Avoid: NONE

SECTION XI - TOXICOLOGICAL INFORMATION

See HEALTH EFFECTS SECTION III

SECTION XII - ECOLOGICAL INFORMATION

Not determined

Material Safety Data Sheet



SECTION XIII - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of unused carbon in refuse container. Dispose of in accordance with local, state, and federal or national regulations.

SECTION XIV - TRANSPORT INFORMATION

Proper Shipping Name: NOT REGULATED

Hazard Class: N/A

Identification Number: N/A

Packing Group: N/A

This product has been tested according to the United Nations *Transport of Dangerous Goods* test protocol for spontaneously combustible materials. It has been specifically determined that this product does not meet the definition of a self heating substance or any hazard class, and therefore is not a hazardous material and not regulated.

SECTION XV - REGULATORY INFORMATION

SARA TITLE III: N/A

TSCA: The ingredients of this product are on the TSCA Inventory List.

OSHA: Nonhazardous according to definitions of health hazard and physical hazard provided in the Hazard Communication Standard (29 CFR 1910.1200)

CANADA

WHMIS CLASSIFICATION: Not Classified

DSL#: 6798

EEC Council Directives relating to the classification, packaging and labeling of dangerous substances and preparations.

Risk (R) and Safety (S) phrases: May be irritating to eyes (R36).

SECTION XVI - OTHER INFORMATION

Intended Use: Generally used for treatment of liquids and gases.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CARBON CORPORATION MAKES NO WARRANTY WITH RESPECT AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

*** END OF MATERIAL SAFETY DATA SHEET ***

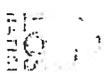
C-AAC Analytical Results Report

Report run on: September 13, 2007 9:42 AM
 Report Number: 12845 Revision: 0 - SamID: 200172582 User:SamID: EVRFXX061207B1

Actinide Analytical Chemistry Group
 https://reports/final_reports/sam/final

Element	Result	Units
TOTAL BATCH VOLUME	25	L
PU	1.33	g/L
PU +/- NSD	5	%
AM-241	1.28E-01	g/L
TOTAL PU IN BATCH	5	%
TOTAL AM IN BATCH	3.32E+01	g
SILVER	3.19	g
ALUMINUM	4.2	ug/ml
ARSENIC	8590	ug/ml
BORON	5.0	ug/ml
BARIUM	140	ug/ml
CALCIUM	14	ug/ml
CALCIUM	159	ug/ml
CHROMIUM	0.28	ug/ml
IRON	1210	ug/ml
GALLIUM	3520	ug/ml
POTASSIUM	364	ug/ml
LITHIUM	682	ug/ml
MAGNESIUM	0.38	ug/ml
SODIUM	99	ug/ml
NICKEL	359	ug/ml
LEAD	731	ug/ml
SELENIUM	11	ug/ml
SILICON	11	ug/ml
THORIUM	166	ug/ml
URANIUM	40	ug/ml
MERCURY	388	ug/ml
	<0.05	ug/ml

*** This section contains sample results data in a format that can easily be copied into MS Excel.
 When viewing this report, highlight the data in this section, then right-click and select "Open Table in Spreadsheet"
 ("Open Table in Spreadsheet" works with Adobe version 7 and later products. It may not work with earlier versions).



Material Safety Data Sheet

Version 3.1
 Revision Date 04/13/2011
 Print Date 09/16/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Lewatit® Sybron Ionac® SR-7

Product Number : 92642
 Brand : Fluka

Supplier : Sigma-Aldrich
 3050 Spruce Street
 SAINT LOUIS MO 63103
 USA

Telephone : +1 800-325-5832
 Fax : +1 800-325-5052
 Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
 Product Safety - Americas Region
 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

No known OSHA hazards

Not a dangerous substance according to GHS.

HMIS Classification

Health hazard: 0
 Flammability: 0
 Physical hazards: 0

NFPA Rating

Health hazard: 0
 Fire: 0
 Reactivity Hazard: 0

Potential Health Effects

Inhalation : May be harmful if inhaled. May cause respiratory tract irritation.
Skin : May be harmful if absorbed through skin. May cause skin irritation.
Eyes : May cause eye irritation.
Ingestion : May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Lewatit® Sybron Ionac® SR-7			
186709-08-0	-	-	-

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment**Respiratory protection**

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	Small beads
Colour	white, light brown

Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	insoluble
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

no data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**OSHA Hazards**

No known OSHA hazards

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Lewatit® Sybron Ionac® SR-7

CAS-No.
186709-08-0

Revision Date

New Jersey Right To Know Components

Lewatit® Sybron Ionac® SR-7

CAS-No.
186709-08-0

Revision Date

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Ionac® SR 7

IONAC SR 7 is an advanced macroporous, anion ion exchange resin with more than three times the selectivity for nitrate ions compared to the best available products. It is tested and certified by NSF International under ANSI/ NSF 61. SR 7 has a new chemistry that prevents "nitrate dumping" against high sulfate backgrounds. SR 7 is characterized by a high degree of porosity, very stable structure and limited reversible swelling, which results in a kinetically superior and durable resin.

Ionac SR 7 applications*:

nitrate removal

Typical physical and chemical properties**

		US Units		International Units	
Ionic form as shipped			Cl		Cl
Bead size	> 90%	US mesh	16 - 50	mm	0.3 - 1.25
Effective size		mm.	0.47 +- 0.06	mm	0.47 +- 0.06
Shipping weight		lbs/ft ³	42	g/l	670
Density				g/ml	1.02
Water retention		% weight	48 - 52	%	48 - 52
Total capacity, min.		kgr CaCO ₃ / ft ³	18	eq/l	0.8
Volume change	Cl ⁻ >> NO ₃ ⁻	max. %	5	max. %	5
Stability	temperature range	°F	34 - 212	°C	1 - 100
	pH range		0 - 14		0 - 14
Storability	of product	min years	2	min. years	2
	temperature range	°F	34 - 104	°C	1 - 40

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling Ionac SR 7. Before working with this product you must read and become familiar with the available information on its hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets and product labels. Consult your Sybron Chemicals Inc. representative or contact Bayer's Product Safety and Regulatory Affairs Department in Pittsburgh, PA.

*As with any product, use of the products mentioned in this publication in a given application must be tested (including field testing, etc.) in advance by the user to determine suitability.
**These items are provided as general information only. They are approximate values and are not part of the product specifications.

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Sybron Chemicals Inc.
A Bayer Company
100 Bayer Road
Pittsburgh, PA 15205
Phone: 1-800-662-2927
Fax: 412-777-4109

www.ionexchange.com

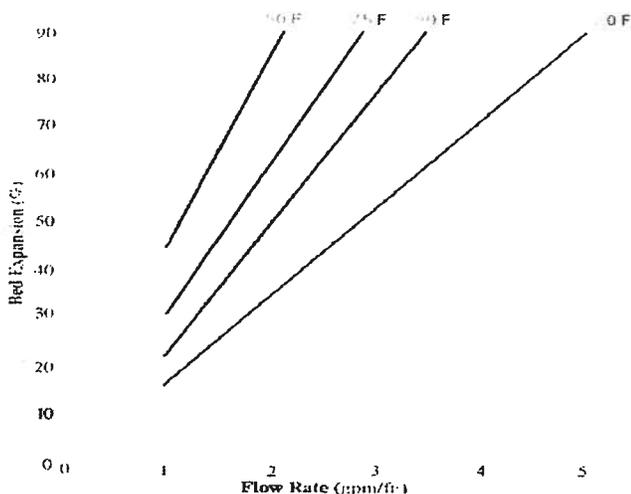
Ionac® SR 7

Recommended Operating Parameters

		US Units		International Units	
Operating Temperature		max. °F	160	max. °C	70
Operating pH-range			5 - 10		5 - 10
Bed Depths		min. ft	2	min. mm	610
Pressure Drop			see chart		see chart
Max. adm. Pressure drop		psi	28	kPa	200
Surface Flow Rate	exhaustion	gpm/ft ²	2 - 10	m/h	5 - 24
	backwash	gpm/ft ²	see chart	m/h	see chart
Bulk Flow Rate	exhaustion	gpm/ft ³	1 - 6	BV/h	8 - 48
Bed Expansion		%	50 - 65	ca. %	50 - 65
Freeboard	% of bed depth	%	90 - 100	%	90 - 100
Regenerant	type		NaCl		NaCl
	level	lb/ft ³	5 - 20	ca. g/l	80 - 320
	concentration	%	5 - 12	%	5 - 12
Surface Flow Rate	regeneration	gpm/ft ²	0.4 - 4	m/h	1 - 10
	rinsing, slow / fast	gpm/ft ²	0.4 - 4 / 2 - 10	m/h	1 - 10 / 5 - 24
Bulk Flow Rate	regeneration	gpm/ft ³	0.25 - 1	BV/h	2 - 8
	rinsing, slow / fast	gpm/ft ³	0.25 - 1 / 1 - 6	BV/h	2.5 - 32 / 8 - 48
Rinsing Water Requirement	slow / fast	gals./ft ³	7 - 15 / 25 - 60	ca. BV	1 - 2 / 3 - 8

Some of the end uses of the products described in this bulletin must comply with applicable regulations, such as the FDA, NSF, USDA, and CPSC. If you have any questions on the regulatory status of these products, contact your Sybron representative or Bayer's Regulatory Affairs Manager in Pittsburgh, PA.

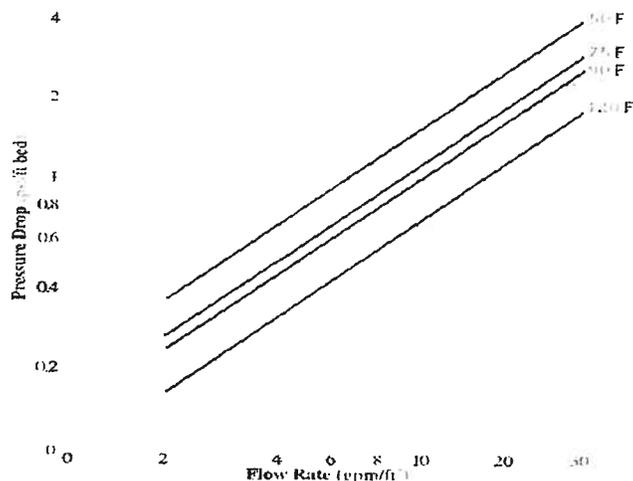
Bed Expansion Curve



$$^{\circ}\text{C} = 5 / 9 (^{\circ}\text{F} - 32)$$

$$\text{m} = \text{ft} * 0.3048$$

Pressure Loss Curve



$$\text{kPa} = \text{psi} * 7.03$$

$$\text{m} / \text{hr} = \text{gpm} / \text{sq. ft.} * 2.44$$

Note: The information contained in this bulletin is current as of April 2003. Please contact Sybron Chemicals Inc. to determine whether this publication has been revised.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Lewatit® MonoPlus SP 112

Product Number : 62102
Brand : Fluka

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

No known OSHA hazards

Not a dangerous substance according to GHS.

HMIS Classification

Health hazard: 1
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 1
Fire: 0
Reactivity Hazard: 0

Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Lewatit™ MonoPlus™ SP 112 sodium form			
53857-91-3	-	-	-

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment**Respiratory protection**

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form Small beads

Colour light brown

Safety data

pH no data available

Melting point/freezing point no data available

Boiling point no data available

Flash point no data available

Ignition temperature no data available

Autoignition temperature no data available

Lower explosion limit no data available

Upper explosion limit no data available

Vapour pressure no data available

Density 1.24 g/mL at 20 °C (68 °F)

Water solubility no data available

Partition coefficient: n-octanol/water no data available

Relative vapour density no data available

Odour no data available

Odour Threshold no data available

Evaporation rate no data available

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

no data available

Hazardous decomposition products

no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

no data available

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Synergistic effects

no data available

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**Toxicity**

no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

5. REGULATORY INFORMATION

OSHA Hazards

No known OSHA hazards

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Lewatit™ MonoPlus™ SP 112 sodium form

CAS-No.
53857-91-3

Revision Date

New Jersey Right To Know Components

Lewatit™ MonoPlus™ SP 112 sodium form

CAS-No.
53857-91-3

Revision Date

California Prop. 65 Components

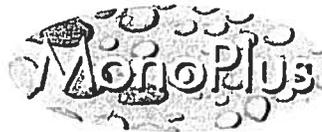
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

6. OTHER INFORMATION

Further information

Copyright 2011 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.



Lewatit MonoPlus™ SP 112

Lewatit MonoPlus SP 112 is a strongly acidic, macroporous-type cation exchange resin of uniform particle size (monodispersed) based on a styrene-divinylbenzene copolymer for use in oxidative and high velocity environments. The optimized kinetics lead to an increased operating capacity compared to ion exchange resins with heterodispersed bead size distribution.

MonoPlus SP 112 is also available in hydrogen form (**MonoPlus SP 112 H**).

Lewatit MonoPlus SP 112 applications*:

softening, demineralization, condensate polishing

Typical physical and chemical properties**

			US Units		International Units
Ionic form as shipped			Na ⁺		Na ⁺
Mean bead size	> 90%	mm	0.66 +- 0.07	mm	0.66 +- 0.07
Uniformity coefficient		max.	1.1	max.	1.1
Shipping weight		lbs/ft ³	49.0	g/l	780
Density				g/l	1.24
Water retention		% weight	53 - 55	%	53 - 55
Total capacity, min.		kgr CaCO ₃ / ft ³	37	eq/l	1.7
Volume change	Na ⁺ >> H ⁺	max. %	-8	max. %	-8
Stability	temperature range	°F	14 - 250	°C	-10 - 120
	pH range		0 - 14		0 - 14
Storability	of product	min years	2	min. years	2
	temperature range	°F	-4 - 104	°C	-20 - 40

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling Lewatit MonoPlus SP 112. Before working with this product, you must read and become familiar with the available information on its hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms e.g., material safety data sheets and product labels. Consult your Sybron Chemicals Inc. representative or contact Bayer's Product Safety and Regulatory Affairs Department in Pittsburgh, PA.

*As with any product, use of the products mentioned in this publication in a given application must be tested (including field testing, etc.) in advance by the user to determine suitability.
**These items are provided as general information only. They are approximate values and are not part of the product specifications.

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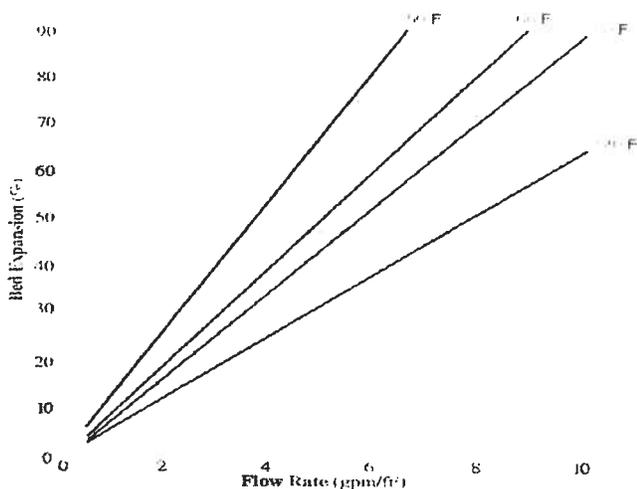
www.ionexchange.com

Lewatit MonoPlus™ SP 112

Recommended Operating Parameters

		US Units		International Units	
Operating Temperature		max. °F	250	max. °C	120
Operating pH-range			0 - 14		0 - 14
Bed Depths		min. ft	2.6	min. mm	800
Pressure Drop			see chart		see chart
Max. adm. Pressure drop		psi	44	kPa	300
Surface Flow Rate	exhaustion	gpm/ft ²	2 - 25	m/h	5 - 60
	backwash	gpm/ft ²	see chart	m/h	see chart
Bulk Flow Rate		exhaustion	gpm/ft ³	BV/h	8 - 48
Bed Expansion			%	see chart	%
Freeboard		% of bed depth	%	60 - 75	%
Regenerant	type		HCl H ₂ SO ₄		HCl H ₂ SO ₄
	level	lb/ft ³	2 - 10 2.5 - 10	g/l	32 - 160 40 - 160
	concentration	%	4 - 10 0.7 - 6	%	4 - 10 0.7 - 6
Surface Flow Rate	regeneration	gpm/ft ²	0.4 - 4 1 - 6	m/h	1 - 10 3 - 15
	rinsing, slow / fast	gpm/ft ²	0.4 - 6 / 2 - 25	m/h	1 - 15 / 5 - 60
Bulk Flow Rate	regeneration	gpm/ft ³	0.3 - 1 0.5 - 4	BV/h	2.5 - 8 4 - 32
	rinsing, slow / fast	gpm/ft ³	0.3 - 4 / 1 - 6	BV/h	2.5 - 32 / 8 - 48
Rinsing Water Requirement		slow / fast	gals./ft ³	BV	1 - 2 / 1 - 4

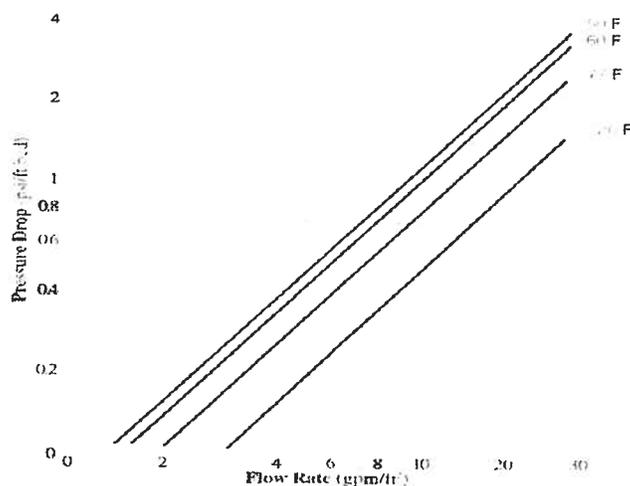
Bed Expansion Curve



$$^{\circ}\text{C} = 5 / 9 (^{\circ}\text{F} - 32)$$

$$m = \text{ft} * 0.3048$$

Pressure Loss Curve

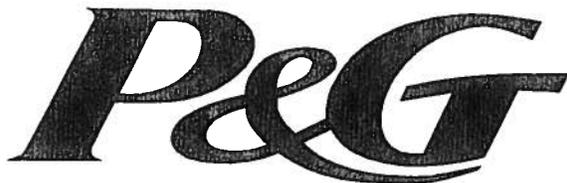


$$\text{kPa} = \text{psi} * 7.03$$

$$\text{m} / \text{hr} = \text{gpm} / \text{sq.ft.} * 2.44$$

Note: The information contained in this bulletin is current as of April 2003. Please contact Sybron Chemicals Inc. to determine whether this publication has been revised.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.



Page 1 of 5
The Procter & Gamble Company
P & G Household Care
Fabric & Home Care Innovation Center
5299 Spring Grove Avenue
Cincinnati, OH 45217-1087

MATERIAL SAFETY DATA SHEET

MSDS: RQ1003262
RQ1003304
RQ1003407

Issue Date: 8/25/2010

SECTION I - PRODUCT IDENTIFICATION

Identity: **Liquid Laundry Detergent**

This MSDS applies to the following Liquid Tide Detergent Brands:

Tide (Original, Free, Mountain Spring, and Clean Breeze)
Tide w/Bleach Alternative. (Original, Mountain Spring, Clean Breeze and Advanced Power Original Scent)
Tide Coldwater (Fresh Scent, Mountain Spring, Free)
Tide w/Febreze Freshness (Sport, Seaside Fresh, Spring & Renewal)
Tide with Dawn Stainscrubbers (Original Scent, Whitewater Clean)
Tide Pure Essentials (with Baking Soda White Lilac)
Tide Total Care (Cool Cotton, Renewing Rain)
Tide with a Touch of Downy (April Fresh, Clean Breeze, Lavender)

High Efficiency Variants:

Tide HE (Original, Free, and Clean Breeze)
Tide w/Bleach Alternative HE (Original, Advanced Power)
Tide Coldwater HE (Fresh Scent, Free)
Tide w/Febreze Freshness HE (Spring & Renewal, Sport)
Tide Total Care HE (Renewing Rain)
Tide with A Touch of Downy HE (April Fresh)

Emergency Telephone Number: 24hr P&G Operator – 1-800-879-8433

* **This MSDS applies to all uses/handling of these products in a retail package for consumer home use.**

SECTION II - HAZARDS IDENTIFICATION

Health Hazards (Acute and Chronic):

Ingestion: May cause transient gastrointestinal irritation.
Eye Contact: May cause mild, transient irritation.
Inhalation: Transient irritation with prolonged exposure to concentrated material.

Signs and Symptoms of Exposure:

Ingestion: May result in nausea, vomiting, and/or diarrhea.
Eye Contact: May cause stinging, tearing, itching, swelling, and/or redness.
Skin: Prolonged contact with concentrated material may be drying or transiently irritating to skin.

SECTION III - COMPOSITION AND INGREDIENTS

Ingredients/Chemical Name: Biodegradable surfactants (anionic and nonionic) and enzymes.

Hazardous Ingredients as defined by OSHA, 29 CFR 1910.1200.

Common Name	Chemical Name	CAS No.	Composition Range	LD50
Ethanol	Ethyl alcohol	64-17-5	1 - 5%	7.06 g/kg (oral, rat)
Ethanolamine	2-Aminoethanol	141-43-5	1 - 5%	1.7g/kg (oral, rat)
Anionic Surfactants	Alcohol Ethoxysulfate, sodium salt	68585-34-2	10-30% total anionic surfactant	>2g/kg (oral, rat)
	Alcohol Sulfates, sodium salts	68585-47-7		>2000 mg/kg (oral, rat)
	Benzene sulfonic acid, sodium salt	68081-81-2		438 mg/kg (oral, rat) 1330 mg/kg (oral, mouse)
	Benzene sulfonic acid, monoethanolamine salt	68910-32-7		not available
Nonionic Surfactants	Alcohol ethoxylate	68439-49-6	1-5% total nonionic surfactant	5300 mg/kg (oral, rat)

SECTION IV - FIRST AID INFORMATION**Emergency and First Aid Procedures:**

Ingestion: Drink a glassful of water.
 Eye Contact: Flush with water for 10 to 15 minutes.
 Skin: If prolonged contact occurs, rinse thoroughly with water. If spilled on clothing, change clothes.

If symptoms persist or reoccur, seek medical attention.

Other: Consumer product package has a caution statement: "CAUTION: Eye irritant. Harmful if swallowed. KEEP OUT OF REACH OF CHILDREN. If swallowed, give a glassful of water. Call a physician. In case of eye contact, flush with water."

SECTION V - FIRE FIGHTING INFORMATION

Flammable Properties: These products have a flashpoint of $\geq 150^{\circ}\text{F}$ and they do not sustain combustion per D.O.T. 49 CFR 173 Appendix H method.

Explosive Limits: LEL: N/A UEL: N/A
Autoignition Temperature: N/A

Suitable Extinguishing Media: CO₂, water, foam, dry chemical.

Unsuitable Extinguishing Media: Not known.

Protection of Fire Fighters:

- **Specific Hazards arising from the chemical mixture:** Not known.
- **Protective Equipment and Precautions for Firefighters:** Standard self-contained breathing apparatus (SCBA) and full fire fighting turn-out gear (Bunker gear).

SECTION X - STABILITY AND REACTIVITY

Chemical Stability: Stable.

Conditions to Avoid: None known.

Materials to Avoid: None known.

Hazardous Decomposition Products: None known.

Possibility of Hazardous Reactions: None known.

SECTION XI - TOXICOLOGICAL INFORMATION

Liquid Tide formulas have a low order of toxicity. If ingested, it may be mildly irritating. It is expected to be moderately emetic.

LD50 (oral, estimated): > 2g/kg

ED50 (emesis, estimated): ~ 0.5 g/kg

Chronic Effects: No chronic health effects reported.

Target Organs: No target organs reported.

Carcinogenicity: NTP: No

IARC: No

OSHA: No

SECTION XII - ECOLOGICAL INFORMATION

Based on ecotoxicity and fate data for the individual ingredients in these mixtures, and for related consumer household cleaning product formulations, it is expected that these mixtures would exhibit a non-hazardous order of toxicity at relevant environmental concentrations.

SECTION XIII - DISPOSAL CONSIDERATIONS

Waste Disposal Method: Products covered by this MSDS, in their original form, when disposed as waste, are considered non hazardous waste according to Federal RCRA regulations (40 CFR 261). Disposal should be in accordance with all Federal, state/provincial and local regulations.

Household Use: Consumer produced household solutions may be disposed of down the drain with running water. Consumer may discard empty container in trash, or recycle where facilities exist.

SECTION XIV - TRANSPORT INFORMATION

US DOT: These products are not regulated when transported by ground.

IATA: These products are not regulated when transported by air.

IMDG: These products are not regulated when transported by vessel.



MATERIAL SAFETY DATA SHEET

Garratt-Callahan Company
50 Ingold Road
Burlingame, California 94010-2206

24 - HOUR EMERGENCY PHONE NUMBER: 303-623-5716

CHEMTREC: 1-800-424-9300

Customer Service, Product Information: 650-697-5811

Revision Date: 06/06/2008

MSDS Number: 2011

SECTION #1 - IDENTIFICATION

Product Name: FORMULA 2011

Product Use: COOLING WATER TREATMENT

SECTION #2 - COMPONENTS*

..... EXPOSURE LIMITS

COMPONENT	CAS NUMBER	PERCENT	ACGIH TLV	OSHA PEL	OTHER
PHOSPHONOBUTANE TRICARBOXYLIC ACID	37971-36-1	2 - 4	Not established	Not established	Not established
BENZOTRIAZOLE	95-14-7	1	Not established	Not established	Not established

*NOTE: OSHA requires only that hazardous components be listed in this section.

SECTION #3 - PHYSICAL DATA

APPEARANCE:	Clear light yellow liquid	%VOLATILES:	84
BOILING POINT:	> 212 °F (100 °C)	SOLUBILITY:	Complete
VAPOR DENSITY:	Not established	SPECIFIC GRAVITY:	1.01 - 1.11
VAPOR PRESSURE:	Not established	EVAPORATION RATE (where butyl acetate=1):	Not established
pH:	2.0 - 4.0	ODOR:	Odorless

SECTION #4 - FIRE AND EXPLOSION DATA

FLASHPOINT (PMCC):	Non-flammable	EXPLOSIVE LIMITS:
AUTOIGNITION:	Not established	LEL: Not established UEL: Not established
EXTINGUISHING MEDIA:	Water, foam, or carbon dioxide. Use media appropriate for the surrounding fire.	
UNUSUAL FIRE AND EXPLOSION HAZARDS:	No special hazards.	
FIRE FIGHTING INSTRUCTIONS:	Under fire conditions irritating and/or toxic gases may be present. Fire fighters should wear full protective clothing and self-contained breathing apparatus.	

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SECTION #5 - EXPOSURE AND EFFECT

Avoid eye contact. May cause eye irritation. Avoid repeated or prolonged skin contact, inhalation of aerosol, mist, spray, fume or vapor. May cause respiratory tract and skin irritation. Wash thoroughly after handling.

EMERGENCY AND FIRST AID PROCEDURES:

SKIN CONTACT: Wash with soap and water for at least 15 minutes; consult physician if pain, irritation or other problems persist.

EYE CONTACT: Flood the eye with copious amounts of water for at least 15 minutes. Have the patient blink as much as possible while flooding the eye. Seek medical attention if irritation occurs.

INGESTION: Treat symptomatically.

INHALATION: If affected, remove to fresh air. If not breathing, give artificial respiration.

NOTES TO PHYSICIAN: Treat symptomatically.

SECTION #6 - REACTIVITY AND POLYMERIZATION

STABILITY:	Stable
CONDITIONS TO AVOID:	Not established
INCOMPATIBLE MATERIALS:	Bases
HAZARDOUS DECOMPOSITION:	Carbon monoxide, carbon dioxide, and oxides of nitrogen
HAZARDOUS POLYMERIZATION:	Will not occur

SECTION #7 - SPILL, LEAK AND DISPOSAL PROCEDURES

DISPOSAL: IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

WARNING: Any drum expansion or rounding indicates pressure buildup. Use extreme caution. When opening, release pressure slowly through bung.

SPILL/LEAK: Restrict access to area. Provide adequate protective equipment and ventilation. Remove chemicals which can react with the spilled material. Do not allow entry into sewers or waterways. Contain by diking with soil or other absorbent material. Scoop up with absorbent and place into chemical waste container.

SECTION #8 - SPECIAL PROTECTIVE MEASURES

VENTILATION:	Good general ventilation should be sufficient for most conditions.
RESPIRATORY PROTECTION:	None needed under normal conditions of use.
SKIN PROTECTION:	Use chemical resistant glove such as butyl rubber, nitrile or neoprene.
EYE PROTECTION:	Wear safety glasses or goggles.
OTHER:	None needed.
WORK HYGIENIC PRACTICES:	Remove contaminated clothing. Wash contaminated clothing before reuse. If liquid is absorbed into shoes or gloves, discard.

SECTION #9 - STORAGE AND HANDLING INFORMATION

STORAGE: Store in a cool, dry area, away from direct sunlight and any incompatible materials. Keep container closed when not in use. Protect from physical damage.

STORE AT TEMPERATURE BETWEEN 50°F-100°F.

SECTION #10 - TRANSPORTATION INFORMATION

NOT REGULATED

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SECTION #11 - REGULATORY INFORMATION

The following regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

SARA TITLE III Section 311/312 Hazard Category: Acute Health

SARA TITLE Section 313 Toxic Chemical List (40CFR372)

This product does not contain a component which is listed in Section 313 at or above minimum concentrations.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (40CFR302.4)

This product is not regulated under CERCLA and SARA Title III Section 304.

This product is not or does not contain component(s) listed in 40CFR Table 302.4.

California Proposition 65:

No components are listed under Prop 65.

Toxic Substances Control Act (TSCA) Inventory Status:

All components are listed on the TSCA Inventory.

HMIS Rating: HEALTH: 1 FIRE: 0 REACTIVITY: 0

NFPA Rating: HEALTH: 1 FIRE: 0 REACTIVITY: 0

SECTION #12 - TOXICOLOGICAL INFORMATION

Toxicity

Oral: Not established

Inhalation: Not an expected route of exposure.

Dermal: Direct skin or eye contact will cause irritation and discomfort.

Chronic Effects: Carcinogenicity: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA

Ecological Data

Fish: 96 hr, LC50, *Pimephales promelas*, 5359 mg/L

Algae: Not established

Daphnia: 48 hr, LC50, *Daphnia magna*, 7071 mg/L

Bioaccumulation: Material is not expected to bio-accumulate.

Persistence/Degradability: Garratt-Callahan has not conducted biodegradation studies with this product since when dissolved/hydrolyzed in water it yields completely mineralized materials.

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**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
13S	TA-46-347	03A, Treated Cooling Water Discharges	Canada del Buey

SOURCE OF DISCHARGE

Outfall 13S is located at TA-46 and potentially discharges treated sanitary wastewater effluent from the Sanitary Waste Water System (SWWS) Plant to the TA-3-336 Reuse Tank or to Canada del Buey. The existing operations at SWWS do not currently discharge treated sanitary effluent directly to Canada del Buey. The discharge is temporarily stored in an effluent holding pond at the SWWS Plant and then pumped up gradient to the Reuse Tank located at the TA-3 Power Plant. Treated sanitary wastewater from the Reuse tank is then discharged to Outfall 001 or to the Sanitary Effluent Reclamation Facility (SERF) for tertiary treatment and reuse at the Strategic Computing Complex (SCC) cooling towers. The NPDES sampling location (Outfall 13S) is located after the chlorine contact chamber in TA-46-33 and allows for the collection of a sample after the final treatment process and prior to being pumped to SERF.

**Table 1
 Sources for Discharges to Outfall 13S**

TA	Bldg	Description
46	333, 347, 431, 334, 336, 335, 337, 338, 375, 340, 477	Sanitary Waste Water System (SWWS) Plant

Figure 1 provides a process schematic of the SWWS Plant and the location of Outfall 13S.

WATER TREATMENT PROCESS

The SWWS plant treats sanitary wastewater, process water, cooling water, storm water, and wastewater discharged to the sanitary sewer and/or collected in storage tanks from all technical areas at the Laboratory (Appendix I). All wastewater discharged to the SWWS Plant must comply with the facility's Waste Acceptance Criteria (WAC) and, if it is something other than sanitary waste, must have a completed/approved Waste Profile Form (WPF) (Appendix N). The following bullets summarize operations at the SWWS Plant:

- Wastewater is received at the SWWS Plant from the sanitary wastewater collection system and is routed through a bar screen to remove solids (i.e., gloves, mop strings, paper towels, sand, asphalt, gravel), which are collected in waste bins and transported offsite to an approved landfill. It is then routed through a grit chamber where it is mixed and the grit is separated. After the grit chamber the wastewater is forced to a splitter box where soda ash and glycerin are added to adjust the alkalinity and provide an additional carbon source for the microorganisms used at the facility.
- Wastewater is then routed to the equalization basins and through 4 aeration basins where it is air sparged at different rates to promote biological growth and treatment. After the aeration basins the wastewater is routed to the secondary clarifiers. The clarified water is routed to the chlorine contact chamber to be disinfected. Chlorine is generated by a MIOX treatment unit that uses brine water and electrophoresis to create a mixed oxidant solution that is used for disinfection.
- Disinfected water is then discharged to the effluent holding pond and pumped up gradient to the Reuse Tank located at the TA-3 Power Plant. From the Reuse Tank the SWWS effluent may be discharged to Outfall 001, reused at the power plant, or routed to the SERF for tertiary

treatment (see Outfall 001). The discharge operations for Outfall 001 de-chlorinate the SWWS effluent prior to discharge through the outfall.

- Waste sludge from the SWWS is mixed with a polymer, and discharged to the sludge drying beds. Decanted water from the digester and/or sludge drying beds is recycled to the head works for treatment. The polymer is used to help flocculate the sludge into large pieces. Dried sludge is packaged into roll off bins and shipped to an approved landfill.

The water treatment codes provided in Table 2 have been assigned to this outfall.

Table 2
Water Treatment Codes Assigned to Outfall 13S

Treatment Code	Treatment Process	Description
1-T	Screening	Use of Bar Screen to remove solids.
1-M	Grit Removal	Grit Chamber
1-O	Mixing	Grit Chamber with Splitter Box
3-E	Pre-Aeration	Aeration Basins
3-A	Activated Sludge	Activated sludge is used to treat the water.
1-U	Sedimentation (settling)	Sludge is settled in clarifier and digester.
2-F	Disinfection (Chlorine)	Chlorine is added using a MIOX system.
4-C	Reuse/recycle of treated effluent	Effluent is sent to reuse tank.
5-H	Drying beds	Sludge drying beds on site.
5-Q	Landfill	Sludge and solids disposed of at an approved landfill.
5-G	Composting	Pilot project in process

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to feed the microorganisms, adjust the pH, maintain/control biological growth, and treat sanitary wastewater. Table 3 provides a list of the chemicals used at the SWWS Plant.

Table 3
Treatment Chemicals Used by the SWWS Facility

Chemical Name	Reason for Use	Hazardous Substances Form 2C, Table 2C-4
Clorox Bleach	Disinfectant	Sodium Hypochlorite, sodium hydroxide
Hilex Bleach	Disinfectant at SWWS	Sodium Hypochlorite
Sodium Bisulfite	Dechlorination	Sodium bisulfite
Acetic acid	On-Site Laboratory Reagent	Acetic acid
Citric acid Monohydrate	On-Site Laboratory Reagent	NA
Sodium Hydroxide	1-50% Solutions for pH Control and/or Laboratory Reagent	Sodium hydroxide
Fresh Tablets	Lily Tabs for Odor Control	NA
Yellow/Green Liquid Concentrate	Tracing Dye	NA
Glycerine	Carbon source for microorganisms	NA
Soda Ash (Na ₂ CO ₃)	Adds alkalinity to the wastewater prior to treatment	NA
Sodium Chloride (NaCl)	Chlorine source for disinfection using the MIOX system	chlorine
Sulfur Dioxide (SO ₂)	Dechlorinate Effluent	NA
Sodium Bisulfite	Dechlorination (only added if Discharged to 13S)	Sodium bisulfite
Polymer	Flocculation Agent	NA

Table 4 identifies the contaminants listed on the WPFs for the influent received by the SWWS Plant for treatment.

**Table 4
 Potential Contaminants Associated with SWWS Influent**

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 Identified on WPFs	
Process	Wastewater discharged to the sanitary sewer from non-radiological laboratories, process equipment, and areas.	Acetic acid Ammonium chloride Chlorine Copper chloride Cupric sulfite Ferric sulfate	Ferrous sulfate Nitric acid Potassium hydroxide Sodium hydroxide Sodium nitrite Zinc sulfate
ER	Water generated due to groundwater monitoring well drilling and sampling activities.	Ammonia Benzene Chlordane Chlorine Dichlorobenzene[1,3] Dieldrin	Endosulfan Endrin Ethylbenzene Heptachlor Toluene Xylene
Cooling	Blow Down from Cooling Towers and Systems	Ammonia Chlorine Cupric sulfate Maleic acid Phosphoric acid	Potassium hydroxide Sodium bisulfite Sodium hydroxide Sodium nitrite Sulfuric acid
Sanitary	Wastewater from septic tanks at remote locations.	Chlorine Toluene	Xylene

POTENTIAL POLLUTANTS

The treatment chemicals used at the SWWS Plant and treated sanitary wastewater will constitute the pollutant load of the discharge to Outfall 13S. Table 5 identifies the Table 2C-4 constituents by discharge source.

**Table 5
 Potential Pollutants Discharged to Outfall 13S**

Table 4 – Potential Pollutants Discharged to Outfall 13S	
Description	Hazardous Constituents from Table 2C-4
SWWS Effluent	Acetic acid, Ammonia, Ammonium chloride, Benzene, Chlordane, Chlorine, Copper chloride, Cupric sulfate, Dichlorobenzene[1,3], Dieldrin, Endosulfan, Endrin, Ethylbenzene, Ferric sulfate, Ferrous sulfate, Heptachlor, Nitric acid, Phosphoric acid, Potassium hydroxide, sodium bisulfite, Sodium hydroxide, Sodium hypochlorite, Sodium nitrite, Sulfuric acid, Toluene, Xylene, Zinc sulfate, Maleic acid

DISCHARGE RATE AND FREQUENCY

The average daily flow rate for Outfall 13S is measured at the NPDES sample point located after the Chlorine Contact Chamber. It is provided in Table 6.

**Table 6
 Discharge Flow Rates/Frequencies to Outfall 13S**

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
SWWS	265,989	1M, 1T, 1U, 2F, 2H, 3A, 4C, 5H, 5Q, 1O, 3E, 5G

SAMPLING AND ANALYSIS FOR RE-APPLICATION

A composite sample for the Form 2C constituents was collected from the NPDES sample point for Outfall 13S for the Permit Re-Application on August 25, 2011.

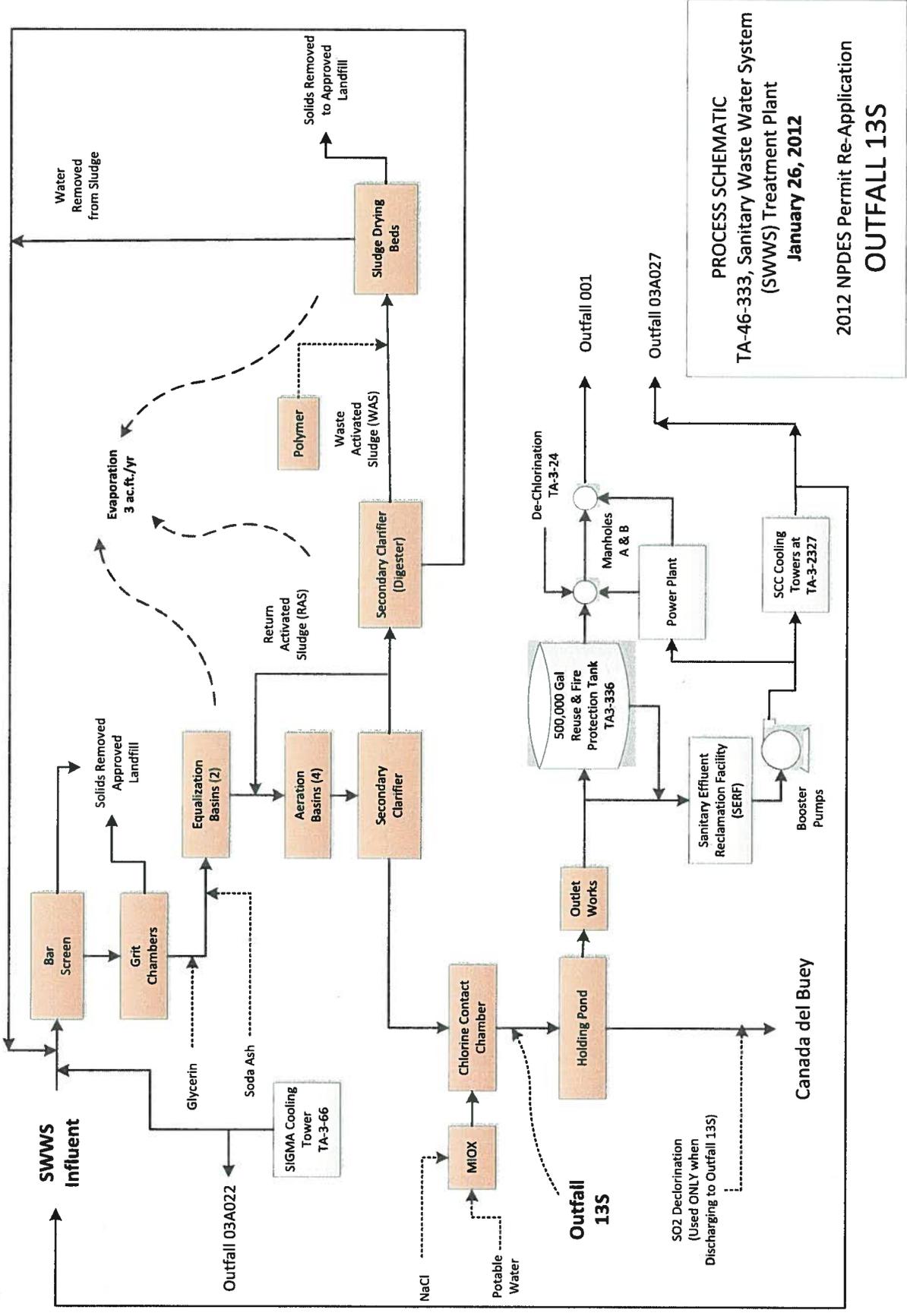
ANALYTICAL RESULTS PROVIDED

- Form 2C analytical data from the composite sample collected on August 25, 2011.
- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35° 51' 08"N
- Longitude – 106° 16' 29"W
- Total Hardness (SM 2340C, Hardness as CaCO₃) – 102 mg/L.
- Photographs for the SWWS Facility are attached.

Figure 1
 Process Schematic and Water Balance for the Sanitary Waste Water System (SWWS) Treatment Plant and Outfall 13S



PROCESS SCHEMATIC
 TA-46-333, Sanitary Waste Water System
 (SWWS) Treatment Plant
 January 26, 2012
 2012 NPDES Permit Re-Application
 OUTFALL 13S

Photographs - Sanitary Waste Water System (SWWS) Plant



Photograph #1 – SWWS
Discharge point to Canada del Buey



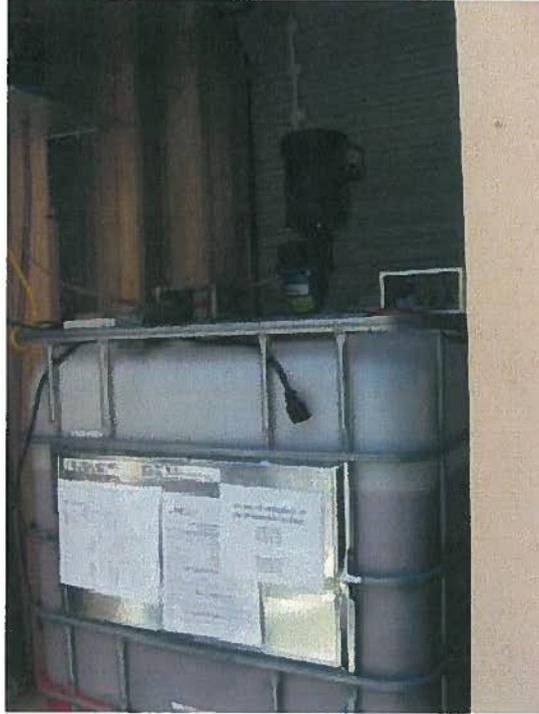
Photograph #2 – SWWS
“Receiving Stream” - Canada del Buey



Photograph #3 – SWWS
Bar Screen



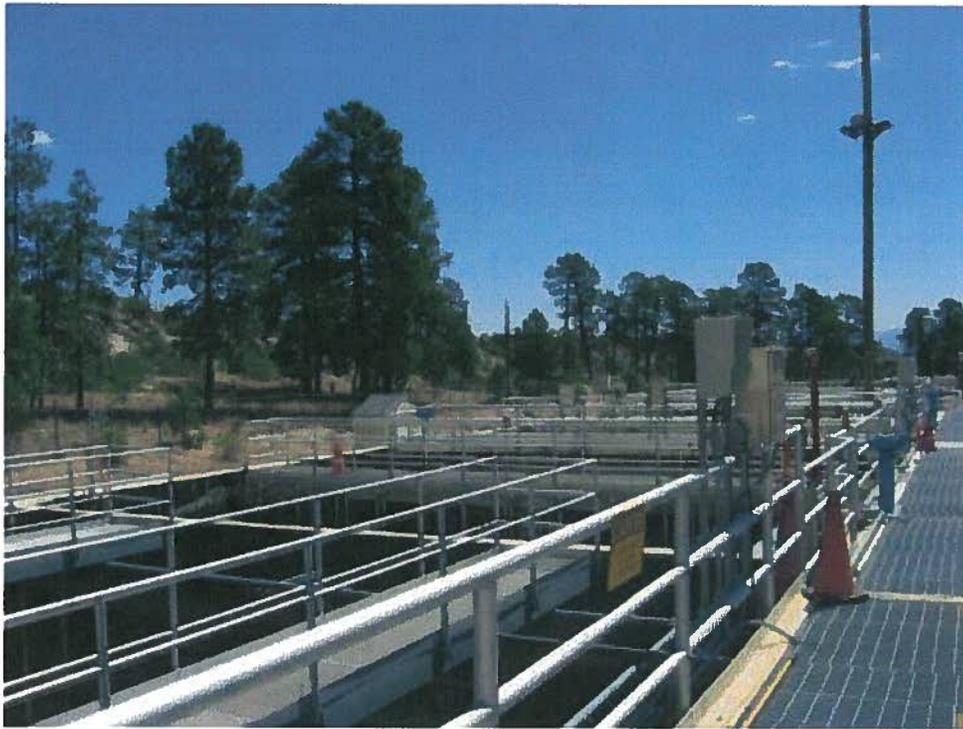
Photograph #4 – SWWS
Grit Chamber



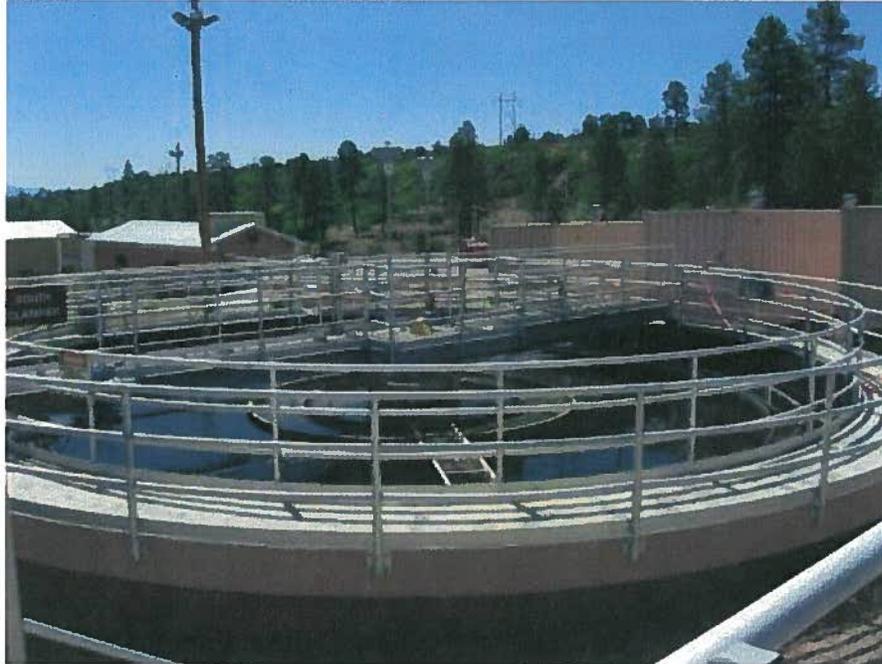
**Photograph #5 – SWWS
Glycerin Feed System**



**Photograph #6 – SWWS
Soda Ash Feed System**



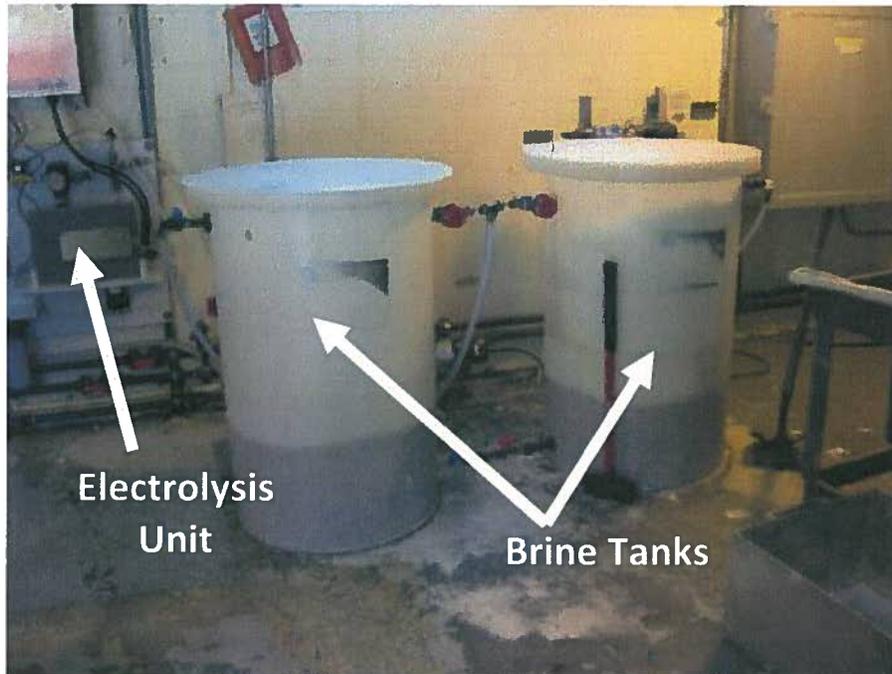
Photograph # 7 and 8 – SWWS
Equalization and Aeration Basins



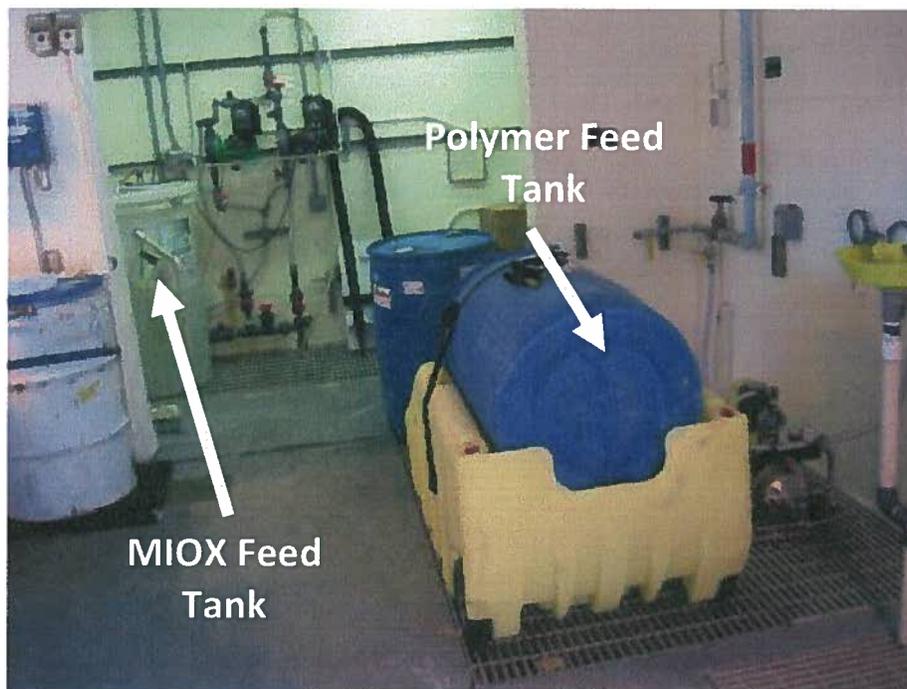
Photograph #9 – SWWS
Secondary Clarifier



Photograph #10 – SWWS
Chlorine Contact Chamber



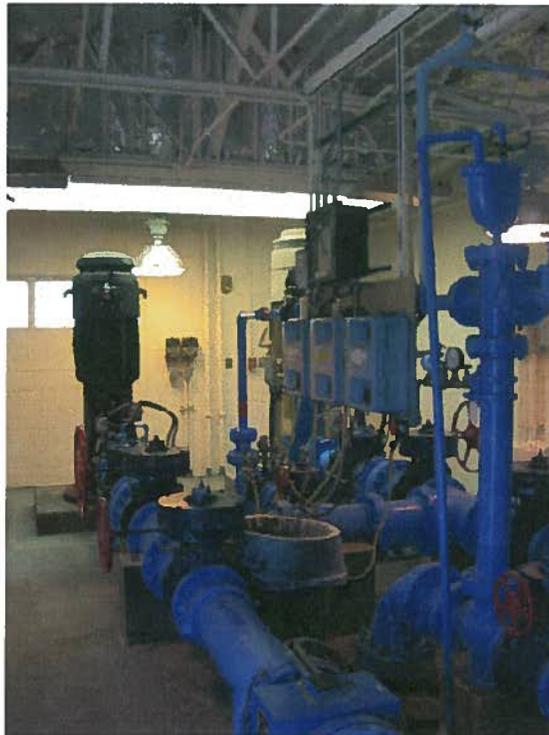
Photograph #11 – SWWS
MIOX System Brine Tanks & Electrolysis Unit



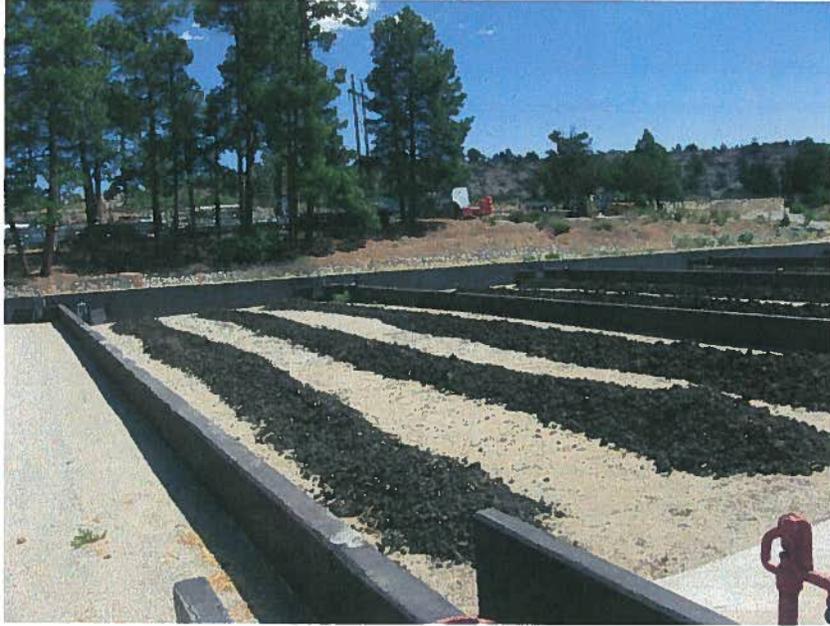
Photograph #12 – SWWS
MIOX Disinfection Solution & Polymer Feed Systems



Photograph #13 – SWWS
Holding Pond (Floats [black balls] Prevent Algal Growth)



Photograph #14 – SWWS
Reuse Pumping System & Chlorine Analyzers



Photograph #15 and 16 – SWWS
Sludge Drying Beds

DMR Outfall Data Summary - 13S
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR							
				Flow Rate			Analytical Lab Result			Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples	
				Average	Maximum	Units	Symbol	Result	Units								MQL
		6/11	Flow (Totalized Est.)	0.23213	0.30800	MGD						0.23213	0.30800	MGD	Report	NA	30
		7/11	Flow (Totalized Est.)	0.24926	0.32400	MGD						0.24926	0.32400	MGD	Report	NA	31
		8/11	Flow (Totalized Est.)	0.33836	0.44300	MGD						0.33836	0.44300	MGD	Report	NA	31
		9/11	Flow (Totalized Est.)	0.31693	0.41400	MGD						0.31693	0.41400	MGD	Report	NA	30
		10/11	Flow (Totalized Est.)	0.32403	0.46100	MGD						0.32403	0.46100	MGD	Report	NA	31
		11/11	Flow (Totalized Est.)	0.31800	0.43400	MGD						0.31800	0.43400	MGD	Report	NA	30
		12/11	Flow (Totalized Est.)	0.33603	0.46400	MGD						0.33603	0.46400	MGD	Report	NA	31
				Average			NA	NA	NA	0.35675	MGD	NA	0.35675	MGD			Total
				Maximum			NA	NA	NA	0.48500	MGD	0.33836	0.48500	MGD			1612
		8/07	pH								7.0				6.0 - 9.0	SU	5
		9/07	pH								7.0				6.0 - 9.0	SU	4
		10/07	pH								6.9				6.0 - 9.0	SU	5
		11/07	pH								7.0				6.0 - 9.0	SU	5
		12/07	pH								6.9				6.0 - 9.0	SU	4
		1/08	pH								7.0				6.0 - 9.0	SU	4
		2/08	pH								6.9				6.0 - 9.0	SU	4
		3/08	pH								7.0				6.0 - 9.0	SU	5
		4/08	pH								7.0				6.0 - 9.0	SU	5
		5/08	pH								7.0				6.0 - 9.0	SU	5
		6/08	pH								7.0				6.0 - 9.0	SU	4
		7/08	pH								6.9				6.0 - 9.0	SU	5
		8/08	pH								7.1				6.0 - 9.0	SU	4
		9/08	pH								7.0				6.0 - 9.0	SU	4
		10/08	pH								7.1				6.0 - 9.0	SU	5
		11/08	pH								7.1				6.0 - 9.0	SU	4
		12/08	pH								7.0				6.0 - 9.0	SU	4
		1/09	pH								7.1				6.0 - 9.0	SU	5
		2/09	pH								7.1				6.0 - 9.0	SU	4
		3/09	pH								7.1				6.0 - 9.0	SU	4
		4/09	pH								7.0				6.0 - 9.0	SU	4
		5/09	pH								7.1				6.0 - 9.0	SU	4
		6/09	pH								7.2				6.0 - 9.0	SU	4
		7/09	pH								7.0				6.0 - 9.0	SU	5
		8/09	pH								7.1				6.0 - 9.0	SU	4
		9/09	pH								7.2				6.0 - 9.0	SU	4
		10/09	pH								7.5				6.0 - 9.0	SU	4
		11/09	pH								7.4				6.0 - 9.0	SU	4
		12/09	pH								7.2				6.0 - 9.0	SU	4
		1/10	pH								7.3				6.0 - 9.0	SU	5
		2/10	pH								7.4				6.0 - 9.0	SU	4
		3/10	pH								7.4				6.0 - 9.0	SU	4
		4/10	pH								7.2				6.0 - 9.0	SU	4
		5/10	pH								7.4				6.0 - 9.0	SU	4
		6/10	pH								7.5				6.0 - 9.0	SU	4
		7/10	pH								7.3				6.0 - 9.0	SU	5
		8/10	pH								7.6				6.0 - 9.0	SU	4

DMR Outfall Data Summary - 13S
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Flow Rate			Outfall Data				Reported on DMR									
				Average	Maximum	Units	Analytical Lab Result		DMR Units		Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples			
							Symbol	Result	Units	MQL								Result	Units	MQL
		4/09	BOD ^a				<	2	<	2	mg/L	30/45	<	3	<	3	lb/D	75/112	lb/D	1
		5/09	BOD ^a				<	2	<	2	mg/L	30/45	<	3	<	3	lb/D	75/112	lb/D	1
		6/09	BOD ^a				<	2	<	2	mg/L	30/45	<	4	<	4	lb/D	75/112	lb/D	2
		7/09	BOD ^a				<	3	<	3	mg/L	30/45	<	4	<	4	lb/D	75/112	lb/D	1
		8/09	BOD ^a				<	2	<	2	mg/L	30/45	<	4	<	4	lb/D	75/112	lb/D	1
		9/09	BOD ^a				<	4	<	4	mg/L	30/45	<	9	<	9	lb/D	75/112	lb/D	1
		10/09	BOD ^a				<	1	<	1	mg/L	30/45	<	1	<	1	lb/D	75/112	lb/D	1
		11/09	BOD ^a					3		3	mg/L	30/45		5		5	lb/D	75/112	lb/D	1
		12/09	BOD ^a					2		2	mg/L	30/45		3		3	lb/D	75/112	lb/D	1
		1/10	BOD ^a					4		4	mg/L	30/45		7		7	lb/D	75/112	lb/D	1
		2/10	BOD ^a					3		3	mg/L	30/45		7		7	lb/D	75/112	lb/D	1
		3/10	BOD ^a					2		2	mg/L	30/45		4		4	lb/D	75/112	lb/D	1
		4/10	BOD ^a					2		2	mg/L	30/45		4		4	lb/D	75/112	lb/D	1
		5/10	BOD ^a					2		2	mg/L	30/45		4		4	lb/D	75/112	lb/D	1
		6/10	BOD ^a					1		1	mg/L	30/45		3		3	lb/D	75/112	lb/D	1
		7/10	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		8/10	BOD ^a					1		1	mg/L	30/45		2		2	lb/D	75/112	lb/D	1
		9/10	BOD ^a					2		2	mg/L	30/45		4		4	lb/D	75/112	lb/D	1
		10/10	BOD ^a					24		24	mg/L	30/45		46		46	lb/D	75/112	lb/D	1
		11/10	BOD ^a					1		1	mg/L	30/45		3		3	lb/D	75/112	lb/D	1
		12/10	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		1/11	BOD ^a					2		2	mg/L	30/45		4		4	lb/D	75/112	lb/D	1
		2/11	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		3/11	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		4/11	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		5/11	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		6/11	BOD ^a				<	1	<	1	mg/L	30/45	<	3	<	3	lb/D	75/112	lb/D	1
		7/11	BOD ^a				<	3	<	3	mg/L	30/45	<	6	<	6	lb/D	75/112	lb/D	1
		8/11	BOD ^a				<	1	<	1	mg/L	30/45	<	2	<	2	lb/D	75/112	lb/D	1
		9/11	BOD ^a				<	3	<	3	mg/L	30/45	<	1	<	1	lb/D	75/112	lb/D	2
		10/11	BOD ^a				<	3	<	3	mg/L	30/45	<	1	<	1	lb/D	75/112	lb/D	1
		11/11	BOD ^a				<	2	<	2	mg/L	30/45	<	1	<	1	lb/D	75/112	lb/D	1
		12/11	BOD ^a				<	4	<	4	mg/L	30/45	<	1	<	1	lb/D	75/112	lb/D	1
								2		2	mg/L	30/45		6		6	lb/D	75/112	lb/D	1
				Average	2	mg/L					Average	5	lb/D							
				Maximum	24	mg/L					Maximum	46	lb/D							
												Total	57							

Concentration										Loading				
Symbol	Average	Symbol	Maximum	Units	Permit Limit	Symbol	Average	Symbol	Maximum	Units	Permit Limit	Units	Maximum	Number of Samples
	1		1	mg/L	30/45		2		2	lb/D	75/112	mg/L; lb/D	2	1
13S														

DMR Outfall Data Summary - 13S
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg.	Monthly Monitoring Period	Parameter	Flow Rate			Outfall Data				Reported on DMR								
				Average	Maximum	Units	Analytical Lab Result		DMR Units		Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples		
							Result	Units	MQL	Result								Units	MQL
		9/07	TSS ^b					1			mg/L	1	30/45	2	2	lb/D	75/112	mg/L; lb/D	1
		10/07	TSS ^b					1			mg/L	1	30/45	1	1	lb/D	75/112	mg/L; lb/D	1
		11/07	TSS ^b					0.43				0	30/45	0	0	lb/D	75/112	mg/L; lb/D	1
		12/07	TSS ^b					5				5	30/45	11	11	lb/D	75/112	mg/L; lb/D	1
		1/08	TSS ^b					4				4	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		2/08	TSS ^b					3				3	30/45	8	8	lb/D	75/112	mg/L; lb/D	1
		3/08	TSS ^b					4				4	30/45	10	10	lb/D	75/112	mg/L; lb/D	1
		4/08	TSS ^b					2				2	30/45	<5	<5	lb/D	75/112	mg/L; lb/D	1
		5/08	TSS ^b					2				2	30/45	5	5	lb/D	75/112	mg/L; lb/D	1
		6/08	TSS ^b					2				2	30/45	3	3	lb/D	75/112	mg/L; lb/D	1
		7/08	TSS ^b					2				2	30/45	<2	<2	lb/D	75/112	mg/L; lb/D	1
		8/08	TSS ^b					2				2	30/45	<6	<6	lb/D	75/112	mg/L; lb/D	1
		9/08	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		10/08	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		11/08	TSS ^b					4				4	30/45	8	8	lb/D	75/112	mg/L; lb/D	1
		12/08	TSS ^b					3				3	30/45	8	8	lb/D	75/112	mg/L; lb/D	1
		1/09	TSS ^b					6				6	30/45	12	12	lb/D	75/112	mg/L; lb/D	1
		2/09	TSS ^b					4				4	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		3/09	TSS ^b					4				4	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		4/09	TSS ^b					9				9	30/45	15	15	lb/D	75/112	mg/L; lb/D	1
		5/09	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		6/09	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		7/09	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		8/09	TSS ^b					2				2	30/45	<4	<4	lb/D	75/112	mg/L; lb/D	1
		9/09	TSS ^b					4				4	30/45	<9	<9	lb/D	75/112	mg/L; lb/D	1
		10/09	TSS ^b					3				3	30/45	4	4	lb/D	75/112	mg/L; lb/D	1
		11/09	TSS ^b					3				3	30/45	5	5	lb/D	75/112	mg/L; lb/D	1
		12/09	TSS ^b					1				1	30/45	2	2	lb/D	75/112	mg/L; lb/D	1
		1/10	TSS ^b					3				3	30/45	6	6	lb/D	75/112	mg/L; lb/D	1
		2/10	TSS ^b					5				5	30/45	12	12	lb/D	75/112	mg/L; lb/D	1
		3/10	TSS ^b					7				7	30/45	14	14	lb/D	75/112	mg/L; lb/D	1
		4/10	TSS ^b					2				2	30/45	5	5	lb/D	75/112	mg/L; lb/D	1
		5/10	TSS ^b					3				3	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		6/10	TSS ^b					1				1	30/45	3	3	lb/D	75/112	mg/L; lb/D	1
		7/10	TSS ^b					2				2	30/45	6	6	lb/D	75/112	mg/L; lb/D	1
		8/10	TSS ^b					3				3	30/45	6	6	lb/D	75/112	mg/L; lb/D	1
		9/10	TSS ^b					4				4	30/45	9	9	lb/D	75/112	mg/L; lb/D	1
		10/10	TSS ^b					4				4	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		11/10	TSS ^b					2				2	30/45	4	4	lb/D	75/112	mg/L; lb/D	1
		12/10	TSS ^b					1				1	30/45	3	3	lb/D	75/112	mg/L; lb/D	1
		1/11	TSS ^b					3				3	30/45	7	7	lb/D	75/112	mg/L; lb/D	1
		2/11	TSS ^b					4				4	30/45	8	8	lb/D	75/112	mg/L; lb/D	1

Please print or type in the unshaded areas only.

NM0890019515

FORM
2C
NPDES



U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
13S	35.00	51.00	8.00	106.00	16.00	29.00	Canada del Buey, Ephemeral Tributary to the Rio Grande (20.6.128)

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION		b. LIST CODES FROM TABLE 2C-1
13S	TA-46-347, SWWS	265,989 GPD (A)	**All of the following Codes Apply**		
	Sanitary Waste	(141,516 GPD)	Screening	1	T
	Cooling Water	(31,459 GPD)	Grit Removal	1	M
	Process Water	(85,227 GPD)	Mixing	1	O
	Stormwater	(440 GPD)	Pre-Aeration	3	B
	Environmental Restoration Water	(7,347 GPD)	Activated Sludge	3	A
			Sedimentation (settling)	1	U
			Disinfection (chlorine)	2	P
			Reuse/Recycle of Treated Effluent	4	C
			(sludge) Drying Beds	5	H
		(sludge) Landfill	5	Q	
		(sludge) Composting (Currently a Pilot Project)	5	G	

OFFICIAL USE ONLY (effluent guidelines sub-categories)

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(S) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
13S	TA-46-347 - Sanitary Waste Water System (SWWS) (A) - Sanitary (141,516 GPD) - Cooling (31,459 GPD) - Process (85,227 GPD) - Stormwater (440 GPD) - Environmental (7,347 GPD) - Sludge (NA)	7	12	0.265989 MGD	0.475 MGD	265,989 Gallons	475,000 Gallons	364

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
Compliance Schedule to meet Effluent Limits for PCBs	13S	Sanitary Waste Water Treatment Facility	Complete corrective actions so that discharge from Outfall 13S complies with final effluent limits for PCBs (0.00064 ug/L AVG; 0.00064 ug/L MAX) per EPA approved schedule or one (1) day before the expiration date of the permit, whichever comes first.	July 30, 2012	July 30, 2012

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Applicable only when discharge is made directly to Canda del Buey. The effluent from the SWWS Facility is routed to the reuse tank at the Power Plant and is either discharged to Outfall 001 or will be routed to tertiary treatment at the SERF.

See Outfall 001 for biological test data.

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

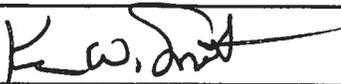
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Española, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages.
SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
138

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)			4. INTAKE (optional)			
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	4	15.8562	4	9.6947	2	4.4396	mg/L	1b/D	NA	NA	NA
b. Chemical Oxygen Demand (COD)	42.5	168					mg/L	1b/D	NA	NA	NA
c. Total Organic Carbon (TOC)	6.62	26.2					mg/L	1b/D	NA	NA	NA
d. Total Suspended Solids (TSS)	4	15.8562	4	9.6947	2.1667	4.4396	mg/L	1b/D	NA	NA	NA
e. Ammonia (as N)	0.0611	0.242					mg/L	1b/D	NA	NA	NA
f. Flow	VALUE	0.475 (C)	VALUE	0.290 (D)	VALUE	0.266 (E)	MGD	NA	VALUE	NA	NA
g. Temperature (winter)	VALUE	14 (F)	VALUE	11.5 (G)	VALUE	11.4	°C		VALUE	NA	NA
h. Temperature (summer)	VALUE	25.9 (F)	VALUE	24.7 (G)	VALUE	23.3	°C		VALUE	NA	NA
i. pH	MINIMUM 7.2 (H)	MAXIMUM 7.7 (H)	MINIMUM 7.5 (I)	MAXIMUM 7.7 (I)			STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)	X		0.136	0.539				1	mg/L	1b/D	NA	NA	NA
b. Chlorine, Total Residual	X		NA		(J)								
c. Color	X		1.0	NA				1	mg/L	1b/D	NA	NA	NA
d. Fecal Coliform	X		1.0/100	NA	(K)			1	cfu/mL	NA	NA	NA	NA
e. Fluoride (16984-48-8)	X		0.342	1.36				1	mg/L	1b/D	NA	NA	NA
f. Nitrate-Nitrite (as N)	X		3.86	15.3				1	mg/L	1b/D	NA	NA	NA

EPA Form 3510-2C (8-90)

PAGE V-1

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)		X	<0.035	<0.139	(L)		1	mg/L	1b/D	NA	NA	NA	NA
h. Oil and Grease		X	<1.42	<5.63	(L)		1	mg/L	1b/D	NA	NA	NA	NA
i. Phosphorus (as P), Total (7723-14-0)	X		1.84	7.29			1	mg/L	1b/D	NA	NA	NA	NA
j. Radioactivity													
(1) Alpha, Total	X		3.74	NA			1	pCi/L	NA	NA	NA	NA	NA
(2) Beta, Total	X		18.8	NA			1	pCi/L	NA	NA	NA	NA	NA
(3) Radium, Total	X		<0.832	NA			1	pCi/L	NA	NA	NA	NA	NA
(4) Radium 226, Total	X		<0.696	NA			1	pCi/L	NA	NA	NA	NA	NA
k. Sulfate (as SO ₄) (14808-79-8)	X		28	111			1	mg/L	1b/D	NA	NA	NA	NA
l. Sulfide (as S)	X		<0.03	<0.119	(L)		1	mg/L	1b/D	NA	NA	NA	NA
m. Sulfite (as SO ₃) (14265-45-3)	X		0.15	0.595			1	mg/L	1b/D	NA	NA	NA	NA
n. Surfactants	X		<0.016	<0.0634	(L)		1	mg/L	1b/D	NA	NA	NA	NA
o. Aluminum, Total (7429-90-5)	X		0.059	0.234			1	mg/L	1b/D	NA	NA	NA	NA
p. Barium, Total (7440-39-3)	X		0.0405	0.161	(M)		1	mg/L	1b/D	NA	NA	NA	NA
q. Boron, Total (7440-42-8)	X		0.0743	0.295	(N)		1	mg/L	1b/D	NA	NA	NA	NA
r. Cobalt, Total (7440-48-4)	X		1.1E-04	4E-04	(O)		1	mg/L	1b/D	NA	NA	NA	NA
s. Iron, Total (7439-89-6)	X		0.0902	0.358			1	mg/L	1b/D	NA	NA	NA	NA
t. Magnesium, Total (7439-95-4)	X		8.8	34.9			1	mg/L	1b/D	NA	NA	NA	NA
u. Molybdenum, Total (7439-98-7)	X		0.0065	0.0258	(P)		1	mg/L	1b/D	NA	NA	NA	NA
v. Manganese, Total (7439-96-5)	X		0.0047	0.0186			1	mg/L	1b/D	NA	NA	NA	NA
w. Tin, Total (7440-31-5)	X		<0.001	<4E-03	(L)		1	mg/L	1b/D	NA	NA	NA	NA
x. Titanium, Total (7440-32-6)	X		0.0095	0.0377			1	mg/L	1b/D	NA	NA	NA	NA

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EPA I.D. NUMBER (copy from Item 1 of Form 1) **NM0890019515**
 OUTFALL NUMBER **135**

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PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS			5. INTAKE (optimal)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES	
												(2) MASS
METALS, CYANIDE, AND TOTAL PHENOLS												
1M. Antimony, Total (7440-36-0)			X	<0.001	<4E-03 (Q)		1	mg/L	1b/D	NA	NA	NA
2M. Arsenic, Total (7440-38-2)		X		0.00238	0.0094		1	mg/L	1b/D	NA	NA	NA
3M. Beryllium, Total (7440-41-7)		X		<2E-04	<8E-04 (Q)		1	mg/L	1b/D	NA	NA	NA
4M. Cadmium, Total (7440-43-9)		X		<1.1E-04	4E-04 (Q)		1	mg/L	1b/D	NA	NA	NA
5M. Chromium, Total (7440-47-3)		X		0.0015	0.0059 (R)		1	mg/L	1b/D	NA	NA	NA
6M. Copper, Total (7440-50-8)		X		0.0049	0.0194		1	mg/L	1b/D	NA	NA	NA
7M. Lead, Total (7439-92-1)		X		<5E-04	<2E-03 (Q)		1	mg/L	1b/D	NA	NA	NA
8M. Mercury, Total (7439-97-6)		X		2.84E-06	1E-05		1	mg/L	1b/D	NA	NA	NA
9M. Nickel, Total (7440-02-0)		X		0.0011	4E-03		1	mg/L	1b/D	NA	NA	NA
10M. Selenium, Total (7782-49-2)		X		0.0018	7E-03 (S)		1	mg/L	1b/D	NA	NA	NA
11M. Silver, Total (7440-22-4)		X		<2E-04	<8E-04 (Q)		1	mg/L	1b/D	NA	NA	NA
12M. Thallium, Total (7440-28-0)		X		<4.5E-04	<2E-03 (Q)		1	mg/L	1b/D	NA	NA	NA
13M. Zinc, Total (7440-66-6)		X		0.0385	0.153		1	mg/L	1b/D	NA	NA	NA
14M. Cyanide, Total (57-12-5)		X		1.61E-03	6E-03 (T)		1	mg/L	1b/D	NA	NA	NA
15M. Phenols, Total		X		<1.6E-03	<6E-03		1	mg/L	1b/D	NA	NA	NA
DIOXIN												
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)		X										

DESCRIBE RESULTS The result from the analytical laboratory is <1.09E-08 mg/L. This is above the limit of the MQL of 1.0E-08 mg/L but is likely due to discrepancies in the amount of sample received by the laboratory and the number of significant figures that are required to be reported. This result is considered a non-detect. See footnote (U) for additional information.

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'		3. EFFLUENT				4. UNITS		5. INTAKE (optional)					
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE					
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS				
GC/MS FRACTION - VOLATILE COMPOUNDS														
1V. Acrolein (107-02-8)			X	<1.25E-03	<5E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
2V. Acrylonitrile (107-13-1)			X	<1E-03	<4E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
3V. Benzene (71-43-2)			X	<3E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
4V. Bis (Chloromethyl) Ether (542-88-1)				NA		(V)								
5V. Bromoform (75-25-2)		X		0.0386	0.153				1	mg/L	1b/D	NA	NA	NA
6V. Carbon Tetrachloride (56-23-5)			X	<3E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
7V. Chlorobenzene (108-90-7)			X	<2.5E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
8V. Chlorodibromomethane (124-48-1)		X		0.0936	0.371				1	mg/L	1b/D	NA	NA	NA
9V. Chloroethane (75-00-3)			X	<3E-04	<1E-03	(L)			1	mg/L	1b/D	NA	NA	NA
10V. 2-Chloroethylvinyl Ether (110-75-8)			X	<1.5E-03	<6E-03	(L)			1	mg/L	1b/D	NA	NA	NA
11V. Chloroform (67-66-3)		X		0.0234	0.0928				1	mg/L	1b/D	NA	NA	NA
12V. Dichlorobromomethane (75-27-4)		X		0.0535	0.212				1	mg/L	1b/D	NA	NA	NA
13V. Dichlorodifluoromethane (75-71-8)				NA		(V)								
14V. 1,1-Dichloroethane (75-34-3)			X	<3E-04	<1E-03	(L)			1	mg/L	1b/D	NA	NA	NA
15V. 1,2-Dichloroethane (107-06-2)			X	<2.5E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
16V. 1,1-Dichloroethylene (75-35-4)			X	<3E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
17V. 1,2-Dichloropropane (78-87-5)			X	<2.5E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
18V. 1,3-Dichloropropylene (542-75-6)			X	<2.5E-04	<1E-03	(Q, W)			1	mg/L	1b/D	NA	NA	NA
19V. Ethylbenzene (100-41-4)			X	<2.5E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
20V. Methyl Bromide (74-83-9)			X	<3E-04	<1E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
21V. Methyl Chloride (74-87-3)			X	<3E-04	<1E-03	(L)			1	mg/L	1b/D	NA	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	5. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)												
22V. Methylene Chloride (75-09-2)			X	<0.003	<0.01	(Q)		1	mg/L	lb/D	NA	NA
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X	<2.5E-04	1E-03	(Q)		1	mg/L	lb/D	NA	NA
24V. Tetrachloroethylene (127-18-4)			X	<3E-04	<1E-03	(Q)		1	mg/L	lb/D	NA	NA
25V. Toluene (108-88-3)			X	<2.5E-04	<1E-03	(Q)		1	mg/L	lb/D	NA	NA
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X	<3E-04	<1E-03	(Q)		1	mg/L	lb/D	NA	NA
27V. 1,1,1-Trichloroethane (71-55-6)			X	<3.25E-04	1E-03	(L)		1	mg/L	lb/D	NA	NA
28V. 1,1,2-Trichloroethane (79-00-5)			X	<2.5E-04	<1E-03	(Q)		1	mg/L	lb/D	NA	NA
29V. Trichloroethylene (79-01-6)			X	<2.5E-04	<1E-03	(Q)		1	mg/L	lb/D	NA	NA
30V. Trichlorofluoromethane (75-69-4)				NA		(V)						
31V. Vinyl Chloride (75-01-4)			X	<5E-04	<2E-03	(Q)		1	mg/L	lb/D	NA	NA
GC/MS FRACTION - ACID COMPOUNDS												
1A. 2-Chlorophenol (95-57-8)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
2A. 2,4-Dichlorophenol (120-83-2)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
3A. 2,4-Dimethylphenol (105-67-9)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
4A. 4,6-Dinitro-Cresol (634-52-1)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
5A. 2,4-Dinitrophenol (51-28-5)			X	<6.25E-03	<3E-02	(Q)		1	mg/L	lb/D	NA	NA
6A. 2-Nitrophenol (88-75-5)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
7A. 4-Nitrophenol (100-02-7)			X	<3.75E-03	<2E-02	(L)		1	mg/L	lb/D	NA	NA
8A. P-Chloro-M-Cresol (59-50-7)			X	<3.75E-03	<2E-02	(L)		1	mg/L	lb/D	NA	NA
9A. Pentachlorophenol (87-86-5)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
10A. Phenol (108-95-2)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA
11A. 2,4,6-Trichlorophenol (88-05-2)			X	<3.75E-03	<2E-02	(Q)		1	mg/L	lb/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS			5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS					(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS											
1B. Acenaphthene (83-32-9)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
2B. Acenaphthylene (208-96-8)			X	<3.75E-04	<2E-03	(L)	1	mg/L	1b/D	NA	NA
3B. Anthracene (120-12-7)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
4B. Benzidine (92-87-5)			X	<3.75E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA
5B. Benzo (a) Anthracene (56-55-3)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
6B. Benzo (a) Pyrene (50-32-8)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
7B. 3,4-Benzo-fluoranthene (205-99-2)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
8B. Benzo (ghi) Perylene (191-24-2)			X	<3.75E-04	<2E-03	(L)	1	mg/L	1b/D	NA	NA
9B. Benzo (k) Fluoranthene (207-08-9)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)			X	<3.75E-03	<2E-02	(L)	1	mg/L	1b/D	NA	NA
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X	<3.75E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA
12B. Bis (2-Chloroisopropyl) Ether (102-80-1)			X	<3.75E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X	<3.75E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X	<3.75E-03	<2E-02	(L)	1	mg/L	1b/D	NA	NA
15B. Butyl Benzyl Phthalate (85-68-7)			X	<3.75E-03	<2E-02	(Q)	1	mg/L	1b/D	NA	NA
16B. 2-Chloronaphthalene (91-58-7)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X	<3.75E-03	<2E-02	(L)	1	mg/L	1b/D	NA	NA
18B. Chrysene (218-01-9)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
19B. Dibenzo (a,h) Anthracene (53-70-3)			X	<3.75E-04	<2E-03	(Q)	1	mg/L	1b/D	NA	NA
20B. 1,2-Dichlorobenzene (95-50-1)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA
21B. 1,3-Di-chlorobenzene (541-73-1)			X	<2.5E-04	<1E-03	(Q)	1	mg/L	1b/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
	(if available)			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
22B. 1,4-Dichlorobenzene (106-46-7)			X	< 2.5E-04	< 1E-03	(Q)			1	mg/L	lb/D	NA	NA
23B. 3,3-Dichlorobenzidine (91-94-1)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
24B. Diethyl Phthalate (84-66-2)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
25B. Dimethyl Phthalate (131-11-3)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
26B. Di-N-Butyl Phthalate (84-74-2)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
27B. 2,4-Dinitrotoluene (121-14-2)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
28B. 2,6-Dinitrotoluene (606-20-2)			X	< 3.75E-03	< 2E-02	(L)			1	mg/L	lb/D	NA	NA
29B. Di-N-Octyl Phthalate (117-84-0)			X	< 3.75E-03	< 2E-02	(L)			1	mg/L	lb/D	NA	NA
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
31B. Fluoranthene (206-44-0)			X	< 3.75E-04	< 2E-03	(Q)			1	mg/L	lb/D	NA	NA
32B. Fluorene (86-73-7)			X	< 3.75E-04	< 2E-03	(Q)			1	mg/L	lb/D	NA	NA
33B. Hexachlorobenzene (118-74-1)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
34B. Hexachlorobutadiene (67-68-3)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
35B. Hexachlorocyclopentadiene (77-47-4)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
36B. Hexachloroethane (67-72-1)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X	< 3.75E-04	< 2E-03	(Q)			1	mg/L	lb/D	NA	NA
38B. Isophorone (78-59-1)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
39B. Naphthalene (91-20-3)			X	< 3.75E-04	< 2E-03	(L)			1	mg/L	lb/D	NA	NA
40B. Nitrobenzene (98-95-3)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
41B. N-Nitrosodimethylamine (62-75-9)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X	< 3.75E-03	< 2E-02	(Q)			1	mg/L	lb/D	NA	NA

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'		3. EFFLUENT				4. UNITS		5. INTAKE (optional)				
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE			
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			(1) CONCENTRATION	(2) MASS		
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
43B. N-Nitrosodiphenylamine (86-30-6)			X	<3.75E-03	(Q, X)			1	mg/L	1b/D	NA	NA	NA
44B. Phenanthrene (85-01-8)			X	<3.75E-04	(L)			1	mg/L	1b/D	NA	NA	NA
45B. Pyrene (129-00-0)			X	<3.75E-04	(Q)			1	mg/L	1b/D	NA	NA	NA
46B. 1,2,4-Trichlorobenzene (120-82-1)			X	<3.75E-03	(Q)			1	mg/L	1b/D	NA	NA	NA
GC/MS FRACTION - PESTICIDES													
1P. Aldrin (309-00-2)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
2P. α-BHC (319-84-6)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
3P. β-BHC (319-85-7)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
4P. γ-BHC (68-89-9)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
5P. δ-BHC (319-86-8)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
6P. Chlordane (57-74-9)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
7P. 4,4'-DDT (50-29-3)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
8P. 4,4'-DDE (72-55-9)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
9P. 4,4'-DDD (72-54-8)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
10P. Dieldrin (60-57-1)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
11P. α-Endosulfan (115-29-7)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
12P. β-Endosulfan (115-29-7)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
13P. Endosulfan Sulfate (1031-07-8)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
14P. Endrin (72-20-8)			X	<1.04E-05	(Q)			1	mg/L	1b/D	NA	NA	NA
15P. Endrin Aldehyde (7421-93-4)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA
16P. Heptachlor (76-44-8)			X	<6.93E-06	(Q)			1	mg/L	1b/D	NA	NA	NA

EPA Form 3510-2C (8-90)

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CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	13S

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT		4. UNITS		5. INTAKE (optional)					
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1)	b. MAXIMUM 30 DAY VALUE (if available) (1)	c. LONG TERM AVRG. VALUE (if available) (1)	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES	
GC/MS FRACTION - PESTICIDES (continued)												
T7P, Heptachlor Epoxide (1024-57-3)			X	<6.93E-06	<3E-05	(Q)	1	mg/L	lb/D	NA	NA	
18P, PCB-1242 (53469-21-9)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
19P, PCB-1254 (11097-69-1)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
20P, PCB-1221 (11104-28-2)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
21P, PCB-1232 (11141-16-5)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
22P, PCB-1248 (12672-29-6)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
23P, PCB-1260 (11096-82-5)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
24P, PCB-1016 (12674-11-2)			X	<3.62E-05	<1E-04	(Q)	1	mg/L	lb/D	NA	NA	
25P, Toxaphene (8001-35-2)			X	<1.56E-04	<6E-04	(Q)	1	mg/L	lb/D	NA	NA	

EPA Form 3510-2C (8-90)

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FOOTNOTES
2012 NPDES Permit Application Form 2C
Outfall 13S

- A. The flow rates and volumes provided in Section II.C of the form were calculated using daily flow rate data collected from August 2010 to July 2011. The sample point for Outfall 13S is located at the first weir after the Chlorine Contact Chamber. The discharge point for Outfall 13S is located in Canada del Buey but is not currently used.
- B. The pollutants identified in Section V.D are hazardous substances listed in Table 2C-4 of the Form 2C instructions. These pollutants are identified because they are either components of the influent received by the Sanitary Waste Water System (SWWS) Facility or they are chemicals used to treat the water at the SWWS Facility and, therefore, may be present in the effluent discharged to the outfall. There were not any Table 2C-3 hazardous substances identified.
- C. **Maximum Daily Value** - The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the highest daily value recorded during that period of time.
- D. **Maximum 30 Day Value** – The flow rate provided was determined by analyzing the average flow rates for the 12 month period between August 2010 and July 2011. It is the highest average flow rate for that period of time.
- E. **Long Term Average** – The flow rate provided was determined by analyzing the daily flow rates recorded from August 2010 to July 2011. It is the average of those values within that period of time.
- F. The reported values are the maximum daily temperature observed in the summer and winter from August 2010 to July 2011.
- G. The reported values are the maximum average 30 day temperatures observed in the winter and summer from August 2010 to July 2011.
- H. The pH values listed are the minimum and maximum values reported from June 2010 through May 2011.
- I. The pH values listed are the average minimum and average maximum values reported from June 2010 through May 2011.
- J. Total residual chlorine in the SWWS effluent is sampled at Outfall 001 after it is de-chlorinated and prior to discharge.
- K. The results for E. Coli are used as the indicator for Fecal Coliform.
- L. The analyte does not have an EPA Region 6 approved Minimum Quantification Level (MQL), was not detected above the Method Detection Limit (MDL), is considered a non-detect, and is believed to be absent from the effluent discharged to the outfall. The result provided is the MDL.
- M. Barium was detected at a value less than the MQL of 0.1 mg/L.
- N. Boron was detected at a value less than the MQL of 0.1 mg/L.
- O. Cobalt was detected at a value less than the MQL of 0.05 mg/L.
- P. Molybdenum was detected at a value less than the MQL of 0.01 mg/L.
- Q. The analytical result reported for the analyte was below the MDL and below the EPA Region 6 approved MQL. The value provided is the MDL.
- R. Chromium was detected a value less than the MQL of 0.01 mg/L.

FOOTNOTES (continued)
2012 NPDES Permit Application Form 2C
Outfall 13S

- S. Selenium was detected at a value less than the MQL of 0.005 mg/L.
- T. Cyanide was detected at a value less than the MQL of 0.01 mg/L.
- U. The laboratory MDL for this analyte is 10 pg/L based on a nominal collection volume of 1000 mL. This is equal to the MQL of 0.00001 ug/L. The laboratory is required to report the results to 3 significant figures, so (for example) if the laboratory only receives 960 mL to extract, the MDL is 10.4 pg/L (0.0000104 ug/L). This causes a result that is over the MQL.
- V. EPA remanded the parameter.
- W. Result is for cis- and trans-1,3-dichloropropylene.
- X. Result is for diphenylamine due to similar mass spectra and decomposition of N-nitrosodiphenylamine in the gas chromatograph injection port to nitric oxide and diphenylamine (thus it is measured as diphenylamine).

**EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)**

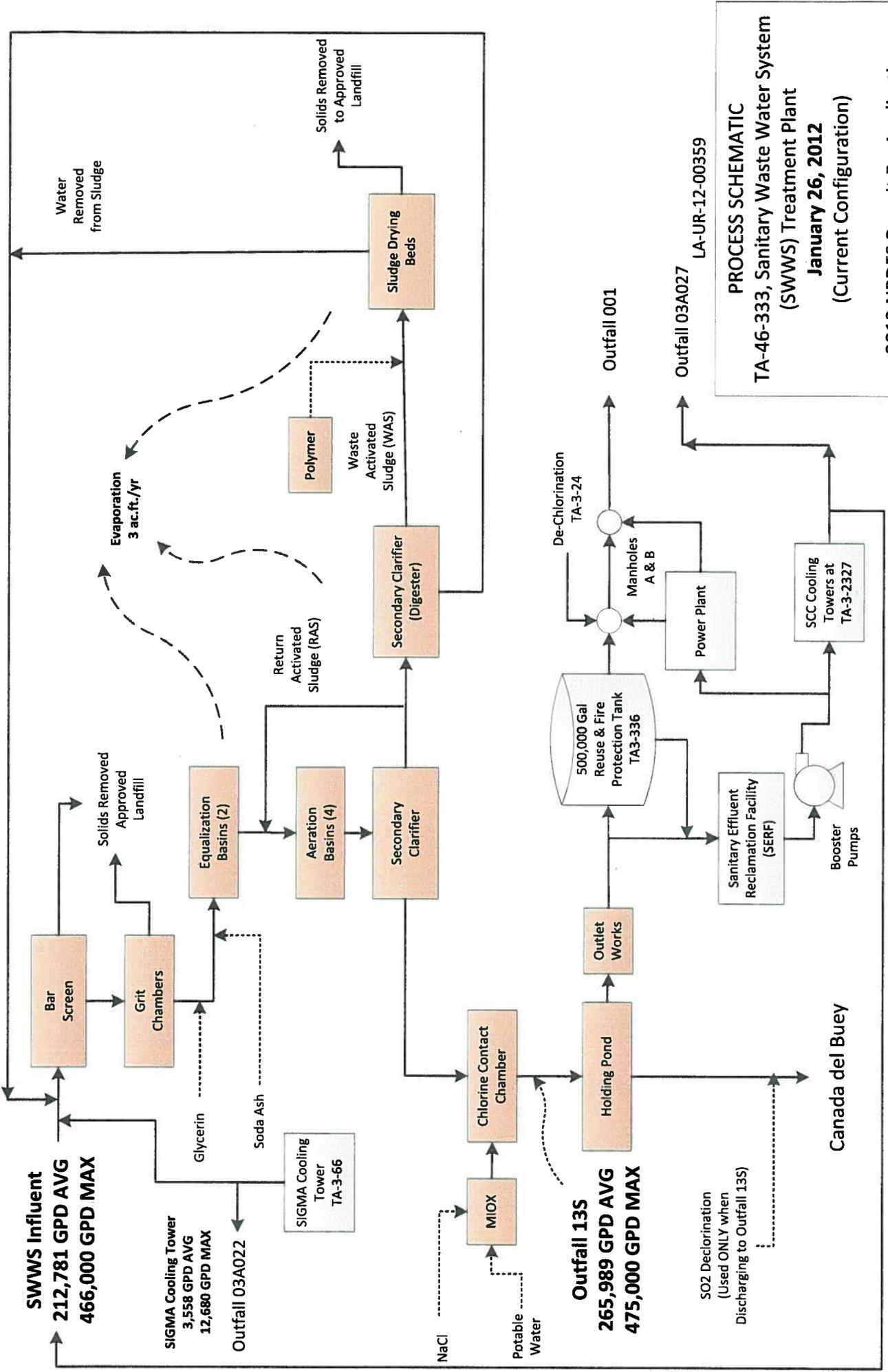
METALS, RADIOACTIVITY, CYANIDE, AND CHLORINE			
Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thallium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine (TRC)	33
Mercury *1	0.0005 0.005		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Chlorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10
BASE/NEUTRAL			
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-Chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronaphthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		

EPA Region 6
MINIMUM QUANTIFICATION LEVELS (MQLs)
 (continued)

Pollutants	MQL (ug/L)	Pollutants	MQL (ug/L)
PESTICIDES AND PCBS			
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxphene	0.3
DIOXIN			
2,3,7,8-TCDD	0.00001		

1. Default MQL for Mercury is 0.005 unless Part 1 of your permit requires the more sensitive Method 1631 (Oxidation/Purge and Trap/Cold Vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.
2. See Section A, Part II of the permit for changes to PCB analytical MQLs.

Figure II.A
Process Schematic and Water Balance for the Sanitary Waste Water System (SWWS) Treatment Plant and Outfall 13S
(Current Configuration)



PROCESS SCHEMATIC
TA-46-333, Sanitary Waste Water System
(SWWS) Treatment Plant
January 26, 2012
(Current Configuration)

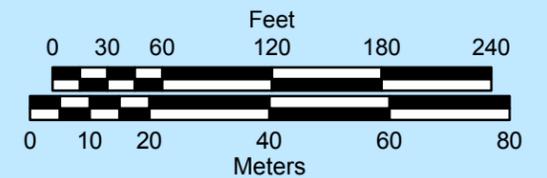
2012 NPDES Permit Re-Application
OUTFALL 13S

* The flow rates and analytical data for 13S are collected at an internal outfall located at the first weir after the Chlorine Contact Chamber.

**NPDES Permit Re-Application Project
TA-46 Building 333, 334, 335, 336, 337,
338, 340, 375, 431, 477
Outfall #13S**

Legend

- | | |
|--|---|
|  NPDES Outfall |  Paved Roads |
|  Springs |  Source Structures |
|  Drainages |  Building Served by Source |
|  100ft Contours |  Structures |
|  20ft Contours |  LANL Boundary |
|  10ft Contours |  Technical Areas |
|  Fences | |
|  Dirt Roads | |



1:1,200

Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-12 27 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

DATA SOURCE:

Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.

Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Orthophotography, 2011 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, APRIL 2011.

Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

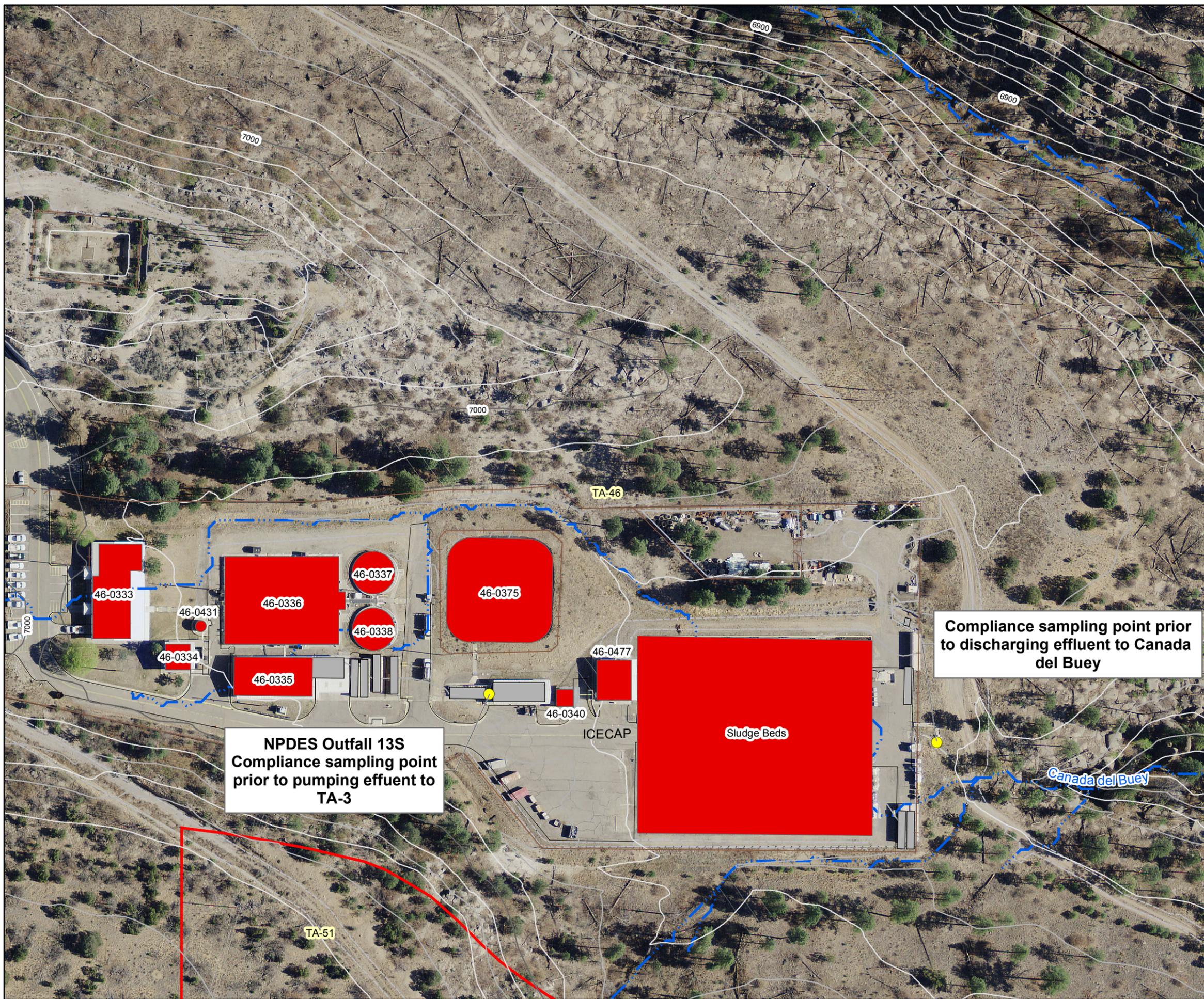
Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.

WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.

WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.

Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.





Material Safety Data Sheet
Acetic acid solutions, 0.1%-56% V/V

Section 1 - Chemical Product and Company Identification

MSDS Name:

Acetic acid solutions, 0.1%-56% V/V

Feb 12, 2004
Last page

Catalog Numbers:

LC10120, LC10150, LC10160, LC10180, LC10190, LC10210, LC10240, LC10260, LC10290, LC10310,
 LC10350, LC10360, LC10380, LC10390, LC10400

Synonyms:

acetic acid solutions, Normal-W/W-W/V-V/V conc.

Company Identification:

LabChem, Inc.
 200 William Pitt Way
 Pittsburgh, PA 15238

Company Phone Number:

(412) 826-5230

Emergency Phone Number:

(800) 424-9300

CHEMTREC Phone Number:

(800) 424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
7732-18-5	Water	balance
64-19-7	Acetic acid	0.1-56

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless

Caution! May cause respiratory tract irritation. May cause eye and skin irritation. May cause digestive tract irritation with nausea, vomiting, and diarrhea.

*Target Organs: none known.***Potential Health Effects****Eye:**

Eye contact may result in swelling irritation, damage to the cornea and conjunctiva resulting in blurred or partial loss of vision.

Skin:

Skin contact may result in irritation, pain, burns, blisters, and brown or yellow stains.



Material Safety Data Sheet
Acetic acid solutions, 0.1%-56% V/V

Ingestion:

Ingestion may result in severe burns of the mouth, throat, and stomach; vomiting and diarrhea of dark blood. Asphyxia from throat swelling can occur, perforations of the esophagus and stomach can occur.

Inhalation:

50ppm causes irritation to most individuals. Respiratory irritation, coughing, choking, headache, dizziness, weakness can occur. Delayed symptoms include lung fluid, chest pains, frothy sputum, cyanosis, rales and hypotension.

Chronic:

May cause dermatitis and conjunctivitis. Dental erosion, tooth discolorization, jaw necrosis, nasal ulceration, laryngitis, bronchitis, pneumonia and gastrointestinal disturbances can occur.

Section 4 - First Aid Measures

Eyes:

Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids until no evidence of chemical remains. Cover burns with loose sterile non-medicated bandages.

Skin:

Get medical aid at once. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes. Cover burns with a dry sterile bandage (secure, not tight).

Ingestion:

Do NOT induce vomiting and seek IMMEDIATE MEDICAL ADVICE. Give conscious victim large quantities of water to dilute acid.

Inhalation:

Get medical aid at once. Move victim to fresh air immediately. Give artificial respiration if necessary. Maintain airway, give oxygen (medical trained only), maintain blood pressure.

Notes to Physician:

Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:

Move container if possible, cool with flooding amounts of water. Avoid breathing corrosive vapors, knock down with water spray. Vapors heavier than air, may travel considerable distance and flash back from source of ignition.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

Autoignition Temperature:

No information found.

Flash Point:

No information found.

NFPA Rating:

CAS# 7732-18-5: Not published.

CAS # 64-19-7 health-3; flammability-2; reactivity-0

Explosion Limits:

Lower: Upper:



Material Safety Data Sheet
Acetic acid solutions, 0.1%-56% V/V

Section 6 - Accidental Release Measures

General Information:

Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Absorb spill with an alkaline material such as soda ash or lime. Place in labeled plastic containers for disposal, wash area down with water. Absorb liquid with inert or neutralizing substance such as fuller's earth, cement powder, fly ash, sand.

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Use only in a well ventilated area. Avoid prolonged or repeated contact with skin.

Storage:

Store in cool, dry area away from heat and oxidizers.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name:	ACGIH	NIOSH	OSHA
Water	None of the components are on this list.	None of the components are on this list.	None of the components are on this list.
Acetic acid	10 ppm TWA; 15 ppm STEL	10 ppm TWA; 25 mg/m ³ TWA	10 ppm TWA; 25 mg/m ³ TWA;

OSHA Vacated PELs

Acetic acid: 10 ppm TWA; 25 mg/m³ TWA

Personal Protective Equipment

Eyes:

Wear safety glasses and chemical goggles or face shield if handling liquids. Provide an eye-wash fountain in the immediate work area. Do not wear contact lenses when working with chemicals.

Skin:

Wear acid protective clothing and gloves.

Clothing:

Wear acid protective clothing and gloves.

Respirators:

>100ppm- SCBAF:PD,PP; SAF:PD,PP,CF.
500ppm- CCROVF/GMOV/SAF/SCBAF.
1000ppm- SAF:PD,PP,CF. Escape-
GMOV/SCBA. Firefighting- SCBAF:PD,PP.



Material Safety Data Sheet
Acetic acid solutions, , 0.1%-56%V/V

State Right to Know

Acetic acid can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California Regulations

European/International Regulations

Canadian DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 64-19-7 is listed on Canada's DSL List.

Canada Ingredient Disclosure List

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

CAS# 64-19-7 is listed on Canada's Ingredient Disclosure List.

Section 16 - Other Information

MSDS Creation Date: October 21, 1997

Revision Date: February 12, 2004

Information in this MSDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc. assumes no liability resulting from the use of this MSDS. The user must determine suitability of this information for his application.



The Clorox Company

1221 Broadway
Oakland, CA 94612
Tel. (510) 271-7000

**Material Safety
Data Sheet**

Product: CLOROX REGULAR-BLEACH		
Description: CLEAR, LIGHT YELLOW LIQUID WITH A CHARACTERISTIC CHLORINE ODOR		
Other Designations	Distributor	Emergency Telephone Nos.
Clorox Bleach EPA Reg. No. 5813-50	Clorox Sales Company 1221 Broadway Oakland, CA 94612	For Medical Emergencies call: (800) 446-1014 For Transportation Emergencies Chemtrec (800) 424-9300

II Health Hazard Data

DANGER: CORROSIVE. May cause severe irritation or damage to eyes and skin. Vapor or mist may irritate. Harmful if swallowed. Keep out of reach of children.

Some clinical reports suggest a low potential for sensitization upon exaggerated exposure to sodium hypochlorite if skin damage (e.g., irritation) occurs during exposure. Under normal consumer use conditions the likelihood of any adverse health effects are low.

Medical conditions that may be aggravated by exposure to high concentrations of vapor or mist: heart conditions or chronic respiratory problems such as asthma, emphysema, chronic bronchitis or obstructive lung disease.

FIRST AID:
Eye Contact: Hold eye open and rinse with water for 15-20 minutes. Remove contact lenses, after first 5 minutes. Continue rinsing eye. Call a physician.
Skin Contact: Wash skin with water for 15-20 minutes. If irritation develops, call a physician.
Ingestion: Do not induce vomiting. Drink a glassful of water. If irritation develops, call a physician. Do not give anything by mouth to an unconscious person.
Inhalation: Remove to fresh air. If breathing is affected, call a physician.

III Hazardous Ingredients

Ingredient	Concentration	Exposure Limit
Sodium hypochlorite CAS# 7681-52-9	6.15%	Not established
Sodium hydroxide CAS# 1310-73-2	<1%	2 mg/m ³ ¹ 2 mg/m ³ ²

¹ACGIH Threshold Limit Value (TLV) - Ceiling
²OSHA Permissible Exposure Limit (PEL) - Time Weighted Average (TWA)

None of the ingredients in this product are on the IARC, NTP or OSHA carcinogen lists.

Special Protection and Precautions

No special protection or precautions have been identified for using this product under directed consumer use conditions. The following recommendations are given for production facilities and for other conditions and situations where there is increased potential for accidental, large-scale or prolonged exposure.

Hygienic Practices: Avoid contact with eyes, skin and clothing. Wash hands after direct contact. Do not wear product-contaminated clothing for prolonged periods.

Engineering Controls: Use general ventilation to minimize exposure to vapor or mist.

Personal Protective Equipment: Wear safety glasses. Use rubber or nitrile gloves if in contact liquid, especially for prolonged periods.

KEEP OUT OF REACH OF CHILDREN

V Transportation and Regulatory Data

DOT/IMDG/IATA: Not restricted.

EPA - SARA TITLE III/CERCLA: Bottled product is not reportable under Sections 311/312 and contains no chemicals reportable under Section 313. This product does contain chemicals (sodium hydroxide <0.2% and sodium hypochlorite <7.35%) that are regulated under Section 304/CERCLA.

TSCA/DSL STATUS: All components of this product are on the U.S. TSCA Inventory and Canadian DSL.

VI Spill Procedures/Waste Disposal

Spill Procedures: Control spill. Containerize liquid and use absorbents on residual liquid; dispose appropriately. Wash area and let dry. For spills of multiple products, responders should evaluate the MSDS's of the products for incompatibility with sodium hypochlorite. Breathing protection should be worn in enclosed, and/or poorly ventilated areas until hazard assessment is complete.

Waste Disposal: Dispose of in accordance with all applicable federal, state, and local regulations.

VII Reactivity Data

Stable under normal use and storage conditions. Strong oxidizing agent. Reacts with other household chemicals such as toilet bowl cleaners, rust removers, vinegar, acids or ammonia containing products to produce hazardous gases, such as chlorine and other chlorinated species. Prolonged contact with metal may cause pitting or discoloration.

VIII Fire and Explosion Data

Flash Point: None

Special Firefighting Procedures: None

Unusual Fire/Explosion Hazards: None. Not flammable or explosive. Product does not ignite when exposed to open flame.

IX Physical Data

Boiling point approx. 212°F/100°C
Specific Gravity (H₂O=1) ~ 1.1 at 70°F
Solubility in Water complete
pH ~11.4

1800-479 6603

JAN 26/2004



Material Safety Data Sheet

KIK INTERNATIONAL

Section 1. Chemical Product and Company Identification

Product Name/Trade Name	Hilex Bleach
Manufacturer:	KIK International 2921 Corder Street Houston Texas 77054
Contact Number:	Tel: 713 747-8710
24 Hour Emergency Contact:	Tel: 1 800 424-9300
Prepared By:	KIK International Laboratory
Replaces Date:	June 7, 2004
Date Last Revised:	August 16, 2004

Section 2 Hazardous Ingredients

Name	%	CAS#	LD50/LC50
Sodium Hypochlorite	5.25-5.50	007681-52-9	N Av./N Av

Section 3 Physical Data

State	Liquid	Ph	12.60 maximum
Appearance	Clear Colorless	% Volatile	93% Approx.
Odor	Chlorine	Boiling Point	100°C
Specific Gravity	1.080 minimum	Vapor Pressure	N Av
Solubility	100%		

Section 4 Fire & Explosion

Flammable: YES NO X
Means of Extinction: Water, Carbon Dioxide, Dry Chemical or Foam
Special Procedures: Fire fighters should wear self-contained breathing apparatus.
Flash Point: & Method: Not Applicable
Hazardous Combustion Products: Chlorine Gas.

Section 5 Reactivity Data

Chemical Stability: YES X NO
Conditions: Temperature above 40 °C, sunlight and metals,
Incompatibility: YES X NO
What Substances: Acids, ammonia, urea, metals & oxidizers.
Reactivity / Conditions: Not Applicable
Hazardous Decomposition Products: Chlorine gas released by contact with acids. Contact with ammonia or

urea produces nitrogen gas and chloramines. Oxygen is released on contact with metals.

Hilex Bleach

Section 6 Toxicological Properties

Route of Entry

Skin Contact	X	Skin Absorption	Eye Contact	X
Inhalation Acute	X	Inhalation Chronic	Ingestion	X

Effects of Acute Exposure: Inhalation of vapors will irritate breathing passages and may cause breathing difficulty. CORROSIVE will cause sever irritation to eyes and skin. May cause permanent damage if not treated properly. Ingestion will cause burning sensation in mouth, throat and stomach.

Effects of chronic exposure: None Known.

Carcinogenicity Reproductive Effects: Terarogenicity Mutafenicity no known effects

Section 7 Preventative Measures

Protective Equipment

Gloves: Not Normally Required

Eyes: Safety Glasses

Respiratory: Not normally required

Footwear: Not Applicable

Section 8 First Aid Measures

Skin: Wash with soap and water

Eyes: Flush eyes with cool running water holding eyelids apart to ensure thorough rinsing for 15 minutes. Remove contact lenses. See a doctor immediately.

Inhalation: Move to fresh air and restore breathing, if required.

Ingestion: DO NOT INDUCE VOMITING! Drink large amounts of water or milk. Do not give anything by mouth to a convulsing or unconscious person. See a doctor immediately.

General Advice: If irritation persists see a doctor immediately.

Section 9 Preparation Information

HMIS Rating:

Health Hazard		1
Fire Hazard	0	
Reactivity	2	

DOT: Not Regulated

As the handling and use of products under user's conditions are beyond our control, no warranty, expressed or implied, is made concerning this product. The information contained herein is offered only as a guide to the handling of this specific material and is not intended to be all-inclusive in the manner and conditions of use and handling. The user assumes all risks of use or handling, whether or not in accordance with any directions or suggestions of the manufacturer. Manufacturer shall not be liable to purchaser or any other person for loss or damages directly or indirectly arising from the use of our product.

Material Safety Data Sheet

Citric acid monohydrate

2004
Last page

ACC# 84211

Section 1 - Chemical Product and Company Identification

MSDS Name: Citric acid monohydrate

Catalog Numbers: AC124910000, AC124910010, AC124910250, AC124912500, S728362, S728363, A104-10, A104-10LC, A104-250LB, A104-3, A104-500, A110-10, A110-3, A110-50, A111-12, A111-12LC, A111-212, A111-SAM1, A111-SAM2, A111-SAM3

Synonyms: 2-Hydroxy-1,2,3-propanetricarboxylic acid monohydrate.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
5949-29-1	Citric acid monohydrate	>97	unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.

Danger! Causes severe eye irritation and possible injury. Causes skin and respiratory tract irritation.

Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes severe eye irritation and possible injury.

Skin: Causes skin irritation. Some references state that citric acid has allergenic properties but, no animal or human studies were found to support this claim. It does not seem likely that citric acid is a sensitizer since it is found in the body as an essential component of the citric acid cycle which releases energy for physiological functions. Citric acid is widely distributed in plants and in animal tissues and fluids.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Excessive intake of citric acid may cause erosion of the teeth.

Inhalation: Causes respiratory tract irritation.

Chronic: Repeated exposure may cause erosion of teeth. Chronic exposure may cause effects similar to those of acute exposure.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Flash Point: Not applicable.

Autoignition Temperature: 1010 deg C (1,850.00 deg F)

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 3; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Spill may be carefully neutralized with lime (calcium oxide, CaO).

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Keep container tightly closed. Avoid ingestion and inhalation. Do not get in eyes. Avoid contact with skin and clothing.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Citric acid monohydrate	none listed	none listed	none listed
Citric acid anhydrous	none listed	none listed	none listed

OSHA Vacated PELs: Citric acid monohydrate: No OSHA Vacated PELs are listed for this chemical. Citric acid anhydrous: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and

face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder

Appearance: white

Odor: Odorless.

pH: 2.2 (0.1N soln)

Vapor Pressure: 3.70E-009 mm Hg @ 25 deg C

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 175 deg C (dec)

Freezing/Melting Point: 100 deg C

Decomposition Temperature: 175 deg C

Solubility: Freely Soluble.

Specific Gravity/Density: 1.542 g/cm³

Molecular Formula: C₆H₈O₇.H₂O

Molecular Weight: 210.15

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Dust generation, moisture.

Incompatibilities with Other Materials: Metals, strong oxidizing agents, strong reducing agents, strong bases, metal nitrates.

Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 5949-29-1: GE7810000

CAS# 77-92-9: GE7350000

LD50/LC50:

Not available.

CAS# 77-92-9:

Draize test, rabbit, eye: 750 ug/24H Severe;

Draize test, rabbit, skin: 500 mg/24H Mild;

Oral, mouse: LD50 = 5040 mg/kg;

Oral, rat: LD50 = 3 gm/kg;

Carcinogenicity:

CAS# 5949-29-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 77-92-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: No information available.

Other Studies: No data available.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 5949-29-1 is not on the TSCA Inventory b It is considered to be listed if the CAS number for the anhydrous form is on the inventory (40CFR720.3(u)(2)).

CAS# 77-92-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 5949-29-1: acute.

CAS # 77-92-9: acute.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 5949-29-1 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 77-92-9 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 5949-29-1: 0

CAS# 77-92-9: 0

Canada - DSL/NDSL

CAS# 77-92-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2B.

Canadian Ingredient Disclosure List

CAS# 77-92-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 2/09/1999

Revision #7 Date: 2/25/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

TI Process Chemicals • 5414 Business Pkwy. • Ringwood, IL 60072 • (P) 815-653-3856 • (F) 815-653-3857
 Emergency Assistance involving chemicals call - INFOTRAC (800) 535-5053

SDS Number: DZ38688 MSDS Version: 002

Revised 08/11/06 GLYCERINE, 96-99%

SECTION 1. PRODUCT IDENTIFICATION

Product Name: GLYCERINE, 96-99%

SDS Number: DZ38688

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Glycerine, minimum	CAS# 000056-81-5	96-99%
Water	CAS# 007732-18-5	1-4%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

SECTION 3. HAZARDS IDENTIFICATION

REGULATORY INFORMATION: (Not meant to be all-inclusive--selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS

=====

SARA HAZARD CATEGORY: This product has been reviewed according to the

A "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and considered, under applicable definitions, to meet the following categories:

It to have met any hazard category

SECTION 4. FIRST AID MEASURES

3: Irrigate immediately with water for at least 5 minutes.

1: Wash off in flowing water or shower.

INSTRUCTION: Induce vomiting if large amounts are ingested.
Consult medical personnel.

RELATION: No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

3: TO PHYSICIAN:

No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT: 390F, 199C

FOOD USED: PMCC

FLAMMABLE LIMITS

LFL: Not deter.

UFL: Not deter.

EXTINGUISHING MEDIA: Water fog, alcohol-resistant foam, CO2, dry chemical.

FLAME & EXPLOSION HAZARDS: Autoignition temperature 698F, 370C.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

ACTION TO TAKE FOR SPILLS/LEAKS: Small spills: Cover with absorbent material, soak up and sweep into a drum. Large spills: Dike around spill and pump into suitable containers.

DISPOSAL METHOD: Reprocess or incinerate in accordance with all

local, state, and federal requirements.

SECTION 7. HANDLING AND STORAGE

EXPOSURE GUIDELINE: OSHA PEL is 10 mg/m³ total, 5 mg/m³ respirable; ACGIH TLV is 10 mg/m³ for glycerine mist.

VENTILATION: Control airborne concentrations below the exposure guideline. Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

EYE PROTECTION: Use safety glasses.

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Practice reasonable care and caution.

REVISION STATUS: Revised section 9 and regsheets.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely.

SKIN CONTACT: Prolonged or repeated exposure not likely to cause significant skin irritation.

SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD50 for skin absorption in rabbits is > 10,000 mg/kg.

INGESTION: Single dose oral toxicity is low. The oral LD50 for rats is 17,000 to 27,200 mg/kg. Signs and symptoms of excessive exposure may be central nervous system effects and increased blood sugar levels.

RESPIRATION: At room temperature, exposures to vapors are unlikely due to physical properties; higher temperatures may generate vapor levels sufficient to cause irritation and other effects. No effects in rats were seen at 0.57 mg/l for 1 hour; therefore the LC50 is greater than this amount.

SYSTEMIC & OTHER EFFECTS: Repeated excessive exposure may cause kidney and liver effects, and increased fat levels in blood. Observations in animals include gastrointestinal irritation with very large oral doses. Did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. Reproduction studies indicate that glycerine does not directly interfere with reproduction in animals. When animals were maintained on synthetic diets or dosed at extremely high levels, reproduction in females was affected - perhaps due to altered nutritional states.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

BILING POINT: IBP 340F, 171C
AP PRESS: 3 mmHg @ 20C
AP DENSITY: 3.1
OL. IN WATER: Miscible
P. GRAVITY: 1.252 @ 25/25C, minimum
PPEARANCE: Water-white liquid.
DOR: Odorless.

SECTION 10. STABILITY AND REACTIVITY DATA

ABILITY: (CONDITIONS TO AVOID) Avoid strong oxidizing agents (sodium hypochlorite, hypochlorous acid).

COMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Acrolein.

HAZARDOUS POLYMERIZATION: Will not occur.

Additional Information:

Contact: PTI Process Chemicals.

uring business hours, Central Time - 815-653-3856

NOTICE

PTI Process Chemicals, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For specific specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These sheets are obtained from PTI Process Chemicals

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, PTI makes no representations as to its accuracy or reliability. Conditions of use are beyond PTI's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

END OF MSDS

SECTION I - IDENTIFICATION - MATERIAL SAFETY DATA SHEET

IDENTITY (As listed on label): *Fresh Tablets / Lily TABS*
 Date Prepared: 01/03/02

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS:	CAS	OSHA PEL	ACGIH TVL
Tris-nitromethane	126-11-4	none	none

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: N/E Specific Gravity (Water=1): N/E
 Vapor Pressure: N/E Percent Volatile by Volume: N/E
 Vapor Density (Air=1): N/E PH: 7.1 (in 25 gallons of water)
 Appearance and Odor: Blue with bubble gum, cherry, or pine scent
 Solubility in Water: 99%

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): 375° F - TCC
 Extinguishing Media: water, foam, dry chemical, CO2
 Special Fire Fighting Procedures: Use water spray to cool containers exposed to heat and flame.
 Unusual Fire and Explosion Hazards: Exposure to prolonged heating at elevated temperatures (>125° F) may cause decomposition and the evolution of irritant gases.

SECTION V - REACTIVITY DATA

Stability: X
 Incompatibility (Materials To Avoid): Contact with excessive moisture or water, prior to intended use, will promote non-toxic effervescence with release of CO2. Hazardous reaction in aqueous solution may occur with chlorine, hypochlorous acid, hypochlorites cyanides, or sulfides.
 Hazardous Polymerization: Will Not Occur
 Conditions to avoid: Avoid storage near excessive heat (>350° F). Avoid in storage contact with excessive moisture or water, as well as acids, aluminum powder, fluorine, phosphorous pentoxide, sulphuric acid, ammonical silver nitrate and molten lithium. May liberate carbon monoxide.
 Hazardous Decomposition or Byproducts: Releases formaldehyde at alkaline pH or when decomposed at elevated temperatures.

SECTION VI - HEALTH HAZARD DATA

Route(s) of Entry: Inhalation, skin, ingestion
 Health Hazards (Acute and Chronic): Skin absorption: May rarely cause an allergic skin response from dissolved tablet.
 Carcinogenicity: NA ARC Monographs OSHA Regulated: N/A
 Signs and Symptoms of Exposure: Skin irritation, slight eye irritation from dust or dissolved tablet.
 Emergency and First Aid Procedures:
 Eyes: Flush eyes with copious amounts of water for 15 minutes. Get medical attention if irritation persists.
 Skin: Remove clothes and shoes for washing. Wash affected area thoroughly with soap and water.
 Ingestion: Induce vomiting and call a physician.
 Toxicity Data: Oral in Rats LD50 = 4 gm/kg. Dermal on Rabbits is 500 mg/24 hrs = moderate irritation.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps To Be Taken If Material Is Released Or Spilled: Wear protective equipment including rubber boots, rubber gloves, rubber apron, and a full face piece or a half mask air-purifying cartridge respirator with particulate filters. Wear chemical goggles if a half mask is worn. For small spills, sweep up and disposed of in DOT approved waste containers. For large spills, shovel into DOT approved waste containers. Keep out of sewers, storm drains, surface waters and soil. Comply with all governmental regulations on spill reporting and handling and disposal of waste.
 Precautions To Be Taken In Handling & Storage: Store in a cool dry well ventilated place away from incompatible materials. Keep cartons dry at all times. Do not get into eyes, on skin or on clothing. If contact is made with product, wash thoroughly. Dispose of empty product containers in a manner approved for this material.

SECTION VIII - CONTROL MEASURES

Respiratory Protection: None
 Ventilation - Local Exhaust: local and/or forced. Mechanical: general ventilation
 Eye Protection: safety goggles
 Protective Gloves: Impervious rubber, nitrile, butyl, or polyethylene.
 Protective Equipment or Clothing: Wear clean, long sleeved shirt, trousers, safety shoes and gloves.
 Hygienic Practices: Preferably an eyewash apparatus should be available to workers using this product in the event of eye contact.

01-03-02

NOTE: The information herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, no warranty or representation, expressed or implied, is made as to the accuracy or completeness of the foregoing data and safety information. The user assumes all liability for any damage of injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the product. This form complies with OSHA Form 174.

Poly John, Inc.

2500 Gaspar Avenue • Whiting, Indiana 46394 • 1-800-292-1305



Material Safety Data Sheet

Note: This MSDS has been compiled as a response to customer requests. It is not required under current OSHA regulations.

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Chemical Product Name	Sodium Chloride (Salt) treated with a Corrosion Inhibitor
Chemical Family	Alkali Metal/Halide
Chemical Name	Sodium Chloride
Formula	NaCl
Molecular Weight	58.44
Commercial Name	CG-90® original anticorrosive deicer

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Manufacturer
Cargill Incorporated - Salt Division
P.O. Box 5621
Minneapolis, MN 55440

Emergency Telephone Numbers
(952) 984-8214 (during business hours)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Description
Sodium Chloride and a Propriety Patented Corrosion Inhibitor.

Ingredient Name	Exposure Limits	Concentration (%)
CAS Number Sodium Chloride 7647-14-5 Corrosion Inhibitor		99.0 1.0

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

THIS PRODUCT IS NOT REGULATED UNDER: OSHA Hazard Communication Standard 29 CFR 1910.1200 or SARA Title III Does not contain any hazardous components.

Potential Health Effects

Route(s) Of Entry: Inhalation, Skin, Ingestion.

Human Effects and Symptoms of Overexposure: Ingestion of large amounts (greater than 0.1 pound) can cause gastrointestinal upset and irritation of the stomach. Rare cases of over exposure can lead to systemic toxicity related to the binding of ionized blood calcium. No applicable information found for chronic systemic effects.

Acute Inhalation: May cause mild irritation of nose and throat.

Chronic Inhalation: Not Applicable

Acute Skin Contact: Dust may cause mild irritation.

Chronic Skin Contact: Not Applicable

Acute Eye Contact: May cause irritation; inflammation.

Chronic Eye Contact: Not Applicable

Acute Ingestion: Ingestion of large amounts may cause gastrointestinal upset.

Chronic Ingestion: Not Applicable

Carcinogenicity

NTP: Not listed as a carcinogen or mutagen.

IARC: Not listed as a carcinogen or mutagen.

OSHA: Not listed as a carcinogen or mutagen.

Medical Conditions Aggravated by Exposure: In some cases of confirmed hypertension, ingestion may result in elevated blood pressure. (This applies only to salt-sensitive individuals.)

4. FIRST AID MEASURES

First Aid For Eyes: For eye contact, flush with water immediately, lifting eyelids occasionally.

First Aid For Skin: Remove clothing from affected area. Wash skin thoroughly. Rinse carefully.

First Aid For Inhalation: If person breathes large quantities, remove to fresh air at once. If breathing stops, apply artificial respiration immediately.

First Aid For Ingestion: Less than a few grams would not be harmful. For larger quantities, drink large amounts of water or milk.

5. FIRE AND MEASURES

Flash Point: Not Flammable.

Extinguishing Media: This product is nonflammable. Use media appropriate to the surrounding fire.

Special Fire Fighting Procedures: Thermal oxidative decomposition may produce toxic fumes. A self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure demand or positive-pressure mode is recommended.

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Contains spills to prevent contamination of water supply or sanitary sewer system. Vacuum or sweep into containers for proper disposal.

7. HANDLING AND STORAGE

Storage Temperature (min./max.):

Special Sensitivity: Avoid contact with strong acids. Under conditions of high heat, sodium chloride will react with lithium to yield elemental sodium, which will intensify fire conditions.

Handling and Storage Precautions: Avoid humid or wet conditions as product will cake and become hard

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection Requirements: Eyeglasses or goggles should be worn in dusty areas.

Skin Protection Requirements: Normal work gloves are adequate. Protective clothing may be worn in dusty areas, but is generally not required.

Respiratory/Ventilation Requirements: NIOSH/MSHA approved respirator for particulates.

Exposure Limits: Not listed

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Mixture of white, gray or clear crystalline solids.

Color: Mixture of white, gray or clear.

Odor: N/A

Boiling Point (760mm Hg) (°C): N/A

Melt Point/Freeze Point (°C): 801°

PH:

Solubility In Water (g/cc, %): 26.4%

Specific Gravity (H₂O=1): 1.25

Bulk Density:

% Volatile By Weight:

Vapor Pressure (mm Hg/747°C): N/A

Vapor Density (Air=1): N/A

10. REACTIVITY

Stability: Stable

Incompatibilities: Avoid contact with strong acids. Incompatible with alkaloids, lead acetate, antipyrine, chloral hydrate, resorcinol and pyrogallol.

Decomposition Products: May evolve chlorine gas when in contact with strong acids. Heating at high temperatures can produce toxic fumes.

11. TOXICOLOGICAL INFORMATION

Description: Not Listed

12. ECOLOGICAL INFORMATION

Ecotoxicity: Not Listed

Environmental Degradation: Not Listed

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: For disposal of this material as a waste, act in accordance with all applicable Federal, state, and local waste management regulations.

14. TRANSPORTATION INFORMATION

D.O.T. Shipping Name: Not Listed

Technical Shipping Name: Not Listed

D.O.T Hazard Class: Not Listed

U.N./N.A. Number: Not Listed

Product Rq (lbs.): Not Listed

D.O.T. Label: Not Listed

D.O.T. Placard: Not Listed

Freight Class Bulk: Not Listed

Freight Class Package: Not Listed

Product Label: Not Listed

15. REGULATORY INFORMATION

OSHA Status: Not Listed

TSCA Status: Not Listed

Cercla reportable Quantity

SARA Title III

Section 302 Extremely

Hazardous Substances: Not Listed

Section 311/312

Hazard categories: Not an OSHA hazardous material.

Section 313

Toxic Chemicals: Not Listed

RCRA Status: Not Listed

State Regulatory Information

Component Name

/CAS Number

Concentration

State-Code

16. OTHER INFORMATION

Reason For Issue: Regulatory Communication

Prepared By: Steve Karl

Approved By: Dave Merriweather

Title: Director-Quality Administration

Approval Date: January 2005

Supersedes Date: March 2003

MSDS Number: NC5

Disclaimer: All statements, technical information and recommendations contained herein are, the best of our knowledge, reliable and accurate; however no warranty, either expressed or implied is made with respect thereto, nor will any liability be assumed for damages resultant from the use of the material described.

It is the responsibility of the user to comply with all applicable federal, state and local laws and regulations. It is also the responsibility of the user to maintain a safe workplace. The user should consider the health hazards and safety information provided herein as a guide and should take the necessary steps to instruct employees and to develop work practice procedures to ensure a safe work environment.

This information is not intended as a license to operate under, or a recommendation to practice or infringe upon any patent of this Company or others covering any process, composition of matter or use.



SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Note: This MSDS is not valid three years after date prepared.

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

1. PRODUCT AND COMPANY DESCRIPTION

OCI Chemical Corporation

Two Corporate Drive
Shelton, CT 06484

Emergency Phone Numbers:

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT
CONTACT: CHEMTREC (800-424-9300) IN THE UNITED STATES OR OCI (1-203-225-3100
or 1-888-278-1657); IN CANADA CONTACT CANUTEC (613) 996-6666.

For Product Information:

(800) 865-1774

Chemical Name or Synonym:

SODIUM CARBONATE ANHYDROUS; DISODIUM CARBONATE; SODA ASH; CARBONIC
ACID, DISODIUM SALT

Molecular Formula:

Na₂CO₃; Molecular weight 105.99

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Reg Number	EINECS Number	OSHA Hazard	Percentage
SODIUM CARBONATE	497-19-8	207-838-8	Y	100

3. HAZARDS IDENTIFICATION

A. Physical Appearance and Odor:

White granules solid, odorless

Warning Statements:

WARNING: CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION

B. POTENTIAL HEALTH EFFECTS

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Continued on Next Page

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

3. HAZARDS IDENTIFICATION (Continued)

Acute Eye:

Causes irritation.

Acute Skin:

May cause redness, swelling.

Acute Inhalation:

May cause upper respiratory tract irritation, lung irritation.

Acute Ingestion:

Low acute oral toxicity. May cause nausea, vomiting, diarrhea, irritation, corrosion.

Chronic Effects:

This product does not contain any ingredient designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

4. FIRST AID MEASURES

FIRST AID MEASURES FOR ACCIDENTAL:**Eye Exposure:**

Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention.

Skin Exposure:

In case of contact, immediately wash with plenty of soap and water for at least 5 minutes. Seek medical attention if irritation develops or persists. Remove contaminated clothing and shoes. Clean contaminated clothing and shoes before re-use.

Inhalation:

Remove victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen, if available. If victim is not breathing, administer CPR (cardio-pulmonary resuscitation). Seek immediate medical attention.

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Continued on Next Page

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

4. FIRST AID MEASURES (Continued)

Ingestion:

If victim is conscious and alert, give 1-2 glasses of water to drink. Do not give anything by mouth to an unconscious person. Seek immediate medical attention. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Vomiting may occur spontaneously. If vomiting occurs and the victim is conscious, give water to further dilute the chemical.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

NOTES TO PHYSICIAN:

All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE FIGHTING MEASURES

FIRE HAZARD DATA:**Flash Point:**

Not Applicable

Extinguishing Media:

Not combustible. Use extinguishing method suitable for surrounding fire.

Special Fire Fighting Procedures:

Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.

Unusual Fire and Explosion Hazards:

Not combustible.

Hazardous Decomposition Materials (Under Fire Conditions)

Carbon dioxide

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Continued on Next Page

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

 **OCI CHEMICAL CORPORATION**

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:

Ventilate closed spaces before entering. Wear appropriate protective gear for situation. See Personal Protection information in Section 8.

Containment of Spill:

Follow procedure described below under Cleanup and Disposal of Spill.

Cleanup and Disposal of Spill:

Scrape up and place in appropriate closed container (see Section 7: Handling and Storage). Collect washings for disposal. Decontaminate tools and equipment following cleanup. Clean up residual material by washing area with water. Avoid creation of dusty conditions.

Environmental and Regulatory Reporting:

Do not flush to drain. If spilled on the ground, the affected area should be scraped clean placed in an appropriate container for disposal. Prevent material from entering public sewer system or any waterways. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact with the Technical Service Department using the Product Information phone number in Section 1.

7. HANDLING AND STORAGE

Minimum/Maximum Storage Temperatures:

Not Available

Handling

Do not get in eyes. Do not breathe dusts. Avoid direct or prolonged contact with skin.

Storage

Store in an area that is cool, dry, well-ventilated.

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Continued on Next Page

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Introductory Remarks:**

These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

Exposure Guidelines:

Exposure limits represent regulated or recommended worker breathing zone concentrations measured by validated sampling and analytical methods, meeting OSHA requirements. The following limits (AGGIH, OSHA and other) apply to this material, where, if indicated, S=skin and C=ceiling limit:

PARTICULATES NOT OTHERWISE REGULATED RESPIRABLE FRACTION

	Notes	TWA	STEL
OSHA		5 mg / cu m ³	NA

Engineering Controls:

Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures.

Respiratory Protection:

When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the latest OSHA standard (29 CFR 1910.134) and/or ANSI Z88.2 recommendations.

Under normal conditions, in the absence of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by OSHA / ANSI: Air-purifying (half-mask / full-face) respirator with cartridges / canister approved for use against dusts, mists and fumes.

*End of Page 5 of 11**Continued on Next Page*

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

8. EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

Eye / Face Protection:

Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material.

It is generally regarded as good practice to wear a minimum of safety glasses with side shields when working in industrial environments.

Skin Protection:

Skin contact should be minimized through use of gloves and suitable long-sleeved clothing (i.e., shirts and pants). Consideration must be given both to durability as well as permeation resistance.

Work Practice Controls:

Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- 1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- 3) Wash exposed skin promptly to remove accidental splashes of contact with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product Information phone number in Section 1 for its exact specifications.

Physical Appearance:

White granules solid.

Odor:

Odorless

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SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

pH:

11.3 at 1 wt / wt %

Specific Gravity:

2.53 at 20°C (68 F)

Water Solubility:

Soluble

7 Wt / Wt % at 25°C (77 F)

Melting Point Range:

851°C (1564 F)

Boiling Point Range:

Not Available

Vapor Density:

Not Available

Molecular Weight:

105.99

10. STABILITY AND REACTIVITY

Chemical Stability:

This material is stable under normal handling and storage conditions described in Section 7.

Conditions To Be Avoided:

Extreme Heat; Hygroscopic; protect from moisture. Mixing of acid and sodium carbonate solutions could cause CO₂ evolution.

Materials / Chemicals To Be Avoided:

Aluminum

Fluorine

Humid Air

Moisture

Sulfuric Acid

Acids

Magnesium

Phosphorus Pentoxide

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SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

10. STABILITY AND REACTIVITY (Continued)

Decomposition Temperature Range:
400°C (752 F)

The Following Hazardous Decomposition Products Might Be Expected:
Decomposition Type: Thermal
Carbon Dioxide

Hazardous Polymerization Will Not Occur.
Avoid The Following To Inhibit Hazardous Polymerization:
Not Applicable

11. TOXICOLOGICAL INFORMATION source <http://www.cdc.gov/niosh/rtecs/vz3dcc50.html>

Acute Eye Irritation:

Toxicological Information and Interpretation
Eye - Eye Irritation, 25 mg/Kg, Rabbit.
Severely Irritating; Muscle contraction or spasticity.

Acute Skin Irritation:

Toxicological Information and Interpretation
Skin – 500 mg/24 hour Skin Irritation, Rabbit.
Mildly Irritating.

Acute Dermal Toxicity:

LD₅₀. Rabbit: >2000 mg/kg

Acute Inhalation Toxicity:

Toxicological Information and Interpretation
LC₅₀ - Lethal Concentration. 50% Of Test Species, 2300 mg/cu m/2hr, rat.

Acute Oral Toxicity:

Toxicological Information and Interpretation
LD₅₀ - Lethal Dose 50% Of Test Species, 4090 mg/kg, rat.

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SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

11. TOXICOLOGICAL INFORMATION (Continued)

Chronic Toxicity:

This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or "suspected" human carcinogens.

No additional test data found for product.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

No data found for product.

Chemical Fate Information:

No data found for product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.

Container Handling and Disposal:

Rinse containers before disposal.

EPA Hazardous Waste - NO

14. TRANSPORTATION INFORMATION

Transportation Status:

US Department of Transportation

DOT Shipping Name:

NOT REGULATED

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SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

15. REGULATORY INFORMATION

FEDERAL REGULATIONS**TSCA Inventory Status:**

All ingredients of this product are listed on the TSCA Inventory.

SARA Title III Hazard Classes:

Fire Hazard	- NO
Reactive Hazard	- NO
Release of Pressure	- NO
Acute Health Hazard	- YES
Chronic Health Hazard	- NO

STATE REGULATIONS:

This product does not contain any components that are regulated under California Proposition 65.

16. OTHER INFORMATION

National Fire Protection Association Hazard Ratings - NFPA(R):

2	Health Hazard Rating - - Moderate
0	Flammability Rating - - Minimal
0	Reactivity Rating - - Minimal

National Paint & Coating Hazardous Materials Identification System - HMIS(R):

2	Health Hazard Rating - - Moderate
0	Flammability Rating - - Minimal
0	Reactivity Rating - - Minimal

Certified to ANSI/NSF 60 – Soda Ash Dense Bulk: This product is certified ANSI/NSF 60 when used in treatment of drinking water at maximum dosage of 100 mg/L.

Reason for Revisions:

Change and / or addition made to Section 1, 2, 11 and 16.

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Continued on Next Page

SODA ASH (SODIUM CARBONATE, ANHYDROUS)

Material Safety Data Sheet Date Prepared: 1/31/06 Supersedes Date: 6/01/04

16. OTHER INFORMATION (Continued)

CANADIAN WHMIS REGULATIONS

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS: H=2 F=0 R=0

Key Legend Information:

NAV	- Not Available
NAP	- Not Applicable
ND	- Not Determined
ACGIH	- American Conference of Governmental Industrial Hygienists
OSHA	- Occupational Safety and Health Administration
TLV	- Threshold Limit Value
PEL	- Permissible Exposure Limit
TWA	- Time Weighted Average
STEL	- Short Term Exposure Limit
NTP	- National Toxicology Program
IARC	- International Agency for Research on Cancer
WHMIS	- Workplace Hazardous Materials Information System

Disclaimer:

The information herein is given in good faith but no warranty, expressed or implied, is made.

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End of MSDS Document



JONES-HAMILTON CO.

8400 Enterprise Drive, Newark, CA 94560-3310 (510) 797-2471

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sodium bisulfate, anhydrous globular, technical; **Product Code:** SBS01

Synonyms: Sodium acid sulfate, Nitre cake, Sodium hydrogen sulfate

Product Use: Cleaning compounds, pH adjustment

Date of MSDS Preparation: January 2003

Manufacturer's Name/Address: Jones-Hamilton Co.
8400 Enterprise Drive
Newark, CA 94560
-or-
30354 Tracy Road
Walbridge, OH 43465

24-Hour Emergency Phone Numbers [U.S.A.]:
California: (510) 797-2471
Ohio: (419) 666-9838
CHEMTREC: (800) 424-9300

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Formula: NaHSO₄

<u>Component</u>	<u>CAS#</u>	<u>% (by weight)</u>	<u>Exposure Limits</u>
Sodium bisulfate	7681-38-1	91.5 – 94.7	None established
Sodium sulfate	7757-82-6	4.8 – 8.0	None established
Moisture	7732-18-5	0.1 – 0.8	None established

OSHA: This material is classified as an irritant under current OSHA regulations.

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Off-white granular material, with the consistency of salt.

Presents little or no hazard if spilled and no unusual hazard if involved in a fire. However, keep out of streams and ditches.

Potential Health Effects:

EYE: Causes mild to severe irritation. May cause burn if not flushed with water.

SKIN: Prolonged exposure may cause moderate irritation. May cause burn if not flushed with water.

INHALATION: Inhalation of dust may irritate or burn nose, throat and lungs.

INGESTION: Small amounts (tablespoonful) swallowed are not likely to cause injury; however, swallowing large amounts may irritate or burn digestive tract.

CHRONIC (CANCER) INFORMATION: Not known to cause cancer. Not listed as carcinogen by IARC, NTP or OSHA.

TERATOLOGY (BIRTH DEFECT) INFORMATION: No data available.

REPRODUCTION INFORMATION: No data available.

POTENTIAL ENVIRONMENTAL EFFECTS: Material in dry form is not hazardous to the environment. However, readily dissolves in water to form a weak acid solution. Therefore, keep out of streams and ditches.

SECTION 4 FIRST AID MEASURES

NOTE TO PHYSICIAN: Supportive care. Treatment based on judgment of the physician in response to reactions of the patient. May aggravate pre-existing respiratory conditions.

EYES: Immediately flush eyes with water for at least 15 minutes, lifting eyelids to thoroughly flush. If redness or irritation persists, get prompt medical attention.

SKIN: Immediately flush affected area with water for at least 15 minutes. If burn occurs, seek immediate medical attention.

INHALATION: Remove to fresh air. If irritation or discomfort persists, seek medical attention.

INGESTION: If large amounts are ingested (greater than tablespoonful), drink large quantities of milk or water. Follow with Milk of Magnesia, beaten eggs or vegetable oil. DO NOT induce vomiting. **Contact Physician immediately.**

SECTION 5 FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Not applicable. Material will not burn.

FLAMMABLE LIMITS: Not applicable. Material is non-combustible.

EXTINGUISHING MEDIA: Use extinguishing media appropriate for surrounding fire. Because material will readily dissolve in water to form a weak acid solution, avoid water contact with material if possible.

HAZARDOUS COMBUSTION PRODUCTS: At temperatures over 806^o F (430^o C), product will decompose generating oxides of sulfur.

FIRE FIGHTING INSTRUCTIONS: Product readily dissolves in water to form a weak acid solution. If using water, wear acid protective equipment. No gases or toxic fumes are emitted from this reaction. However, if elevated temperatures (> 806^oF) are reached, self-contained breathing apparatus should be worn.

SECTION 6 ACCIDENTAL RELEASE MEASURES

LAND SPILL: Vacuum or shovel material and place in disposal container. Avoid excessive dust generation. Dilute residual material with ample supply of water and direct to sanitary sewer if Federal, State or Local regulations permit.

WATER SPILL: Readily dissolves in water to form a weak acid solution. If water is isolated or can be contained, neutralize with weak alkaline solution.

Notify appropriate authorities if required by regulations.

SECTION 7 HANDLING AND STORAGE

HANDLING: Wear all recommended personal protective clothing when handling. Avoid contact with eyes. Wash thoroughly after handling. Minimize dust generation. Avoid breathing dust.

STORAGE: Material is hygroscopic and will readily absorb moisture. Keep containers tightly closed. DO NOT store where exposed to moist conditions. DO NOT store near strong alkalis.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to maintain airborne particulate below nuisance levels (>10 mg/m³).

RESPIRATORY PROTECTION: In dusty atmospheres (>10 mg/m³), use a NIOSH-approved dust respirator.

SKIN PROTECTION: Rubber gloves and cotton-blend coveralls.

EYE PROTECTION: Safety glasses or goggles.

GENERAL HYGIENE CONSIDERATIONS: There are no known health hazards associated with this material when used as recommended. Follow good industrial hygiene practices including but not limited to: (1) wash hands after use and before eating; (2) avoid breathing dust; and (3) wear safety glasses.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Off-white granular material.

ODOR: Fresh to Pungent

PHYSICAL STATE: Dry (Anhydrous) crystalline solid spherical shape beads

SOLUBILITY: 1080 g/l @ 68° F (20° C)

MOLECULAR FORMULA: NaHSO₄

PARTICLE SIZE: ±0.75 mm diameter

BULK DENSITY: 80 – 85 lbs/ft³ (loose)

MELTING POINT: 350° F (177° C)

PERCENT VOLATILE: Non-volatile

MOLECULAR WEIGHT: 120

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable.

INCOMPATIBILITY: Avoid contact with strong alkaline material such as caustic. Dissolves readily in water to form a weak acid solution. **DO NOT MIX** with liquid chlorine bleach, ammonia cleansers or similar products.

CONDITIONS TO AVOID: DO NOT store dry product where exposed to moist conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Only if heated over 806^o F (430° C), at which sulfur dioxide and sulfur trioxide are formed.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

REPORTED HUMAN EFFECTS: No human data are available for this product.

REPORTED ANIMAL EFFECTS: Oral – LD₅₀ (rat) 2800 mg/kg.

Skin irritation – This material is neither corrosive nor destructive to the skin of New Zealand rabbits. Occasionally, a very slight rash may appear.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: This product readily dissolves in water to form a weak acid solution. A 0.05 percent or greater (by weight) solution of this product will likely be acutely harmful to fish and other water organisms.

CHEMICAL FATE INFORMATION: Material will decompose in soil. Studies show that there are no adverse effects of applying the main ingredient in this product (sodium bisulfate) directly to crops. In fact, there are existing products on the market that use sodium bisulfate as a soil additive to improve crop production. However, do not apply excessive quantities to soil.

SECTION 13 DISPOSAL CONSIDERATIONS

If this product as supplied becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA), 40 CFR Part 261. Dispose of in accordance with local, State and Federal laws and regulations.

SECTION 14 TRANSPORT INFORMATION

DOMESTIC (Land, Department of Transportation): Not regulated.

International (Water, IMO): Not regulated. **International (Air, ICAO & IATA):** Not regulated.

Shipment in Canada: Not regulated. **Surface Shipments in Europe:** Not regulated.

SECTION 15 REGULATORY INFORMATION

OSHA: This product is classified as an **Irritant** by definition of Hazard Communication Standard (29 CFR 1910.1200).

HMIS Rating: Health – 1; Flammability – 0; Reactivity – 1; Protective Equipment – F

NFPA Rating: Health – 1; Flammability – 0; Reactivity – 1; Special Precautions – None

TSCA: Listed in U.S. TSCA Section 8(b) Inventory.

CERCLA (RQ): This product contains no Hazardous Substances listed in 40 CFR Part 302.

SARA Title III: Section 311/312 Hazard Class – Acute.

This product contains NONE of the substances subject to the reporting requirements of Section 313 (40 CFR Part 372).

California Proposition 65: This product does not contain any ingredient known to the State of California to cause cancer or reproductive toxicity as listed under the Safe Drinking Water and Toxic Enforcement Act of 1986.

New Jersey: Department of Health RTK List – sn 1704. Special Hazardous Substances – Corrosive

Australia: List of Designated Hazardous Substances – Corrosive (R34), Harmful (R37)

Canada – WHMIS: Controlled Product Hazard Class D2B. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

Canada – CEPA: All components of this product are on the Domestic Substances List (DSL), and acceptable for use under the provisions of CEPA.

European Union (EU): Dangerous Substances (Annex I)

- Risk Phrases: R36/37/38
- Labels: Xi
- Safety Phrases: S8, S22, S24/25, S26, S36 & S50

Germany: Water Classification (VwVwS) – Water Hazard Class: 1

Switzerland: Toxic Substance Classification – Giftklasse 3

Inventories: Australian Inventory of Chemical Substances; China; European Industry of Existing Commercial Chemical Substances (231-665-7); European Union Inventory of Cosmetic Ingredients, Other Ingredients; ICCA High Production Volume Working List; Japan Existing and New Chemical Substances (1-83, 1-491, 1-501); Korea Existing and Evaluated Chemical Substances (KE-31481); Philippines Inventory of Chemicals and Chemical Substances; OECD List of High Production Volume Chemicals.

SECTION 16 OTHER INFORMATION

DISCLAIMER

The information provided herein relates only to the specific material described herein and does not relate to its use by customer whether alone or in combination with any other material in any process. The information set forth herein is furnished free of charge and is based on technical data that Jones-Hamilton Co. believes to be reliable, but Jones-Hamilton Co. does not make any representation or warranty as to the accuracy or completeness of this information. This information is intended for use by persons having technical skill and at their own discretion and risk. Customer is responsible for determining whether the information included herein is appropriate for customer's use, and customer assumes full responsibility for conclusions it derives from this information. Neither Jones-Hamilton Co. nor any of its officers, employees, directors, agents or other representatives shall have any liability to customer or any of its officers, employees, directors, agents or other representatives resulting from customer's use of this information. Inasmuch as Jones-Hamilton Co. has no reason to know how customer intends to use the information provided herein, and since conditions of use are outside of our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

MSDS PREPARED BY:

Ray Hahn
Corporate Manager – Environmental, Safety & Security



Material Safety Data Sheet
Sodium hydroxide solutions, 1-50%

Section 1 - Chemical Product and Company Identification

MSDS Name:

Sodium hydroxide solutions, 1-50%

Catalog Numbers:

LC23950, LC24000, LC24040, LC24060, LC24070, LC24075, LC24090, LC24100, LC24110, LC24120, LC24140, LC24150, LC24200, LC24220, LC24230, LC24250, LC24270, LC24280, LC24300, LC24305, LC24307, LC24310, LC24320, LC24330, LC24350, LC24380, LC24400, LC24420, LC24450, LC24460, LC24500

Synonyms:

Caustic Soda, Soda Lye, Sodium Hydrate

Company Identification:

LabChem, Inc.
 200 William Pitt Way
 Pittsburgh, PA 15238

Company Phone Number:

(412) 826-5230

Emergency Phone Number:

(800) 424-9300

CHEMTREC Phone Number:

(800) 424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name:	Percent
7732-18-5	Water	balance
1310-73-2	Sodium hydroxide	0.04-50

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear

Danger! Corrosive. Causes skin burns. Causes eye burns. Causes digestive tract burns.

Causes respiratory tract burns.

Target Organs: None.

Potential Health Effects

Eye:

Causes severe eye burns.

Skin:

Causes skin burns. May cause deep, penetrating ulcers of the skin.



Material Safety Data Sheet

Sodium hydroxide solutions, 1-50%

Ingestion:

Causes gastrointestinal tract burns. Causes severe pain, nausea, vomiting, diarrhea, and shock.

Inhalation:

Irritation may lead to chemical pneumonitis and pulmonary edema. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma.

Chronic:

Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids until chemical is gone. Get medical aid at once.

Skin:

Get medical aid at once. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing to reduce further exposure.

Ingestion:

Do NOT induce vomiting. Give conscious victim 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid at once.

Inhalation:

Move victim to fresh air immediately. Give artificial respiration if necessary. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:

Wear appropriate protective clothing to prevent contact with skin and eyes. Wear a self-contained breathing apparatus (SCBA) to prevent contact with thermal decomposition products. Use water with caution and in flooding amounts.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

Autoignition Temperature:

Not applicable.

Flash Point:

Not applicable.

NFPA Rating:

CAS# 7732-18-5: Not published.

CAS# 1310-73-2: Not published.

Explosion Limits:

Lower: No information Upper: No information

Section 6 - Accidental Release Measures

General Information:

Use proper personal protective equipment as indicated in Section 8.



Material Safety Data Sheet

Sodium hydroxide solutions, 1-50%

Spills/Leaks:

Absorb spills with absorbent (vermiculite, sand, fuller's earth) and place in plastic bags for later disposal.

Section 7 - Handling and Storage

Handling:

Wash thoroughly after handling. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale.

Storage:

Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong acids. Keep away from metals. Keep away from flammable liquids. Keep away from organic halogens.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name:	ACGIH	NIOSH	OSHA
Water	None of the components are on this list.	None of the components are on this list.	None of the components are on this list.
Sodium hydroxide	None of the components are on this list.	None of the components are on this list.	2 mg/m ³ TWA;

OSHA Vacated PELs

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.

Skin:

Wear appropriate gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR 1910.134. Always use a NIOSH-approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: Clear

Odor: Not available.

pH: Alkaline

Vapor Pressure: 14 mm Hg

Vapor Density: No information found.



Material Safety Data Sheet

Sodium hydroxide solutions, 1-50%

Evaporation Rate: No information found.
Viscosity: >1 (ether=1)
Boiling Point: 212°F (100.00°C)
Freezing/Melting Point: 32°F (0.00°C)
Decomposition Temperature: No information found.
Solubility in water: No information found.
Specific Gravity/Density: 1.0
Molecular Formula: NaOH
Molecular Weight: 40

Section 10 - Stability and Reactivity

Chemical Stability:

Stable.

Conditions to Avoid:

Incompatible materials, acids.

Incompatibilities with Other Materials

Reacts with mineral acids to form corresponding salts; reacts with weak acids gases like hydrogen sulfide, sulfur dioxide, and carbon dioxide; ignites when in contact with cinnamaldehyde or zinc; and reacts explosively with a mixture of chloroform and methane. Corrosive to metals such as aluminum, tin, and zinc as well as to alloys such as steel, and may cause formation of flammable hydrogen gas.

Hazardous Decomposition Products

Toxic fumes of sodium oxide, sodium peroxide fumes.

Hazardous Polymerization

Has not been reported.

Section 11 - Toxicological Information

RTECS:

CAS# 7732-18-5: ZC0110000.
CAS# 1310-73-2: WB4900000.

LD50/LC50:

CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg.
CAS# 1310-73-2:
No information found.

Carcinogenicity:

CAS# 7732-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.
CAS# 1310-73-2: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.

Epidemiology:

No information reported.

Teratogenicity:

No information reported.

Reproductive:

No information reported.



Material Safety Data Sheet
Sodium hydroxide solutions, 1-50%

Mutagenicity

Mutation data reported.

Neurotoxicity

No information reported.

Section 12 - Ecological Information

Ecotoxicity:

TLm, mosquito fish, 125 ppm/96hr. (fresh water); TLm, bluegill, 99 mg/48hr.(tap water).

Environmental:

Once liquid, sodium hydroxide leaches rapidly into the soil.

Physical:

No information found.

Other:

No information found.

Section 13 - Disposal Considerations

Dispose of in accordance with federal, state, and local regulations.

Section 14 - Transport Information

	US DOT < 0.5%	Between 0.5% and 2.0%	> 2.0%
Shipping Name:	Not regulated.	Sodium hydroxide solution	Sodium hydroxide solution
Hazard Class:		8	8
UN Number:		UN1824	UN1824
Packing Group:		PG III	PG II

Section 15 - Regulatory Information

US Federal

TSCA

CAS# 7732-18-5 is listed on the TSCA Inventory.

CAS# 1310-73-2 is listed on the TSCA Inventory.

SARA Reportable Quantities (RQ)

CAS# 1310-73-2: final RQ = 1000 pounds (454 kg)

CERCLA/SARA Section 313

None of the components are on this list.

OSHA - Highly Hazardous

None of the components are on this list.

US State



Material Safety Data Sheet

Sodium hydroxide solutions, 1-50 %

State Right to Know

Sodium hydroxide can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California Regulations

European/International Regulations

Canadian DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 1310-73-2 is listed on Canada's DSL List.

Canada Ingredient Disclosure List

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

CAS# 1310-73-2 is listed on Canada's Ingredient Disclosure List.

Section 16 - Other Information

MSDS Creation Date: July 6, 1998

Revision Date: August 16, 2004

Information in this MSDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc. assumes no liability resulting from the use of this MSDS. The user must determine suitability of this information for his application.

TRACING Dye

HARBOR BOSUN™ MATERIAL SAFETY DATA SHEET
YELLOW/GREEN LIQUID CONCENTRATE
PAGE 1 OF 3

MSDS PREPARATION INFORMATION

PREPARED BY: T. P. MULDOON
DATE PREPARED: (937) 886-9100
1/1/03

PRODUCT INFORMATION

MAUFACTURED BY: KINGSCOTE CHEMICALS
3334 S. TECH BLVD.
MIAMISBURG, OHIO 45342

CHEMICAL NAME NOT APPLICABLE
CHEMICAL FORMULA NOT APPLICABLE
CHEMICAL FAMILY AQUEOUS DYE PRODUCR

HAZARDOUS INGREDIENTS

NONE PER 29 CFR 1910.1200

PHYSICAL DATA

PHYSICAL STATE LIQUID
ODOR AND APPEARANCE YELLOW/GREEN, WITH NO APPARENT ODOR
SPECIFIC GRAVITY APPROXIMATELY 1.05
VAPOR DENSITY (mm Hg @ 25 C) ~23.75
VAPOR DENSITY (AIR =1) ~0.6
EVAPORATION RATE (Butyl Acetate = 1) ~1.8
BOILING POINT 100 degrees C (212 degrees F)
FREEZING POINT 0 degrees C (32 degrees F)
pH 8.0 OR ABOVE
SOLUBILITY IN WATER HIGHLY SOLUBLE

FIRE HAZARD

CONDITION OF FLAMMABILITY NON-FLAMABLE
MEANS OF EXTINCTION WATER FOG, CARBON DIOXIDE, OR DRY CHEMICAL
FLASH POINT AND METHOD NOT APPLICABLE
UPPER FLAMABLE LIMIT NOT APPLICABLE
LOWER FLAMABLE LIMIT NOT APPLICABLE
AUTO-IGNITION TEMPERATURE NOT APPLICABLE
HAZARDOUS COMBUSTION PRODUCTS NOT APPLICABLE
UNUSUAL FIRE HAZARD NOT APPLICABLE

HARBOR BOSUN™ MATERIAL SAFETY DATA SHEET
YELLOW/GREEN LIQUID CONCENTRATE
PAGE 2 OF 3

EXPLOSION HAZARD

SENSITIVITY TO STATIC DISCHARGE NOT APPLICABLE
SENSITIVITY TO MECHANICAL IMPACT NOT APPLICABLE

REACTIVITY DATA

PRODUCT STABILITY STABLE
PRODUCT INCOMPATIBILITY NONE KNOWN
CONDITIONS OF REACTIVITY NOT APPLICABLE
HAZARDOUS DECOMPOSITION PRODUCTS NONE KNOWN

TOXICOLOGICAL PROPERTIES

SYMPTOMS OF OVER EXPOSURE FOR EACH POTENTIAL ROUTE OF ENTRY:

INHALLATION, ACUTE NO HARMFUL EFFECTS EXPECTED.
INHALATION, CHRONIC NO HARMFUL EFFECTS EXPECTED.
SKIN CONTACT WILL TEMPORARILY GIVE SKIN A YELLOW/GREEN COLOR.
EYE CONTACT NO HARMFUL EFFECTS EXPECTED.
INGESTION URINE MAY BE A YELLOW/GREEN COLOR UNTIL THE DYE
HAS BEEN WASHED THROUGH THE SYSTEM.
EFFECTS OF ACUTE EXPOSURE NO HARMFUL EFFECTS EXPECTED
EFFECTS OF CHRONIC EXPOSURE NO HARMFUL EFFECTS EXPECTED
THRESHOLD OF LIMIT VALUE NOT APPLICABLE
CARCINOGENICITY NOT LISTED AS A KNOWN OR SUSPECTED CARCINOGEN BY
IARC, NTP OR OSHA.
TERATOGENICITY NONE KNOWN
TOXICOLOGY SYNERGISTIC PRODUCTS NONE KNOWN

PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

GLOVES RUBBER
RESPIRATORY USE NISOH APPROVED DUST MASK IF DUSTY CONDITIONS
EXIST.
CLOTHING PROTECTIVE CLOTHING SHOULD BE WORN WHERE
CONTACT IS UNAVOIDABLE.
OTHER HAVE ACCESS TO EMERGENCY EYEWASH.

HARBOR BOSUN™ MATERIAL SAFETY DATA SHEET
YELLOW/GREEN LIQUID CONCENTRATE
PAGE 3 OF 3

PREVENTATIVE MEASURES (CONT.)

ENGINEERING CONTROLS	NOT NECESSARY UNDER NORMAL CONDITIONS, USE LOCAL VENTILATION IF DUSTY CONDITIONS EXIST.
SPILL OR LEAK RESPONSE	SWEEP UP SPILLS AND PLACE IN WASTE DISPOSAL CONTAINER, FLUSH AFFECTED AREA WITH WATER.
WASTE DISPOSAL	INCINERATE OR REMOVE TO A SUITABLE SOLID WASTE DISPOSAL SITE, DISPOSE OF ALL WASTES IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
HANDELING PROCEDURES AND EQUIPMENT	NO SPECIAL REQUIREMENTS.
STORAGE REQUIREMENTS	STORE IN A COOL, DRY PLACE AWAY FROM EXCESSIVE HEAT OR FLAME.
SHIPPING INFORMATION	NO SPECIAL REQUIREMENTS

FIRST AID MEASURES

FIRST AID EMERGENCY PROCEDURES

EYE CONTACT	FLUSH EYES WITH WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IF IRRITATION PERSISTS.
SKIN CONTACT	WASH SKIN THOROUGHLY WITH SOAP AND WATER. GET MEDICAL ATTENTION IF IRRITATION DEVELOPS.
INHALATION	IF DUST IS INHALED, MOVE TO FRESH AIR. IF BREATHING IS DIFFICULT GIVE OXYGEN AND GET IMMEDIATE MEDICAL ATTENTION.
INGESTION	DRINK PLENTY OF WATER AND INDUCE VOMITING. GET MEDICAL ATTENTION IF LARGE QUANTITIES WERE INGESTED OR IF NAUSEA OCCURS. NEVER GIVE FLUIDS OR INDUCE VOMITING IF THE PERSON IS UNCONSCIOUS OR HAS CONVULSIONS.

SPECIAL NOTICE

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END OF MATERIAL SAFETY DATA SHEET

**2012 NPDES PERMIT RE-APPLICATION
 OUTFALL FACT SHEET**

Outfall ID No.	Outfall Location	Outfall Category	Receiving Stream
051	TA-50-1	Radioactive Liquid Waste Treatment Facility (RLWTF)	Effluent Canyon, a Tributary to Mortandad Canyon

SOURCE OF DISCHARGE

Outfall 051 is located at TA-50 and discharges treated radioactive liquid wastewater effluent from the Radioactive Liquid Waste Treatment Facility (RLWTF) at TA-50-1 into Effluent Canyon, a tributary of Mortandad Canyon. Table 1 identifies the location of the RLWTF and provides a description of influent sources that it receives.

**Table 1
 Sources for Discharge to Outfall 051**

TA	Bldg	Description
50	1	Radioactive Liquid Waste Treatment Facility <ul style="list-style-type: none"> - Process water from radiochemistry laboratories, duct washing systems, radiological areas, boilers, and process areas. - Cooling water from systems located in radiological areas. - Storm and surface water (including samples) collected from sumps, manholes, and vaults. - Environmental Restoration (ER) waste water generated by groundwater monitoring and sampling activities at performed at LANL.

Figure 1 provides a process flow diagram for the RLWTF.

WATER TREATMENT PROCESS

The RLWTF treats low-level and transuranic (TRU) radioactive liquid wastewater delivered from processes at various generator facilities to TA-50 by underground collection system or by tanker truck. All wastewater discharged into the RLWTF must comply with the facility's Waste Acceptance Criteria and must have a completed/approved Waste Profile Form (Appendix N). The NPDES sample point for this outfall allows for the collection of a sample after the final treatment process. The RLWTF includes two different treatment processes as follows:

- **Low-Level Radioactive Liquid Waste (RLW) Treatment Process** - Low-level influent is received at the facility through the Radioactive Liquid Waste Collection System (see Appendix J, K) where it is routed through a pH adjustment chamber and collected in the influent tanks. RLW is fed from the influent tanks to the clarifiers where it is treated by chemical precipitation and flocculation (sodium hydroxide, magnesium hydroxide, ferric chloride, sulfate, or other chemicals) to remove silica and radionuclides. The clarified water is drawn off and filtered. The RLW may then be treated by ion exchange or is sent to a Reverse Osmosis (RO) unit. The RO permeate (treated water) is routed to effluent storage tanks prior to being discharged to the effluent evaporator, TA-52 solar evaporation tanks (anticipated to be operational within the next 5 years), or the NPDES outfall. If the effluent is to be discharged to Outfall 051 it is further treated with ion exchange to remove copper/zinc and may have magnesium/calcium salts added to adjust the hardness prior to discharge. Secondary waste treatment processes are also included for RO concentrate (Secondary RO) and sludge (vacuum filter/dewatering). These processes result in recycle streams back to the influent tanks and to other process units, and concentrated and solid waste streams shipped as low-level radioactive waste.

- **TRU RLW Treatment Process** - TRU RLW is received at the facility through an underground, doubled walled pipe collection system from TA-55 (see Appendix J, K) and is collected at the TA-50-66 influent tanks. The TRU influent is routed from TA-50-66 to the treatment tank in Room 60 where it is treated by chemical precipitation (sodium hydroxide) to remove radionuclides. Solids from the tank are collected in a sludge tank, allowed to settle, and are then solidified with cement in a drum tumbler. The cement drums are shipped and disposed of as TRU waste. The treated water is routed to the low-level treatment plant for either additional treatment or for storage pending shipment off-site for LLW disposal.

The water treatment codes provided in Table 2 have been assigned to this outfall.

Table 2
Water Treatment Codes Assigned to the RLWTF and Outfall 051

Treatment Code	Treatment Process	Description
1F	Evaporation	Waste Reduction Evaporator, Mechanical Evaporator, and/or Solar Evaporation Tanks
1G	Flocculation	Clarifiers
1O	Mixing	Various
1S	Reverse Osmosis (Hyperfiltration)	RO Units
1U	Sedimentation (Settling)	Sludge
1Q	Multimedia Filtration	Pressure and Cartridge Filters used for Particulate Removal
1R	Rapid Sand Filtration	Gravity Media Filter for Particulate Removal
2C	Chemical Precipitation	Sodium hydroxide, magnesium hydroxide, magnesium sulfate, sodium aluminate, co-polymer, and ferric sulfate are used to promote precipitation of radionuclides and silica removal
2G	Coagulation	Clarifiers
2J	Ion Exchange	Perchlorate, copper, and zinc removal
2K	Neutralization	Influent and Room 60 Neutralization
5Q	Landfill	Drums of TRU and LLW Waste
5U	Vacuum Filtration	Vacuum filter for LLW sludge

TREATMENT CHEMICALS AND POTENTIAL CONTAMINANTS

The water treatment processes identified in Table 2 utilize chemicals to control pH, promote precipitation, and flocculation. Table 3 identifies the treatment chemicals that are used at the RLWTF.

Table 3
Treatment Chemicals Used at the RLWTF

Source	Reason for Use/Frequency	Hazardous Substances from Form 2C, Table 2C-4
Sodium Hydroxide 25%	pH Adjustment, Promote Precipitation/Flocculation, and Membrane Cleaning	Sodium Hydroxide
Ferric Sulfate	Promote Precipitation/Flocculation	Ferric Sulfate
Magnesium Hydroxide	Promote Precipitation/Flocculation	NA
Carbon Dioxide	Adjust pH	NA
Magnesium Sulfate	Precipitation/Flocculation	NA

**Table 3 (continued)
 Treatment Chemicals Used at the RLWTF**

Source	Reason for Use/Frequency	Hazardous Substances from Form 2C, Table 2C-4
EDTA	Membrane Cleaning	EDTA
Sodium bisulfite	Membrane Cleaning	Sodium Bisulfite
Dishwashing Soap	Membrane Cleaning	NA
Ionac SR-6	Ion Exchange Resin	NA
Hydrochloric Acid	Reduce pH	Hydrochloric Acid
Solid Sodium Hydroxide	Precipitation/Flocculation	Sodium Hydroxide
SCU	Ion Exchange Media	NA
SCP	Ion Exchange Media	NA
Sodium Aluminate	Precipitation/Flocculation	NA
WEST W-126	Ionic Co-polymer used as a Flocculent	2-Propanoic Acid

Table 4 identifies the contaminants listed on the Waste Profile Forms for the influent waste streams received by the RLWTF for treatment.

**Table 4
 Potential Contaminants Associated with the RLWTF Influent**

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 Identified on WPFs ¹	Detected in Outfall 051 Discharge (Aug 07 – Jun 10)
Process	Discharged from laboratories, radiological areas and process areas.	acetic acid ammonia ammonium bifluoride ammonium carbonate ammonium chloride ammonium fluoride ammonium hydroxide benzene chloroform chromic acid cupric chloride cupric sulfate endrin EDTA ferric chloride ferric nitrate ferric sulfate ferrous ammonium sulfate ferrous chloride ferrous sulfate formaldehyde formic acid heptachlor hydrochloric acid hydrofluoric acid lead nitrate nitric acid phenol phosphoric acid potassium dichromate potassium hydroxide potassium permanganate sodium dodecylbenzenesulfonate sodium fluoride sodium hydroxide sodium hypochlorite sodium nitrite sodium phosphate (dibasic) sulfuric acid uranyl nitrate zinc chloride zinc nitrate zinc sulfate	Chloroform ² Chromium ³ Copper ⁴ Lead ⁵
ER	Discharged from groundwater drilling and remediation projects.	acrolein ammonia aniline benzoic acid Dieldrin endosulfan endrin ethyl benzene Naphthalene Phenol Toluene xylene	Naphthalene ⁶ Phenol ⁷

Table 4 (continued)
Potential Contaminants Associated with the RLWTF Influent

Waste Stream Type	Description	Hazardous Substances from Form 2C, Table 2C-4 Identified on WPFs ¹		Detected in Outfall 051 Discharge (Aug 07 – Jun 10)
Storm Water	Discharged from sumps, manholes, and vaults. ^{8,9}	Ammonia chloroform	nitric acid trichloroethylene	Chloroform ²

- NOTE: The wastewater influent received by the RLWTF is not Resource Conservation and Recovery Act (RCRA) listed hazardous waste.
- Chloroform was detected twelve (12) times at concentrations ranging from 0.000283 – 0.0546 mg/L.
- Chromium was detected one (1) time at a concentration of 0.001 mg/L.
- Copper was detected thirty five (35) times at concentrations ranging from 0.0102 – 0.24 mg/L.
- Lead was detected on (1) time at a concentration of 0.0076 mg/L.
- Naphthalene was detected two (2) times at concentrations of 0.000372 – 0.000933 mg/L.
- Phenol was detected on (1) time at a concentration of 0.0177 mg/L.
- Ammonia, chloroform, and trichloroethylene were detected in storm water collected from TRU Low Level Waste (LLW) storage dome sumps located at TA-54 and sent to the RLWTF for treatment. These detections are likely due to residual cleaning chemicals and/or the presence of asphalt.
- The nitric acid is used as a preservation chemical for storm water and surface water samples that are managed at TA-59. Unused sample material is poured down the RLW drain to the collection system.

POTENTIAL POLLUTANTS

The treatment chemicals and treated RLWTF effluent constitute the pollutant load that could potential discharge to Outfall 051. Table 5 identifies the Table 2C-4 constituents that will potentially be discharged to the outfall.

Table 5
Potential Pollutants Discharged to Outfall 051

Description	Hazardous Substances Required to be Listed on the NPDES Permit Application Form 2C		
TA-50 RLWTF Treated Effluent, Outfall 051	acetic acid	EDTA	potassium hydroxide
	acrolein	ferric chloride	potassium permanganate
	ammonia	ferric nitrate	sodium bisulfite
	ammonium bifluoride	ferric sulfate	sodium dodecylbenzenesulfonate
	ammonium carbonate	ferrous ammonium sulfate	sodium fluoride
	ammonium chloride	ferrous chloride	sodium hydroxide
	ammonium fluoride	ferrous sulfate	sodium hypochlorite
	ammonium hydroxide	formaldehyde	sodium nitrite
	aniline	formic acid	sodium phosphate (dibasic)
	benzene	heptachlor	sulfuric acid
	benzoic acid	hydrochloric acid	toluene
	chloroform	hydrofluoric acid	trichloroethylene
	chromic acid	lead nitrate	uranyl nitrate
	cupric chloride	naphthalene	xylene
	cupric sulfate	nitric acid	zinc chloride
	dieldrin	phenol	zinc nitrate
	endosulfan	phosphoric acid	zinc sulfate
	endrin	potassium bichromate	2-propanoic acid
	ethylbenzene		

DISCHARGE RATE AND FREQUENCY

The average daily flow rates for the sources that discharge to Outfall 051 are provided in Table 6.

Table 6
Source Flow Rates/Frequencies to Outfall 051

Operation/Source	Average Flow (Gallon/Day)	Treatment Code
RLWTF	19,700	1G, 1O, 1S, 1Q, 1R 1U, 2J, 1F, 2K, 2C, 5Q, 5U

SAMPLING AND ANALYSIS FOR RE-APPLICATION

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Mechanical Evaporator and/or Zero Liquid Discharge (ZLD) Solar Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A grab sample for the Form 2C Constituents will be collected for Outfall 051 when/if the RLWTF discharges effluent through the outfall. See the attached Discharge Monitoring Report Outfall Summary for the analytical data collected prior to November 2010.

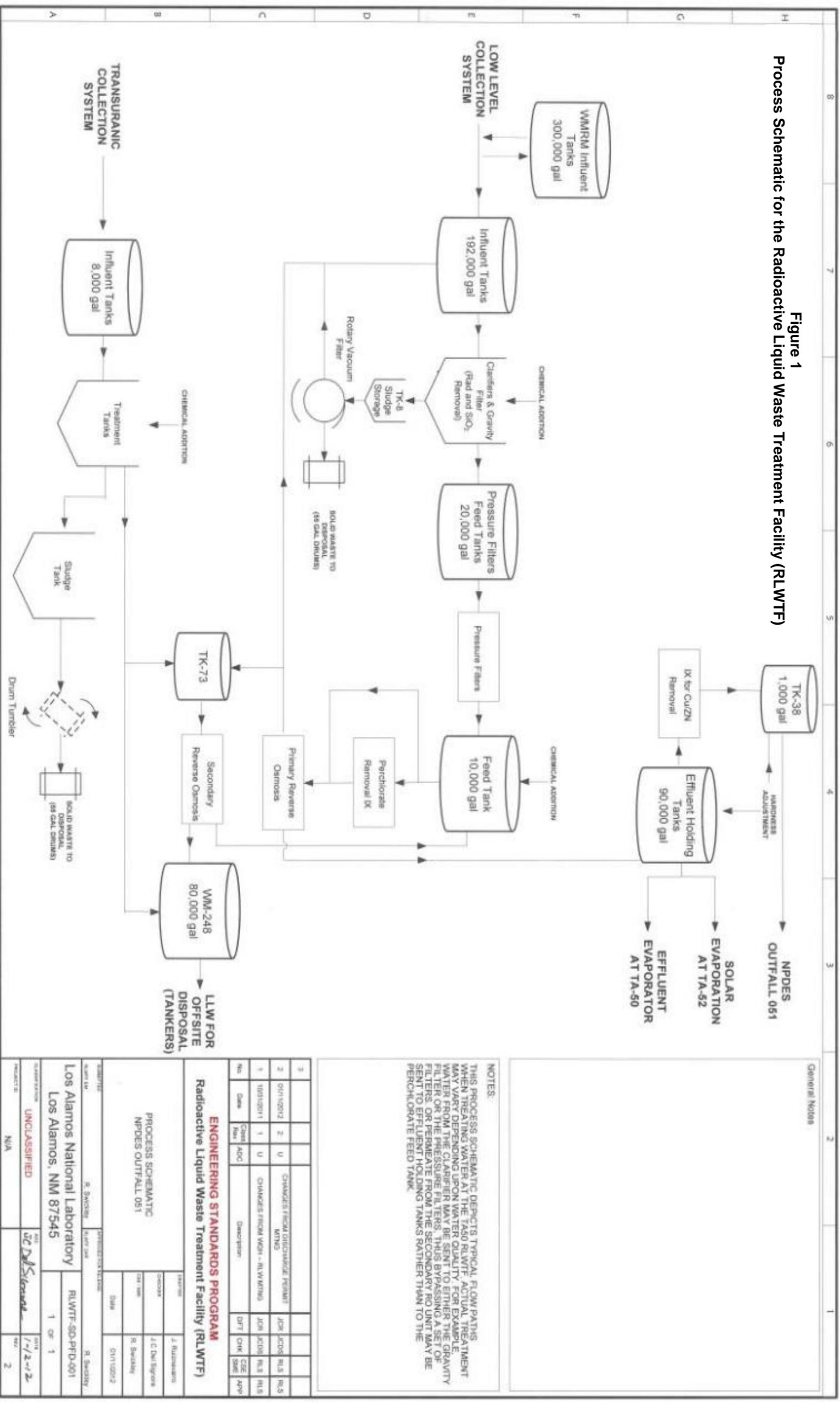
ANALYTICAL RESULTS PROVIDED

- NPDES Discharge Monitoring Reports (DMRs) from August 2007 – December 2011.
- Material Safety Data Sheets for treatment chemicals.

ADDITIONAL INFORMATION

- Latitude – 35°51'54"
- Longitude – 106°17'54"

Figure 1
 Process Schematic for the Radioactive Liquid Waste Treatment Facility (RLWTF)

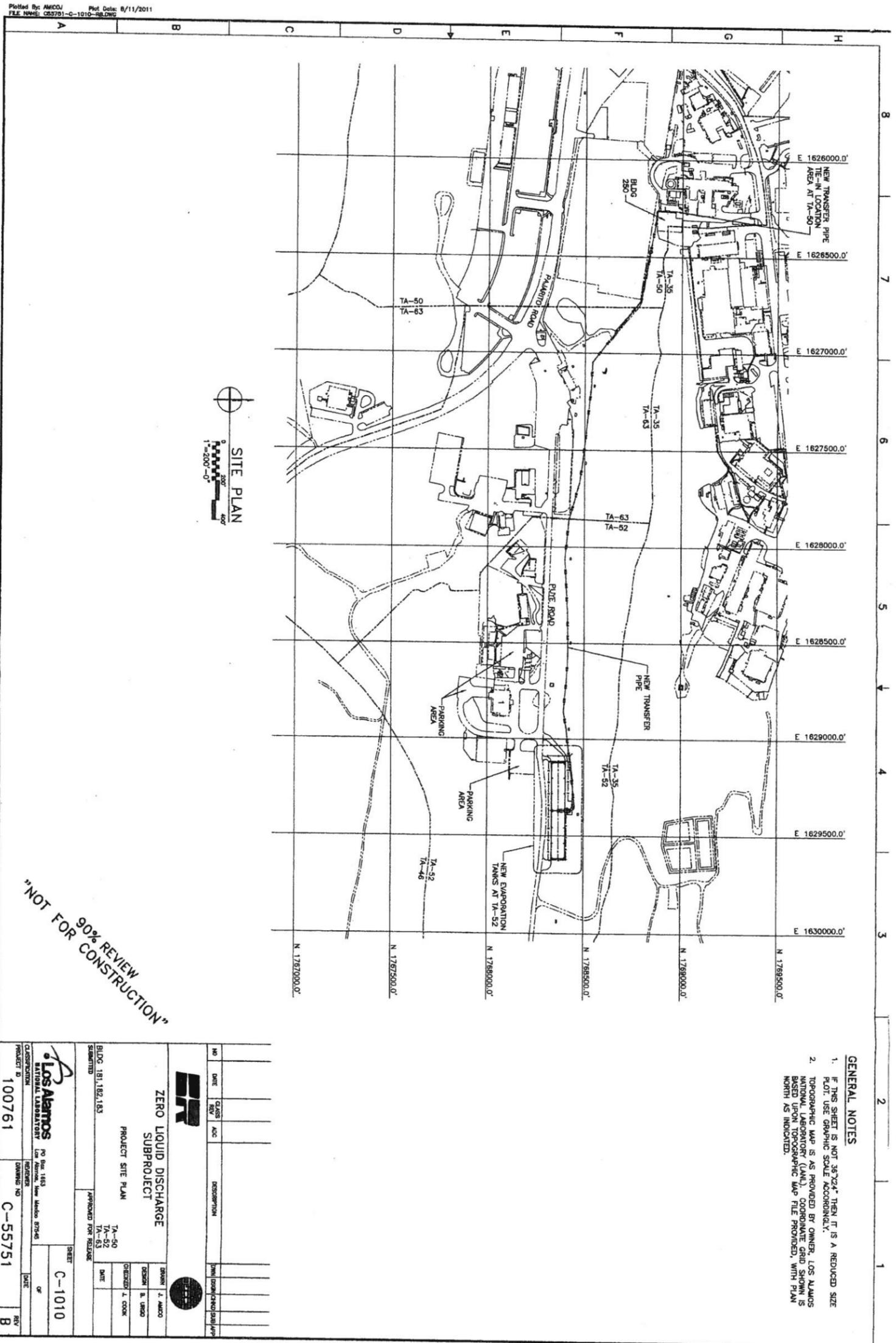


Form 2C Section IV.B - Improvements

ZERO LIQUID DISCHARGE (ZLD) PROJECT

The configuration of the RLWTF and Outfall 051 will be changing in the next 5 years due to the construction of two new Concrete Evaporation Tanks at Technical Area (TA) 52 under the Zero Liquid Discharge (ZLD) Project. These evaporation tanks will receive treated effluent from the RLWTF and will reduce the volume of treated effluent discharged to Outfall 051. The evaporation tanks will be connected to the RLWTF by a transfer pipe line that will be approximately 0.75 miles long. Figures 2 and 3 provide copies of the 90% review design drawings for the transfer line and evaporation tanks.

Figure 2
 Transfer Line from the RLWTF to the Evaporation Tanks at TA-52 (90% Design Drawing)



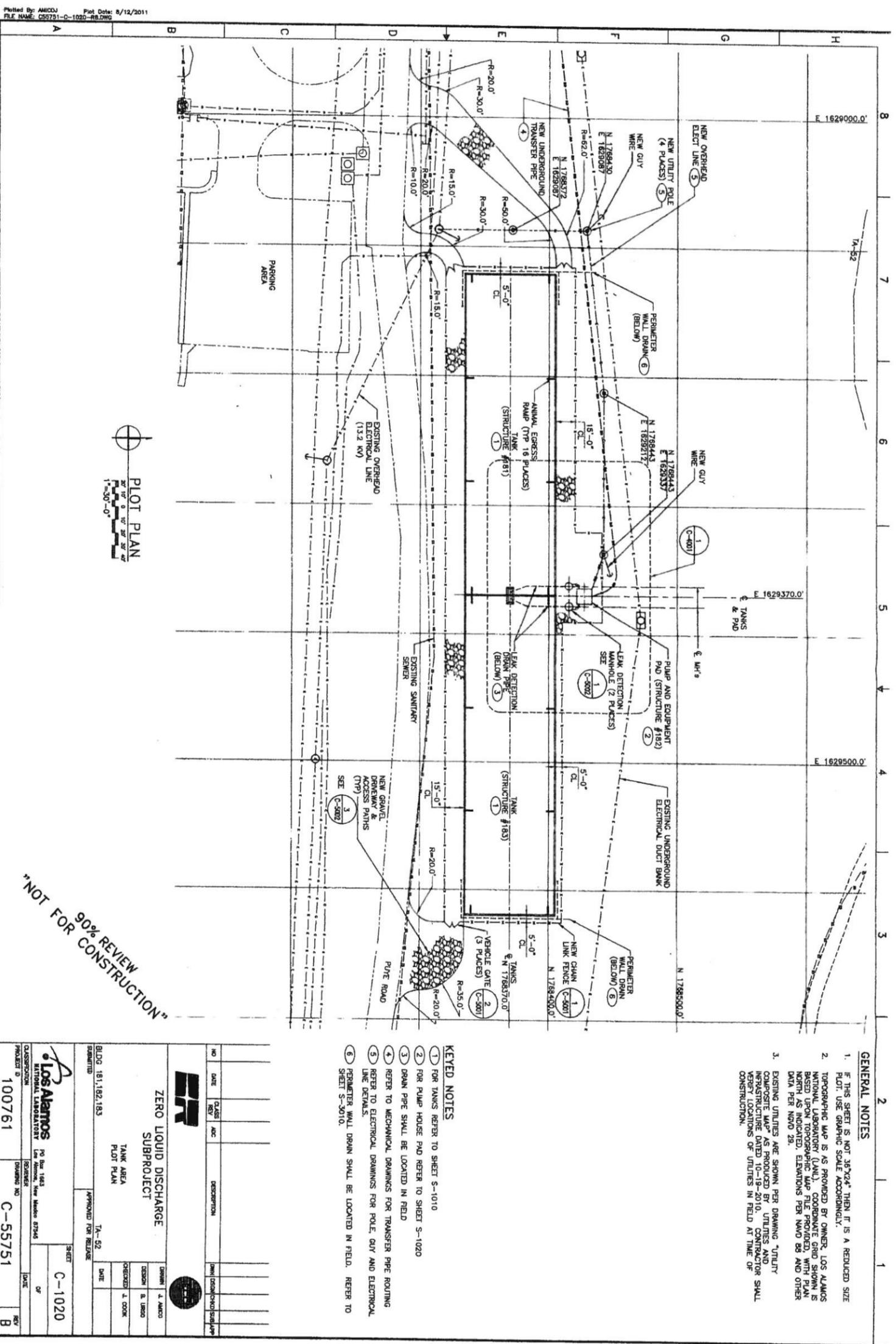
GENERAL NOTES

1. IF THIS SHEET IS NOT 36"x24" THEN IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
2. TOPOGRAPHIC MAP IS AS PROVIDED BY OWNER. LOS ALAMOS NATIONAL LABORATORY (LANL) CORPORATE GRID BASED UPON TOPOGRAPHIC MAP FILE PROVIDED WITH PLAN NORTH AS INDICATED.

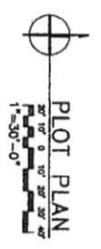
NO	DATE	CLASS	REV	BY	APP	DESCRIPTION

ZERO LIQUID DISCHARGE SUBPROJECT	
PROJECT SITE PLAN	
BLDG 181, 182, 183 SUBMITTED	APPROVED FOR RELEASE
TA-50 TA-52 TA-53	DATE
DRAWN: J. AMCO CHECKED: S. LINDO DESIGNED: J. COOK	SHEET: C-1010 REV: B
PROJECT ID: 100761	DRAWING NO: C-55751

Figure 3
 Evaporation Tanks at TA-52 (90% Design Drawing)



Printed By: AMCOJ Plot Date: 8/12/2011
 FILE NAME: C55751-C-1020-RE.DWG



NO	DATE	REVISION	BY	DESCRIPTION	CHK	DATE

		ZERO LIQUID DISCHARGE SUBPROJECT	
BLDG 1811, 182, 183 SUBMITTED		TA-52 APPROVED FOR RELEASE	
SHEET C-1020		DATE	
PROJECT # 100761		DRAWING NO. C-55751	
CLASSIFICATION UNCLASSIFIED		DATE	

DMR Outfall Data Summary - 051
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	A - Bldg	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR											
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Maximum			Permit Limit	Units	Number of Samples
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units				
51	TA-50-1	8/07	Flow (Totalized Est.)	0.01941	0.01981	MGD											0.01941	0.01981	MGD	1	
		9/07	Flow (Totalized Est.)	0.01956	0.01991	MGD											0.01956	0.01991	MGD	1	
		10/07	Flow (Totalized Est.)	0.01905	0.01962	MGD											0.01905	0.01962	MGD	1	
		11/07	Flow (Totalized Est.)	0.01952	0.01989	MGD											0.01952	0.01989	MGD	1	
		12/07	Flow (Totalized Est.)	0.01970	0.01994	MGD											0.01970	0.01994	MGD	1	
		1/08	Flow (Totalized Est.)	0.01932	0.01978	MGD											0.01932	0.01978	MGD	1	
		2/08	Flow (Totalized Est.)	0.01975	0.01986	MGD											0.01975	0.01986	MGD	1	
		3/08	Flow (Totalized Est.)	0.01978	0.02005	MGD											0.01978	0.02005	MGD	1	
		4/08	Flow (Totalized Est.)	0.01970	0.02005	MGD											0.01970	0.02005	MGD	1	
		5/08	Flow (Totalized Est.)	0.01949	0.02002	MGD											0.01949	0.02002	MGD	1	
		6/08	Flow (Totalized Est.)	0.01963	0.02012	MGD											0.01963	0.02012	MGD	1	
		7/08	Flow (Totalized Est.)	0.01965	0.02015	MGD											0.01965	0.02015	MGD	1	
		8/08	Flow (Totalized Est.)	0.02256	0.03968	MGD											0.02256	0.03968	MGD	1	
		9/08	Flow (Totalized Est.)	0.01999	0.02032	MGD											0.01999	0.02032	MGD	1	
		10/08	Flow (Totalized Est.)	0.01975	0.02011	MGD											0.01975	0.02011	MGD	1	
		11/08	Flow (Totalized Est.)	0.01983	0.02016	MGD											0.01983	0.02016	MGD	1	
		12/08	Flow (Totalized Est.)	0.01997	0.02020	MGD											0.01997	0.02020	MGD	1	
		1/09	Flow (Totalized Est.)	0.01977	0.02013	MGD											0.01977	0.02013	MGD	1	
		2/09	Flow (Totalized Est.)	0.01989	0.02011	MGD											0.01989	0.02011	MGD	1	
		3/09	Flow (Totalized Est.)	0.01979	0.02005	MGD											0.01979	0.02005	MGD	1	
		4/09	Flow (Totalized Est.)	0.01968	0.01989	MGD											0.01968	0.01989	MGD	1	
		5/09	Flow (Totalized Est.)	0.01994	0.02026	MGD											0.01994	0.02026	MGD	1	
		6/09	Flow (Totalized Est.)	0.01817	0.01984	MGD											0.01817	0.01984	MGD	1	
		7/09	Flow (Totalized Est.)	0.01940	0.01987	MGD											0.01940	0.01987	MGD	1	
		8/09	Flow (Totalized Est.)	0.01996	0.02021	MGD											0.01996	0.02021	MGD	1	
		9/09	Flow (Totalized Est.)	0.02017	0.02042	MGD											0.02017	0.02042	MGD	1	
		10/09	Flow (Totalized Est.)	0.02005	0.02040	MGD											0.02005	0.02040	MGD	1	
		11/09	Flow (Totalized Est.)	0.01998	0.02005	MGD											0.01998	0.02005	MGD	1	
		12/09	Flow (Totalized Est.)	0.01990	0.02029	MGD											0.01990	0.02029	MGD	1	
		1/10	Flow (Totalized Est.)	0.02003	0.02021	MGD											0.02003	0.02021	MGD	1	
		2/10	Flow (Totalized Est.)	0.01991	0.02024	MGD											0.01991	0.02024	MGD	1	
		3/10	Flow (Totalized Est.)	0.01945	0.01966	MGD											0.01945	0.01966	MGD	1	
		4/10	Flow (Totalized Est.)	0.01969	0.02018	MGD											0.01969	0.02018	MGD	1	
		5/10	Flow (Totalized Est.)	0.01978	0.01984	MGD											0.01978	0.01984	MGD	1	
		6/10	Flow (Totalized Est.)	0.01976	0.02010	MGD											0.01976	0.02010	MGD	1	
		7/10	Flow (Totalized Est.)	0.01907	0.02058	MGD											0.01907	0.02058	MGD	1	
		8/10	Flow (Totalized Est.)			MGD													MGD		
		9/10	Flow (Totalized Est.)			MGD													MGD		
		10/10	Flow (Totalized Est.)			MGD													MGD		
		11/10	Flow (Totalized Est.)	0.00090	0.00090	MGD											0.00090	0.00090	MGD	1	
		12/10	Flow (Totalized Est.)			MGD													MGD		
		1/11	Flow (Totalized Est.)			MGD													MGD		
		2/11	Flow (Totalized Est.)			MGD													MGD		
		3/11	Flow (Totalized Est.)			MGD													MGD		
		4/11	Flow (Totalized Est.)			MGD													MGD		
		5/11	Flow (Totalized Est.)			MGD													MGD		
		6/11	Flow (Totalized Est.)			MGD													MGD		
		7/11	Flow (Totalized Est.)			MGD													MGD		
		8/11	Flow (Totalized Est.)			MGD													MGD		
		9/11	Flow (Totalized Est.)			MGD													MGD		

DMR Outfall Data Summary - 051
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg	Monthly Monitoring Period	Parameter	Flow Rate			Analytical Lab Result				Reported on DMR									
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples
		2/10	Total Copper					80.6	ug/L	10		80.6	ug/L	10		80.6	ug/L	Report	mg/L	1
		3/10	Total Copper					20.7	ug/L	10		20.7	ug/L	10		20.7	ug/L	Report	mg/L	1
		4/10	Total Copper					31.8	ug/L	10		31.8	ug/L	10		31.8	ug/L	Report	mg/L	1
		5/10	Total Copper					120	ug/L	10		120	ug/L	10		120	ug/L	Report	mg/L	1
		6/10	Total Copper					120	ug/L	10		120	ug/L	10		120	ug/L	Report	mg/L	1
		7/10	Total Copper					240	ug/L	10		240	ug/L	10		240	ug/L	Report	mg/L	1
		8/10	Total Copper						ug/L	10			ug/L	10			ug/L	0.00014/0.0002	mg/L	
		9/10	Total Copper						ug/L	10			ug/L	10			ug/L	0.00014/0.0002	mg/L	
		10/10	Total Copper						ug/L	10			ug/L	10			ug/L	0.00014/0.0002	mg/L	
		11/10	Total Copper					<0.3	ug/L	10	<0.3		ug/L	10		0.0	ug/L	0.00014/0.0002	mg/L	1
		12/10	Total Copper																	
		1/11	Total Copper																	
		2/11	Total Copper																	
		3/11	Total Copper																	
		4/11	Total Copper																	
		5/11	Total Copper																	
		6/11	Total Copper																	
		7/11	Total Copper																	
		8/11	Total Copper																	
		9/11	Total Copper																	
		10/11	Total Copper																	
		11/11	Total Copper																	
		12/11	Total Copper																	
				Total Average				43.273	ug/L	10			ug/L	10		NA	NA			Total
				Total Maximum				240.000	ug/L	10			ug/L	10		NA	NA			38
				After Implementation of Compliance Schedule (August 2010)																
				Average				< 0.3	ug/L	10			ug/L	10		NA	NA			Total
				Maximum				< 0.3	ug/L	10			ug/L	10		NA	NA			1
51	TA-50-1	8/07	Total Zinc					19.4	ug/L	20		19.4	ug/L	20		0.0	0.0			1
		9/07	Total Zinc					2.3	ug/L	20		2.3	ug/L	20		0	0			1
		10/07	Total Zinc					2.2; 2.8	ug/L	20		2.2; 2.8	ug/L	20		0.000	0.000			1
		11/07	Total Zinc					2.2	ug/L	20		2.2	ug/L	20		0.000	0.000			1
		12/07	Total Zinc					6.4	ug/L	20		6.4	ug/L	20		0.000	0.000			1
		1/08	Total Zinc					3.2	ug/L	20		3.2	ug/L	20		0.000	0.000			1
		2/08	Total Zinc					5.6	ug/L	20		5.6	ug/L	20		0.000	0.000			1
		3/08	Total Zinc					4.5	ug/L	20		4.5	ug/L	20		0.000	0.000			1
		4/08	Total Zinc					<5	ug/L	20			ug/L	20		0.000	0.000			1
		5/08	Total Zinc					4.6	ug/L	20		4.6	ug/L	20		0.000	0.000			1
		6/08	Total Zinc					5	ug/L	20		5	ug/L	20		0.000	0.000			1
		7/08	Total Zinc					4.1	ug/L	20		4.1	ug/L	20		0.000	0.000			1
		8/08	Total Zinc					3.7	ug/L	20		3.7	ug/L	20		0.000	0.000			1
		9/08	Total Zinc					<2.6	ug/L	20			ug/L	20		0.000	0.000			1
		10/08	Total Zinc					4.7	ug/L	20		4.7	ug/L	20		0.000	0.000			1
		11/08	Total Zinc					3.3	ug/L	20		3.3	ug/L	20		0.000	0.000			1
		12/08	Total Zinc					5.9	ug/L	20		5.9	ug/L	20		0.000	0.000			1
		1/09	Total Zinc					3.6	ug/L	20		3.6	ug/L	20		0.000	0.000			1
		2/09	Total Zinc					9.99	ug/L	20		9.99	ug/L	20		0.000	0.000			1
		3/09	Total Zinc					3.43	ug/L	20		3.43	ug/L	20		0.000	0.000			1
		4/09	Total Zinc					6.37	ug/L	20		6.37	ug/L	20		0.000	0.000			1

DMR Outfall Data Summary - 051
 Los Alamos National Laboratory
 NPDES Permit No. NM0028355

OUTFALL No.	TA - Bldg	Monthly Monitoring Period	Parameter	Outfall Data						Reported on DMR																							
				Flow Rate			Analytical Lab Result			DMR Units			Minimum			Average			Maximum			Units			Permit Limit			Units			Number of Samples		
				Average	Maximum	Units	Symbol	Result	Units	MQL	Result	Units	MQL	Result	Units	MQL	Minimum	Average	Maximum	Units	Permit Limit	Units	Number of Samples										
		3/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		4/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		5/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		6/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		7/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		8/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		9/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		10/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		11/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		12/08	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		1/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		2/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		3/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		4/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		5/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		6/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		7/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		8/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		9/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		10/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		11/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		12/09	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		1/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		2/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		3/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		4/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		5/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		6/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		7/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		8/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		9/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		10/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		11/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		12/10	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		1/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		2/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		3/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		4/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		5/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		6/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		7/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		8/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		9/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		10/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		11/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
		12/11	Total Toxic Organics												0	0	mg/L	1.0/1.0	mg/L	1													
															NA	NA	mg/L			Total													
															NA	NA	mg/L			37													
51	TA-50-1	8/1/07-7/31/08	PCB												0	0	ug/L	Report	mg/L	1													
		1/1/09-12/31/09	PCB												0	0	ug/L	Report	mg/L	1													

DMR Outfall Data Summary - Outfall 051

Biological Testing Data

Los Alamos National Laboratory

NPDES Permit No. NM0028355

Outfall	Date Sampled	Type of Sample	Test Organism	Type of Test	NOEC (%)	Pass (P)/ Fail (F)	
051	9/27/2007	Grab	Daphnia Pulex	48 hr acute	56	F	
<i>051</i>	10/30/2007	Grab	Daphnia Pulex	48 hr acute	56	F	
051	12/19/2007	Grab	Daphnia Pulex	48 hr acute	56	F	
051	2/25/2008	Grab	Daphnia Pulex	48 hr acute	100	P	
051	6/25/2008	Grab	Daphnia Pulex	48 hr acute	75	F	
051	8/6/2008	Grab	Daphnia Pulex	48 hr acute	100	P	
051	11/17/2008	Grab	Daphnia Pulex	48 hr acute	56	F	
051	2/10/2009	Grab	Daphnia Pulex	48 hr acute	100	P	
051	4/16/2009	Grab	Daphnia Pulex	48 hr acute	100	P	
051	7/28/2009	Grab	Daphnia Pulex	48 hr acute	100	P	
051	12/1/2009	Grab	Daphnia Pulex	48 hr acute	< 32	F	
051	1/4/2010	Grab	Daphnia Pulex	48 hr acute		F	
051	4/26/2010	Grab	Daphnia Pulex	48 hr acute		F	
051	11/18/2010	Grab	Daphnia Pulex	48 hr acute		P	
		051	= Quarterly Compliance Test				
		<i>051</i>	= First Re-Test				

EPA I.D. NUMBER (copy from Item 1 of Form 1)
 NM0890019515

Form Approved.
 OMB No. 2040-0086.
 Approval expires 3-31-98.

Please print or type in the unshaded areas only.

FORM 2C NPDES  **U.S. ENVIRONMENTAL PROTECTION AGENCY**
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURE OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER (name)
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	
051	35.00	51.00	54.00	106.00	17.00	54.00	Mortandad Canyon, an Ephemeral Tributary to the Rio Grande (NMAC 28.6.4.128)

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT	
	a. OPERATION (list)	b. AVERAGE FLOW (include units)	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1
051	Effluent from the RLWTF	19,700 GPD	Neutralization	2 K
	- Process Water (Rad Lab Waste)	(18,150)	Mixing	1 O
	- Cooling Water (Rad Areas)	(1,232)	Chemical Precipitation	2 C
	- Environmental Water (ER Waste)	(50)	Flocculation	1 G
	- Storm Water (sumps etc.)	(268)	Sedimentation (Settling)	1 U
			Rapid Sand Filtration	1 r
			Multimedia Filtration	1 Q
			Reverse Osmosis	1 S
			Ion Exchange	2 J
			Coagulation	2 G
			Vacuum Filtration	5 U
			Evaporation	1 P
			Landfill	5 q

OFFICIAL USE ONLY (effluent guidelines sub-categories)

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
 YES (complete the following table) NO (go to Section III)

1. OUTFALL NUMBER (list)	2. OPERATION(s) CONTRIBUTING FLOW (list)	3. FREQUENCY		4. FLOW				C. DURATION (in days)
		a. DAYS PER WEEK (specify average)	b. MONTHS PER YEAR (specify average)	a. FLOW RATE (in mgd)		B. TOTAL VOLUME (specify with units)		
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	
051	TA-50-1 - RLWTF Effluent Normal operating days = 260 days/year	5	12	0.0197 GPD	0.020 GPD	19,700 Gallons	20,000 Gallons	270

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?
 YES (complete Item III-B) NO (go to Section IV)

B. Are the limitations in the applicable effluent guideline expressed in terms of production (or other measure of operation)?
 YES (complete Item III-C) NO (go to Section IV)

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	
NA	NA	NA	NA

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operations of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.
 YES (complete the following table) NO (go to Item IV-B)

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED
NA	NA	NA	NA	NA	NA

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding - Complete one set of tables for each outfall - Annotate the outfall number in the space provided.
 NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
Table 2C-4 Sodium Hydroxide	Treatment Chemical - Adjust pH and Promote Precipitation and Flocculation	acetic acid, ammonia, ammonium bifluoride, ammonium carbonate, ammonium chloride, ammonium hydroxide, benzene, chloroform, chromic acid, cupric chloride, cupric sulfate, endrin, EDTA, ferric chloride, ferric nitrate, ferric sulfate, ferrous ammonium sulfate, ferrous chloride, ferrous sulfate, formaldehyde, formic acid, heptachlor, hydrochloric acid, hydrofluoric acid, lead nitrate, nitric acid, Phenol, phosphoric acid, potassium dichromate, potassium hydroxide, potassium permanganate, sodium dodecylbenzenesulfonate, sodium fluoride, sodium hydroxide, sodium hypochlorite, sodium nitrite, sodium phosphate (dibasic), sulfuric acid, uranyl nitrate, zinc chloride, zinc nitrate, zinc sulfate	RLWTF Influent (Based on Waste Profile Form Data) - Process Water
Ferric Sulfate	Treatment Chemical - Promote Precipitation and Flocculation		
EDTA	Treatment Chemical - Clean membranes		
Sodium bisulfite	Treatment Chemical - Clean membranes		
Hydrochloric Acid	Treatment Chemical - Adjust pH		
2-propanoic acid	Treatment Chemicals WEST W-126 - Co-Polymer/Flocculation		
Ammonia, chloroform, nitric acid, trichloroethylene	RLWTF Influent (Based on Waste Profile Form Data) - Storm Water		
Acrolein, ammonia, aniline, benzoic acid, dieldrin, enosulfan, endric, ethylbenzene, naphthalene, phenol, toluene, xylene	RLWTF Influent (Based on Waste Profile Form Data) - Environmental Restoration Water		NOTE: There were no Table 2C-3 Contaminates Identified

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item V-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?
 YES (list all such pollutants below) NO (go to Item VI-B)

NA

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

Whole Effluent Toxicity 48 hr Acute Toxicity - FAILED
 Daphnia Pulex, 3-hr composite (2 samples, collected ~24 hours apart), Quarterly

See the DMR Outfall Data Summary Report for the detailed results.

Currently Conducting Toxicity Identification Evaluations (TIE) and Toxicity Reduction Evolutions (TRE)

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

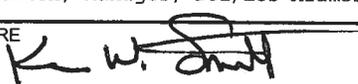
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
GEL General Engineering Labs	2040 Savage Rd. Charleston, SC 29407	843-556-8171	Metals, VOC, SVOC, Pesticides, Radiological, Water Quality Parameters
SWRI Southwest Research Institute	Division 01 6220 Culebra Rd San Antonio, TX 78238	210-522-3867	Arsenic, Selenium
Cape Fear Analytical	3306 Kitty Hawk Rd Suite 120 Wilmington, NC 28405	910-795-0421	Dioxins and Furans
Pacific EcoRisk	2250 Cordelia Rd Fairfield, CA 94534	707-207-7760	WET Testing
New Mexico Water Testing Laboratory INC	401 N. Coronado Ave. Espanola, NM 87532	505-929-4545	E-Coli

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE (type or print) Kevin W. Smith, Manager, DOE/Los Alamos Site Office	B. PHONE NO. (area code & no.) (505) 606-2004
C. SIGNATURE 	D. DATE SIGNED 1/27/2012

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

YES (identify the test(s) and describe their purposes below)

NO (go to Section VIII)

EXTRA PAGE FOR SIGNATURE

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

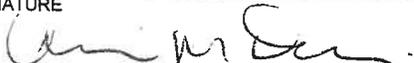
YES (list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)

NO (go to Section IX)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<p>A. NAME & OFFICIAL TITLE (type or print)</p> <p>Alison M. Dorries, Division Leader, ENV Protection Division</p>	<p>B. PHONE NO. (area code & no.)</p> <p>(505) 665-6952</p>
<p>C. SIGNATURE</p> 	<p>D. DATE SIGNED</p> <p>1/27/12</p>

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (use the same format) instead of completing these pages. SEE INSTRUCTIONS.

EPA I.D. NUMBER (copy from Item 1 of Form 1)
NM0890019515

V. INTAKE AND EFFLUENT CHARACTERISTICS (continued from page 3 of Form 2-C)

OUTFALL NO.
051

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT				3. UNITS (specify if blank)				4. INTAKE (optional)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1)	b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS					
a. Biochemical Oxygen Demand (BOD)											
b. Chemical Oxygen Demand (COD)											
c. Total Organic Carbon (TOC)											
d. Total Suspended Solids (TSS)											
e. Ammonia (as N)											
f. Flow	VALUE										
g. Temperature (winter)	VALUE										
h. Temperature (summer)	VALUE										
i. pH	MINIMUM										

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RLWTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

PART B - Mark "X" in column 2-a for each pollutant which is limited either directly, or indirectly but express quantitative data or an explanatory

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. MAXIMUM DAILY VALUE (if available)				4. LONG TERM AVERAGE VALUE (if available)			
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	a. CONCENTRATION	b. MASS	d. NO. OF ANALYSES	b. NO. OF ANALYSES
a. Bromide (24959-67-9)	X									
b. Chlorine, Total Residual	X									
c. Color		X								
d. Fecal Coliform		X								
e. Fluoride (16984-48-8)	X									
f. Nitrate-Nitrite (as N)	X									

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CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)	
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE	
				(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS
g. Nitrogen Total Organic (as N)	X									
h. Oil and Grease	X									
i. Phosphorus (as P), Total (7723-14-0)	X									
j. Radioactivity										
(1) Alpha, Total	X									
(2) Beta, Total	X									
(3) Radium, Total	X									
(4) Radium 226, Total	X									
k. Sulfate (as SO ₄) (14808-79-8)	X									
l. Sulfide (as S)		X								
m. Sulfite (as SO ₃) (14265-45-3)		X								
n. Surfactants	X									
o. Aluminum, Total (7429-90-5)		X								
p. Barium, Total (7440-39-3)		X								
q. Boron, Total (7440-42-8)	X									
r. Cobalt, Total (7440-48-4)		X								
s. Iron, Total (7439-89-6)		X								
t. Magnesium, Total (7439-95-4)	X									
u. Molybdenum, Total (7439-98-7)	X									
v. Manganese, Total (7439-96-5)	X									
w. Tin, Total (7440-31-5)	X									
x. Titanium, Total (7440-32-6)		X								

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RWLTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	051

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GCIMS fractions you must test for. Mark "X" in column 2-a for all such GCIMS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols, if you are not required to mark column 2-a (secondary industries, nonprocess wastewater outfalls, and nonrequired GCIMS fractions), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS				5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES			
												(2) MASS	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS														
1M. Antimony, Total (7440-36-0)			X											
2M. Arsenic, Total (7440-38-2)			X											
3M. Beryllium, Total (7440-41-7)			X											
4M. Cadmium, Total (7440-43-9)			X											
5M. Chromium, Total (7440-47-3)			X											
6M. Copper, Total (7440-50-8)		X												
7M. Lead, Total (7439-92-1)			X											
8M. Mercury, Total (7439-97-6)			X											
9M. Nickel, Total (7440-02-0)		X												
10M. Selenium, Total (7782-49-2)			X											
11M. Silver, Total (7440-22-4)			X											
12M. Thallium, Total (7440-28-0)			X											
13M. Zinc, Total (7440-66-6)		X												
14M. Cyanide, Total (57-12-5)			X											
15M. Phenols, Total		X												
DIOXIN														
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)			X											
DESCRIBE RESULTS														

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RLWTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

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CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE		d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			
GC/MS FRACTION - VOLATILE COMPOUNDS												
1V. Acrolein (107-02-6)			X									
2V. Acrylonitrile (107-13-1)			X									
3V. Benzene (71-43-2)		X										
4V. Bis (Chloro-methyl) Ether (542-88-1)												
5V. Bromoform (75-25-2)			X									
6V. Carbon Tetrachloride (56-23-5)			X									
7V. Chlorobenzene (108-90-7)			X									
8V. Chloro-dibromomethane (124-48-1)			X									
9V. Chloroethane (75-00-3)			X									
10V. 2-Chloro-ethylvinyl Ether (110-75-8)			X									
11V. Chloroform (67-66-3)			X									
12V. Dichloro-bromomethane (75-27-4)			X									
13V. Dichloro-difluoromethane (75-71-8)												
14V. 1,1-Dichloro-ethane (75-34-3)			X									
15V. 1,2-Dichloro-ethane (107-06-2)			X									
16V. 1,1-Dichloro-ethylene (75-35-4)			X									
17V. 1,2-Dichloro-propane (78-87-5)			X									
18V. 1,3-Dichloro-propylene (542-75-6)			X									
19V. Ethylbenzene (100-41-4)			X									
20V. Methyl Bromide (74-83-9)			X									
21V. Methyl Chloride (74-87-3)			X									

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RLWTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)												
23V. Methylene Chloride (75-09-2)			X									
23V. 1,1,2,2-Tetrachloroethane (79-34-5)			X									
24V. Tetrachloroethylene (127-18-4)			X									
25V. Toluene (108-88-3)			X									
26V. 1,2-Trans-Dichloroethylene (156-60-5)			X									
27V. 1,1,1-Trichloroethane (71-55-6)			X									
28V. 1,1,2-Trichloroethane (79-00-5)			X									
29V. Trichloroethylene (79-01-6)			X									
30V. Trichlorofluoromethane (75-69-4)												
31V. Vinyl Chloride (75-01-4)			X									
GC/MS FRACTION - ACID COMPOUNDS												
1A. 2-Chlorophenol (95-57-8)			X									
2A. 2,4-Dichlorophenol (120-83-2)			X									
3A. 2,4-Dimethylphenol (105-67-9)			X									
4A. 4,6-Dinitro-Cresol (534-52-1)			X									
5A. 2,4-Dinitrophenol (51-28-5)			X									
6A. 2-Nitrophenol (88-75-5)			X									
7A. 4-Nitrophenol (100-02-7)			X									
8A. p-Chloro-M-Cresol (59-50-7)			X									
9A. Pentachlorophenol (87-86-5)			X									
10A. Phenol (108-95-2)			X									
11A. 2,4,6-Trichlorophenol (88-05-2)			X									

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RLWTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE		d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS		(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS													
1B. Acenaphthene (83-32-9)			X										
2B. Acenaphthylene (208-96-8)			X										
3B. Anthracene (120-12-7)			X										
4B. Benzidine (92-87-5)			X										
5B. Benzo (a) Anthracene (56-55-3)			X										
6B. Benzo (a) Pyrene (50-32-8)			X										
7B. 3,4-Benzofluoranthene (205-99-2)			X										
8B. Benzo (ghi) Perylene (191-24-2)			X										
9B. Benzo (k) Fluoranthene (207-08-9)			X										
10B. Bis (2-Chloro-ethyl) Methane (111-91-1)			X										
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)			X										
12B. Bis (2-Chloroisopropyl) Ether (102-50-1)			X										
13B. Bis (2-Ethylhexyl) Phthalate (117-81-7)			X										
14B. 4-Bromophenyl Phenyl Ether (101-55-3)			X										
15B. Butyl Benzyl Phthalate (85-68-7)			X										
16B. 2-Chloronaphthalene (91-58-7)			X										
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)			X										
18B. Chrysene (218-01-9)			X										
19B. Dibenzo (a,h) Anthracene (53-70-3)			X										
20B. 1,2-Dichlorobenzene (85-50-1)			X										
21B. 1,3-Dichlorobenzene (541-73-1)			X										

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RLWTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

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1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"		3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS			
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (continued)												
22B. 1,4-Dichlorobenzene (106-46-7)			X									
23B. 3,3-Dichlorobenzidine (91-94-1)			X									
24B. Diethyl Phthalate (84-66-2)			X									
25B. Dimethyl Phthalate (131-11-3)		X										
26B. Di-N-Butyl Phthalate (84-74-2)			X									
27B. 2,4-Dinitrotoluene (121-14-2)			X									
28B. 2,6-Dinitrotoluene (606-20-2)			X									
29B. Di-N-Octyl Phthalate (117-84-0)			X									
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)			X									
31B. Fluoranthene (206-44-0)			X									
32B. Fluorene (86-73-7)			X									
33B. Hexachlorobenzene (118-74-1)			X									
34B. Hexachlorobutadiene (87-68-3)			X									
35B. Hexachlorocyclopentadiene (77-47-4)			X									
36B Hexachloroethane (67-72-1)			X									
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)			X									
38B. Isophorone (78-59-1)			X									
39B. Naphthalene (91-20-3)			X									
40B. Nitrobenzene (98-95-3)			X									
41B. N-Nitrosodimethylamine (62-75-9)			X									
42B. N-Nitrosodi-N-Propylamine (621-64-7)			X									

The RLWTF has not discharged to Outfall 051 since November 2010. LANL requests to re-permit the outfall so that the RLWTF can maintain the capability to discharge to the outfall should the Effluent Evaporator and/or ZLD Evaporation Tanks become unavailable due to maintenance, malfunction, and/or there is an increase in treatment capacity caused by changes in LANL scope/mission.

A composite sample for the Form 2C Constituents will be collected from Outfall 051 when/if the RWLTF discharges effluent to Mortandad Canyon. See the DMR Outfall Summary for the analytical data collected prior to November 2010.

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PAGE V-7

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT				4. UNITS		5. INTAKE (optional)			
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCEN- TRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
					(1) MASS	(2) MASS	(1) CONCENTRATION	(2) MASS					
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)													
43B. N-Nitro-sodphenylamine (86-30-6)			X										
44B. Phenanthrene (85-01-8)			X										
45B. Pyrene (129-00-0)			X										
46B. 1,2,4-Trichlorobenzene (120-82-1)			X										
GC/MS FRACTION - PESTICIDES													
1P. Aldrin (309-00-2)			X										
2P. α-BHC (319-84-6)			X										
3P. β-BHC (319-85-7)			X										
4P. γ-BHC (58-89-9)			X										
5P. δ-BHC (319-86-8)			X										
6P. Chlordane (57-74-8)			X										
7P. 4,4'-DDT (50-29-3)			X										
8P. 4,4'-DDE (72-55-9)			X										
9P. 4,4'-DDD (72-54-8)			X										
10P. Dieldrin (60-57-1)			X										
11P. α-Endosulfan (115-29-7)			X										
12P. β-Endosulfan (115-29-7)			X										
13P. Endosulfan Sulfate (1031-07-8)			X										
14P. Endrin (72-20-8)			X										
15P. Endrin Aldehyde (7421-93-4)			X										
16P. Heptachlor (76-44-8)			X										

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CONTINUE ON PAGE V-9

EPA I.D. NUMBER (copy from Item 1 of Form 1)	OUTFALL NUMBER
NM0890019515	051

CONTINUED FROM PAGE V-8

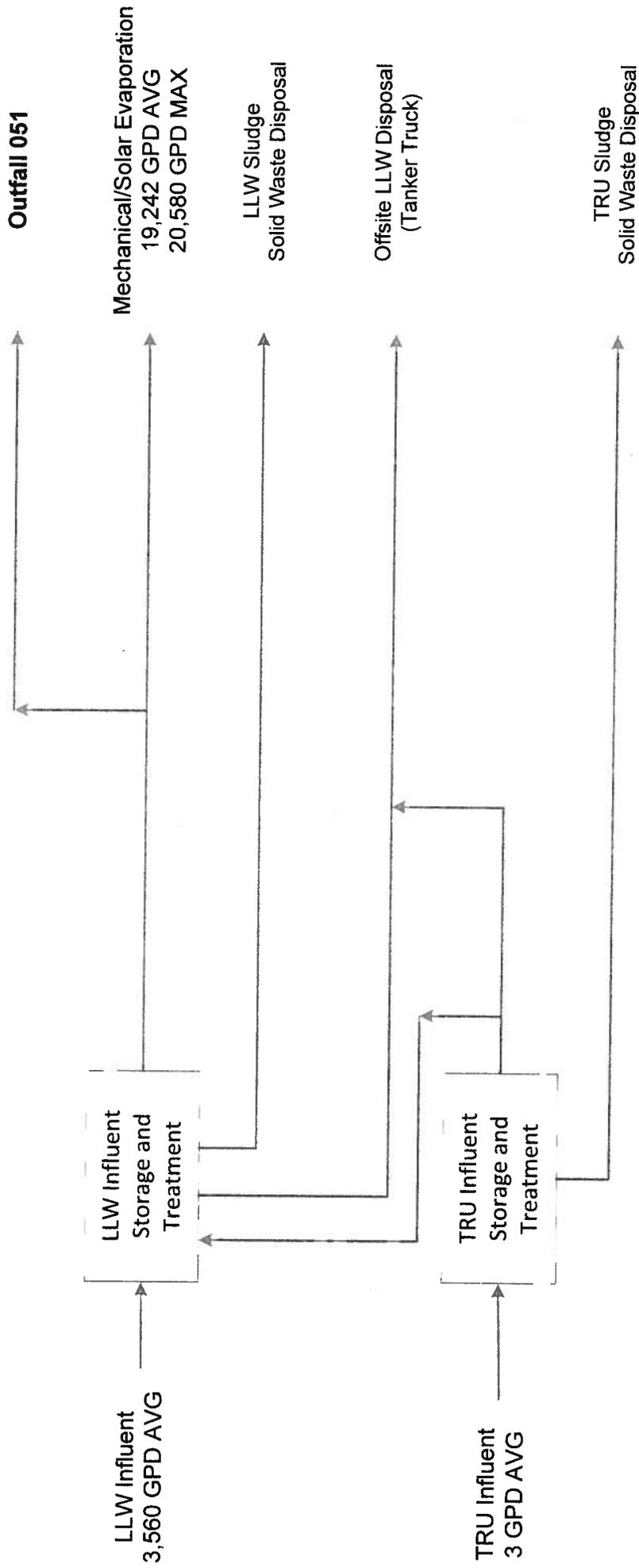
1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT		4. UNITS		5. INTAKE (optional)	
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	d. NO. OF ANALYSES	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	b. NO. OF ANALYSES
GCMS FRACTION - PESTICIDES (continued)									
17P. Heptachlor Epoxide (1024-57-3)			X						
18P. PCB-1242 (53469-21-9)			X						
19P. PCB-1254 (11097-69-1)			X						
20P. PCB-1221 (11104-28-2)			X						
21P. PCB-1232 (11141-16-5)			X						
22P. PCB-1248 (12672-29-6)			X						
23P. PCB-1260 (11096-82-5)			X						
24P. PCB-1016 (12674-11-2)			X						
25P. Toxaphene (6001-35-2)			X						

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EPA Form 3510-2C (8-90)

Figure II.A
Water Balance for Outfall 051



LA-UR-12-00359

WATER BALANCE

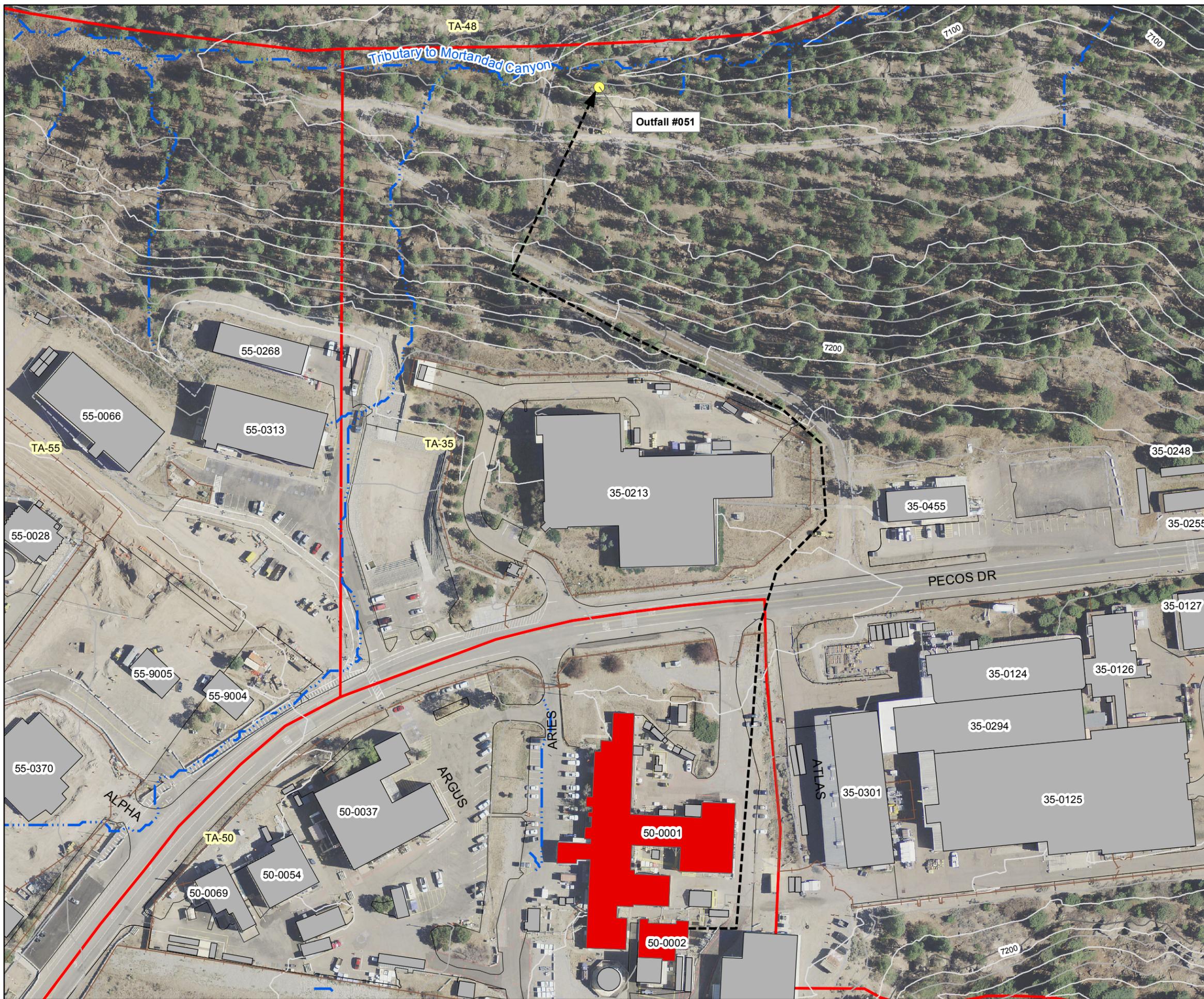
Radioactive Liquid Waste Treatment
 Facility (RLWTF) TA-50-1

January 25, 2012

2012 NPDES Permit Re-Application

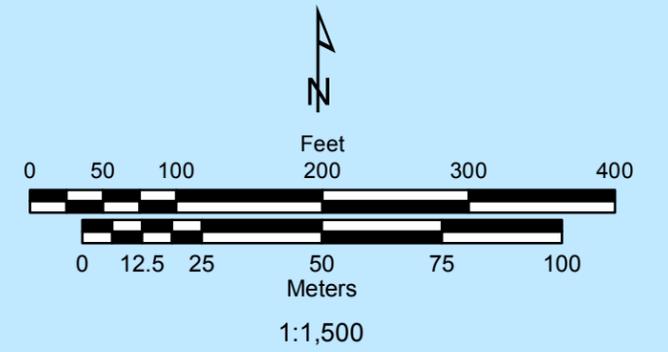
OUTFALL 051

NPDES Permit Re-Application Project TA-50 Building 1, 2 Outfall #051



Legend

NPDES Outfall	Paved Roads
Springs	Source Structures
Drainages	Building Served by Source
100ft Contours	Structures
20ft Contours	LANL Boundary
10ft Contours	Technical Areas
Fences	
Dirt Roads	



Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-11 27 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
NAD 1983 Datum, NGVD 1929

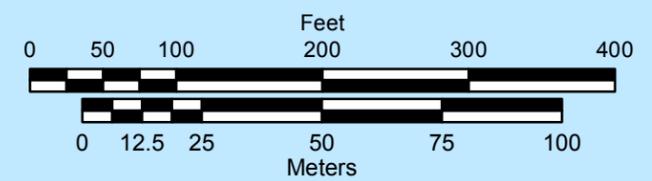
DATA SOURCE:
 Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Hypsography, 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.
 LANL Areas Used and Occupied ; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; 19 September 2007; as published 13 August 2010.
 Locations of Springs; Los Alamos National Laboratory, Waste and Environmental Services Division in cooperation with the New Mexico Environment Department, Department of Energy Oversight Bureau, EP2008-0138; 1:2,500 Scale Data; 17 March 2008.
 Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Orthophotography, 2011 Los Alamos National Laboratory Aerial Photography, Site Planning and Project Initiation Group, APRIL 2011.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.
 Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 13 August 2010.
 WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
 WQH NPDES Outfalls; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; Edition 2002.01; 01 September 2003.
 Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Disclaimer: This map was created for work processes associated with the Water Quality & RCRA. All other uses for this map should be confirmed with LANL ENV-RCRA staff.

NPDES Permit Re-Application Project TA-50 Building 1, 2 Outfall #051

Legend

- | | | | |
|---|----------------|---|---------------------------|
|  | NPDES Outfall |  | Paved Roads |
|  | Springs |  | Source Structures |
|  | Drainages |  | Building Served by Source |
|  | 100ft Contours |  | Structures |
|  | 20ft Contours |  | LANL Boundary |
|  | 10ft Contours |  | Technical Areas |
|  | Fences | | |
|  | Dirt Roads | | |



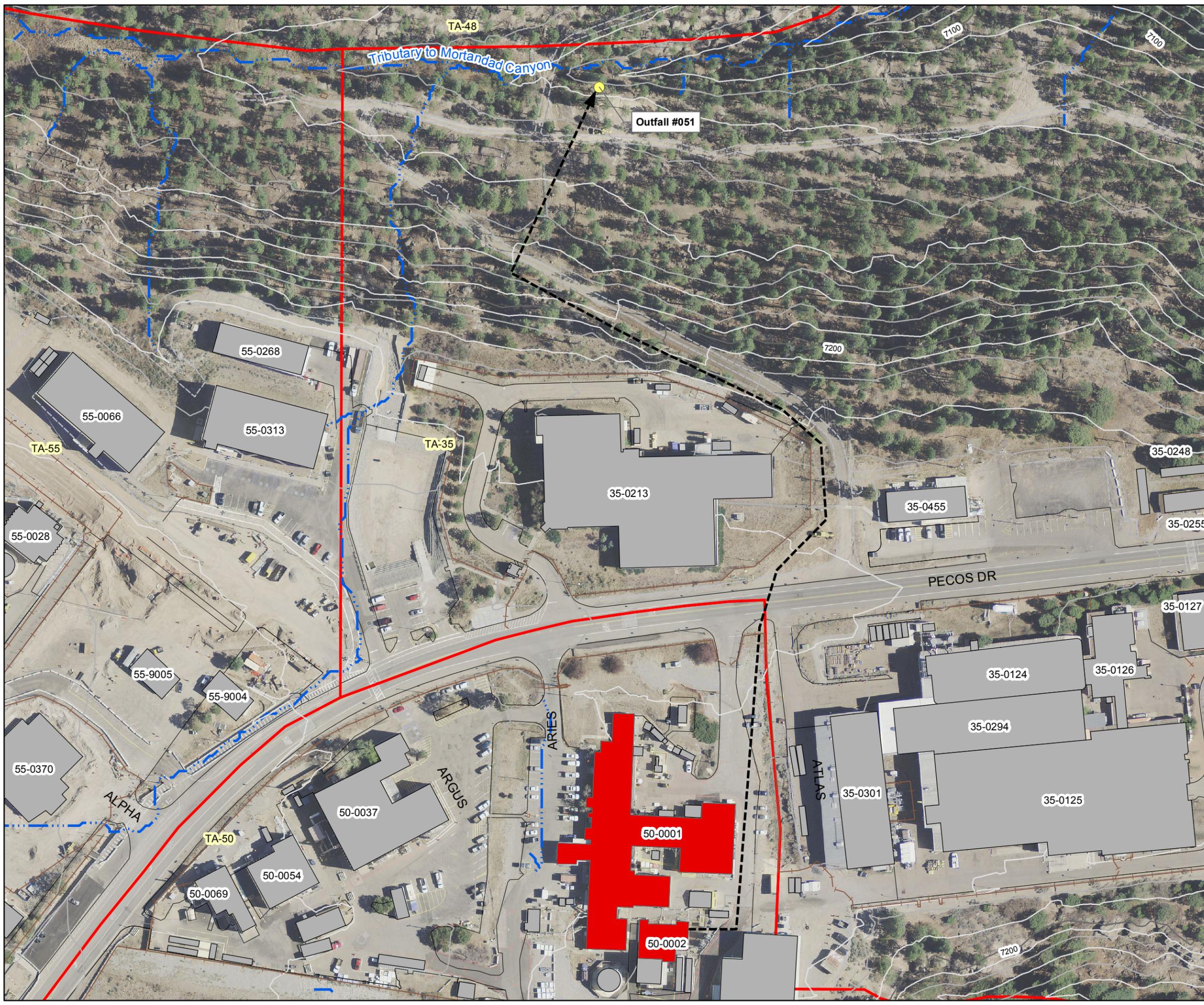
1:1,500

Map Created By: Brad McKown Revised by Winters Red Star
Map #11-0096-11 27 SEPTEMBER 2011

State Plane Coordinate System
New Mexico, Central Zone, US Feet
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Health	2
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Sodium Hydroxide, 25% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Hydroxide, 25%

Catalog Codes: SLS4210

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sodium hydroxide; Water

CI#: Not applicable.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	25
Water	7732-18-5	75

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of Ingestion. Hazardous in case of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Non-corrosive for skin. Non-irritant for skin. Non-sensitizer for skin. Non-permeator by skin. Non-irritating to the eyes. Non-hazardous in case of ingestion. Non-hazardous in case of inhalation. **CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe

skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Finish by rinsing thoroughly with running water to avoid a possible infection. Cold water may be used.

Skin Contact:

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:

Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product in case of insufficient ventilation, wear suitable respiratory equipment if you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as acids.

Storage:

Alkalis may be stored in heavy duty gauge steel containers. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Sodium hydroxide CEIL: 2 (mg/m³) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Alkaline. Bitter. (Strong.)

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Basic.

Boiling Point: The lowest known value is 100°C (212°F) (Water).

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: Weighted average: 1.15 (Water = 1)

Vapor Pressure: The highest known value is 17.535 mm of Hg (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (In Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Extremely reactive or incompatible with acids.

Corrosivity:

Highly corrosive in presence of aluminum. Slightly corrosive to corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant), of ingestion. Hazardous in case of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive liquid.

Identification : Sodium hydroxide, solution (Sodium hydroxide) : UN1824 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Sodium hydroxide Massachusetts RTK: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCG (EEC): R35- Causes severe burns.

HMS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:05 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume

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Ferric Sulfate



Univar USA Inc Material Safety Data Sheet

MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300



Water Elements, LLC

Material Safety Data Sheet (MSDS)

Section 1 Chemical and Company Identification

**FOR EMERGENCIES CONCERNING A SPILL OR RELEASE CALL
 CHEMTREC: (800) 424-9300 (24 HOUR NUMBER)**

Product Name: FERRIC SULFATE SOLUTION

CAS #: 10028-22-5

Product Use: Water Treatment Chemical

Product Information: **Sales Office**
 Water Elements, LLC (WE)
 201 W. Christina Blvd. Suite 3
 Lakeland, FL 33813
 1-877-IRONWRX (toll free) 1-877-476-6979
 1-863-701-7017

Section 2 Composition / Information On Ingredients

Ingredient	CAS #	Percentage	ACGIH TLV	OSHA PEL	STEL
Water:	7732-18-5	< 60%	N/A ²	N/A ²	N/A ²
Ferric Sulfate:	10028-22-5	< 50% as Fe ₂ (SO ₄) ₃	1 mg/m ³	1 mg/m ³	N/A ²
Sulfuric Acid:	7664-93-9	< 10%	1 mg/m ³	1 mg/m ³	N/A ²

*Freezing Point
 < -58°F (-50°C)*

Section 3 Physical Data

Boiling Point, 750 mm hg:	Approx 221 °F	pH:	<2
Melting Point:	-12°C (10°F) 40% Soln.	Solubility in Water:	Complete
Specific Gravity:	1.38 to 1.6	Vapor Pressure:	40 mm Hg @ 35°C
% Volatile:	N/A ²	Evaporation Rate:	N/F ¹
Vapor Density (Air = 1):	N/A ²	Molecular Weight:	399.88
Appearance:	Red-Brown Liquid	Odor:	Slightly acrid

Section 4 Fire and Explosion Data			
Flash Point:	N/A ²	Flammable Limits In Air:	UEL: N/A ² LEL: N/A ²
Special Fire and Explosion Hazards:	Substance itself does not burn, but may decompose upon heating to produce corrosive and/or toxic fumes.	Extinguishing Media:	Will not burn; Use materials appropriate for surrounding fire.
Special Fire Fighting Instructions:		Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in a positive pressure mode. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers and tanks cool.	

Section 5 Reactivity			
Decomposition:	Decomposes upon heating to produce corrosive and/or toxic fumes. At temperatures above 600°C, sulfur trioxide may be released.	Polymerization:	Will not Occur
Stability:	Stable		
Incompatibility:	Product solution is corrosive to carbon steel, copper, copper alloys and galvanized steel among others. May be corrosive to paints, enamels and concrete. Reacts with lime and other basic materials to form insoluble iron salts.		
Conditions to Avoid:	Heat, light, moisture. Avoid contact with mineral acids, excessive heat and bases.		

Section 6 Health Hazards

Emergency Overview: Harmful if swallowed or inhaled. Causes irritation to eyes, respiratory tract and skin.

Summary of Acute Health Hazards

Ingestion: Low toxicity in small quantities but larger dosages may cause nausea, vomiting, diarrhea, and black stool. Pink urine discoloration is a strong indicator of iron poisoning. Liver damage, coma, and death from iron poisoning has been recorded.

Inhalation: May cause irritation of the upper respiratory tract. Symptoms may include coughing, shortness of breath.

Skin: This product may cause irritation to the skin. Symptoms include redness, itching, and pain. May cause skin discoloration with irritation.

Eyes: This product may cause irritation or burns; repeated or prolonged exposure may cause conjunctivitis.

Signs and Symptoms of Exposure: Repeated exposure to large amounts of Ferric Sulfate may increase irritation and toxicity.

Effects of Overexposure: Prolonged exposure of the eyes may cause discoloration. Repeated high exposure could cause too much iron to build up in the body. Symptoms of upset stomach, nausea, constipation and black bowel movements may occur. Chronic exposure may cause liver effects. Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

Toxic effects in animals from repeated exposure by ingestion include reduced weight gain, elevated serum iron levels, increased red blood cell counts, and iron deposition in many organs. Tests in bacterial and mammalian cell cultures demonstrate no genetic damage. Animal tests demonstrate no carcinogenicity.

CARCINOGENICITY: None of the components of this material are listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

Section 7 First Aid

EYE: Immediately flush eyes for 15 minutes with large amounts of water while holding eyelids apart. Washing within one minute is essential to achieve maximum effectiveness. Obtain medical attention immediately after flushing.

SKIN: Flush skin with water. Remove contaminated clothing; wash before reuse. If irritation is still present, seek medical attention.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Obtain medical attention immediately.

INGESTION: DO NOT INDUCE VOMITING. Give 1 or 2 glasses of water or milk. Never give anything by mouth to an unconscious individual. Obtain medical attention immediately.

Section 8 Personal Protection

Adequate general ventilation should be provided to keep vapor and mists below exposure limits. Wear safety glasses with side shields. Wear a face shield if possibility of material splashing or spraying exists. Where there is possibility of skin contact, use the following as appropriate, to avoid skin contact: gloves impervious to material, apron, boots, hood, pants, and jacket. Wear a NIOSH/OSHA approved respirator with a dust/mist cartridge suitable for use with sulfuric acid if there is potential of exposure to mists in excess of applicable limits, in any situation where product vapor or mists may be present, such as in confined spaces.

An eye wash and safety shower should be readily accessible. Wash hands thoroughly after handling.

Section 9 NFPA/HMIS RATINGS

	NFPA	HMIS	
Health:	2	2	4 = Extreme / Severe
Reactivity:	0	0	3 = High / Serious
Flammability:	0	0	2 = Moderate
Corrosive	Yes	Yes	1 = Slight

Section 10 Spill/Leak Procedure

Review safety precautions before proceeding with cleanup. Use appropriate personal protection equipment. Neutralize spill with lime (calcium hydroxide), limestone (calcium carbonate), or soda ash (sodium carbonate).

CAUTION: limestone and soda ash will evolve CO₂; ventilation should be provided in enclosed areas. Dike area around spill to prevent spreading, and use absorbent material to pick up spill.

CERCLA REPORTABLE DISCHARGE (RQ): 1000 lbs. (454kg), based on anhydrous ferric sulfate. Divide by solution concentration to obtain solution weight.

DISPOSAL: Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user to determine whether a substance should be classified as a hazardous waste at the time of disposal. This is due to the fact that product use, transformation, synthesis, mixtures, etc. may change the nature of the product. Dispose of waste in accordance with applicable federal, state, and local laws.

Steps to be taken in case material is released or spilled: Notify the appropriate environmental authorities. Note that spills may need to be reported to the National Response Center (800/ 424-8802)

Section 11 Shipping Information			
DOT			
Proper Shipping Name:	Corrosive Liquids, Acidic, Inorganic NOS. (Ferric Sulfate Solution)	Hazard Class:	Class 8
UN#:	UN 3264	DOT Labels:	Corrosive Liquid
Packaging Group:	Group III	DOT Placards:	Corrosive Liquid
IMO			
Proper Shipping:	Corrosive Liquids, Acidic, Inorganic NOS. (Ferric Sulfate Solution)	Hazard Class:	Corrosive material, 8
UN#:	UN 3264	IMO Label:	Corrosive
Packaging Group:	Group III	Reportable Quantity:	1,000 lbs (454 kg)
Shipping Containers:	Rubber-lined steel tank cars/ trucks; polyethylene drums, bottles, type 304 stainless steel of better.		
Storage Conditions:	Keep containers closed		
Section 12 SARA Title III Hazard Classification			
Acute:	Yes	Chronic:	No
Fire:	No	Reactivity:	No
Pressure:	No	Toxic Chemical:	No
Flammability:	0		
Extremely Hazardous Substance:	No		
CERCLA Hazardous Substance:	Yes		

Section 13 Additional Information and References

IMPORTANT!! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure.

WE provides the information contained in each material safety data sheet ("MSDS"), technical data sheet ("TDS"), product information brochure and/or information contained herein (including data and statements) in good faith and makes no representations as to its comprehensiveness or accuracy as of the date of publication. The MSDSs, TDSs, and product information brochures are referred to collectively as the "Data Sheets". It is the responsibility of the user to obtain and use the most recent version of the Data Sheets. Each Data Sheet relates only to the specific product designated therein and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and information are beyond the control of WE, WE expressly disclaims any and all liability as to any consequential damages or results obtained or arising from any use of the products or the information contained in the Data Sheets. **NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE AS CONCERNS THE DATA SHEETS OR THE RELATED PRODUCTS.**

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Synonyms: Ferric Sulfate, Iron (III) Sulfate Solution, Ferric Trisulfate,

¹N/F = None found

²N/A = Not applicable

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

Mag Hydrocode



Univar USA Inc Material Safety Data Sheet

MSDS No:
Version No:
Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300

UNIVAR USA INC.
ISSUE DATE:2000-04-17
Annotation:

MSDS NO:P14725V
VERSION:010 2006-08-18

The Version Date and Number for this MSDS is : 08/18/2006 - #010

SECTION I PRODUCT IDENTIFICATION

PRODUCT NAME: MAGNESIUM HYDROXIDE SOLUTION

MSDS #: P14725V

DATE ISSUED: 04/17/2000

SUPERSEDES: 08/08/1997

ISSUED BY: 008497

REVIEWED DATE: 07/16/2004

This MSDS has been reviewed on 07/16/2004, and is
current as of the DATE ISSUED above.

SECTION I Chemical Product And Company Identification

Product Name: Magnesium Hydroxide Solution
 Hi-Chem Mag-50

CAS NUMBER: 1309-42-8

Distributed by:
Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
425-889-3400

Section II Composition/Information On Ingredients

Chemical Name	CAS Number	%	Exposure Limits (TWAs) in Air		
			ACGIH TLV	OSHA PEL	STEL
Magnesium Hydroxide	1309-42-8	51-65	10 mg/m3	15 mg/m3	N/A
			(total dust)	(total dust)	
			5 mg/m3		
			(respirable dust)		

Freezing Point
32°F

Section III Hazard Identification

ROUTES OF EXPOSURE: N/A

SUMMARY OF ACUTE HEALTH HAZARDS The product presents a very low health

UNIVAR USA INC.
ISSUE DATE:2000-04-17

MSDS NO:P14725V
VERSION:010 2006-08-18

Annotation:

risk. Magnesium hydroxide is a general purpose food additive. Dust generated from the dried product is classified as a nuisance dust.

INGESTION: Ingestion is unlikely. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain and diarrhea.

INHALATION: May irritate the respiratory tract on prolonged or repeated contact. May aggravate preexisting respiratory conditions.

SKIN: Repeated or prolonged contact may cause irritation

EYES: May irritate or injure eyes.

SUMMARY OF CHRONIC HEALTH HAZARDS: The excessive inhalation above (TLV) of mineral dust, over long periods of time, may cause industrial bronchitis, reduce breathing capacity, and lead to increased susceptibility to other lung disease.

SIGNS AND SYMPTOMS OF EXPOSURE: N/A

EFFECTS OF OVEREXPOSURE: N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Dust from the dried product may aggravate pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

NOTES TO PHYSICIANS: N/A

Section IV First Aid Measures

INGESTION: Low toxicity. Give 1-2 glasses of water and seek immediate medical attention. Never give anything of mouth to an unconscious person. Leave decision to induce vomiting for medical personnel, since some particles may be aspirated into the lungs.

INHALATION: Move to fresh air; if discomfort persists, get medical attention.

SKIN: Wash with soap and water

EYES: Irrigate immediately with plenty of water. Obtain medical attention if necessary.

Section V Fire Fighting Measures

FLASH POINT: N/A

AUTOIGNITION TEMPERATURE: N/A

LOWER EXPLOSIVE LIMIT: N/A

UPPER EXPLOSIVE LIMIT: N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A

EXTINGUISHING MEDIA: N/A

SPECIAL FIREFIGHTING PROCEDURES:

FIREFIGHTERS SHOULD WEAR NIOSH-APPROVED, POSITIVE PRESSURE, SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING WHEN APPROPRIATE.

Section VI Accidental Release Measures

Dike the spilled liquid, and either pump back into original container or cover with clay-type substance for absorption.

Section VII Handling and Storage

Store at ambient temperature. Prevent possible eye and skin contact by wearing protective clothing and equipment.

Section VIII Exposure Controls/Personal Protection

RESPIRATORY PROTECTION: Respirator approved by NIOSH/MSHA are adequate for contaminate concentrations encountered.

VENTILATION: N/A

PROTECTIVE CLOTHING: Gloves are recommended, rubber gloves re recommended when repeated or prolonged contact is likely.

EYE PROTECTION: Safety glasses are recommended.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: N/A

WORK/HYGIENIC PRACTICES: Avoid contact with the eyes and skin.

Section IX Physical and Chemical Properties

PHYSICAL STATE:	Milky liquid
MELTING POINT/RANGE:	N/A
pH:	10-11
BOILING POINT/RANGE:	212 DEG F, 100 DEG C
APPEARANCE/COLOR ODOR:	White - Off white, No odor
SOLUBILITY IN WATER:	NIL
SPECIFIC GRAVITY (Water = 1):	1.4-1.5
VAPOR DENSITY (Air = 1):	N/A
VAPOR PRESSURE (mmHg):	N/A
MOLECULAR WEIGHT:	N/A
% OF SOLUTION:	48-51 51-55 61-65
% VOLATILES:	49-52 45-49 35-39

Section X Stability and Reactivity

STABILITY: Stable HAZARDOUS POLYMERIZATION: Will Not Occur

CONDITIONS TO AVOID: N/A

MATERIALS TO AVOID: Acids and maleic anhydride Magnesium hydroxide is soluble in aqueous acids generating heat.

HAZARDOUS DECOMPOSITION PRODUCTS: HEAT AND STEAM

Section XI Toxicological Information

UNIVAR USA INC.
ISSUE DATE:2000-04-17
Annotation:

MSDS NO:P14725V
VERSION:010 2006-08-18

N/A

Section XII Ecological Information

N/A

Section XIII disposal Considerations

May be disposed of in a secured sanitary landfill. Disposal must be done in accordance with Local, State, and Federal regulations.

Section XIV Transport Information

DOT Proper Shipping Name: N/A

DOT Hazard Class/I.D. No: N/A

Section XV Regulatory Information

Reportable Quantity: N/A

NFPA Rating: Health - 1; Fire - 0; Reactivity - 0

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

Carcinogenicity Lists: No NTP: No IARC Monograph: No OSHA Regulated: No

Section XVI Other information

SYNONYMS/ COMMON NAMES: Brucite

CHEMICAL FAMILY TYPE: Magnesium Hydroxide

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

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This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

Material Safety Data Sheet

Carbon Dioxide

Section 1. Chemical product and company identification

Product Name : Carbon Dioxide
Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Product use : Synthetic/Analytical chemistry.
MSDS# : 001013
Date of Preparation/Revision : 4/11/2005.
In case of emergency : 1-800-949-7937

Section 2. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Carbon Dioxide	124-38-9	100	ACGIH TLV (United States, 9/2004). STEL: 54000 mg/m ³ 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m ³ 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 6/2001). STEL: 54000 mg/m ³ 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m ³ 10 hour(s). Form: All forms TWA: 5000 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 6/1993). TWA: 9000 mg/m ³ 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms

Section 3. Hazards identification

Physical state : Gas.
Emergency overview : Warning!
CONTENTS UNDER PRESSURE.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
Avoid contact with skin and clothing. Avoid breathing gas. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.
Contact with rapidly expanding gas, liquid, or solid can cause frostbite.

Routes of entry : Inhalation, Dermal, Eyes
Potential acute health effects
Eyes : Moderately irritating to the eyes.
Skin : Moderately irritating to the skin.
Inhalation : Moderately irritating to the respiratory system.
Ingestion : Ingestion is not a normal route of exposure for gases

Carbon Dioxide

Potential chronic health effects : **CARCINOGENIC EFFECTS** Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS Not available.

Medical conditions aggravated by overexposure : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological information (section 11)

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Fire fighting media and instructions : Use an extinguishing agent suitable for surrounding fires.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

No specific hazard.

Special protective equipment for fire-fighters : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 7. Handling and storage

Handling : Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. High pressure gas. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement. Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
When working with cryogenic liquids, wear a full face shield.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Insulated gloves suitable for low temperatures
- Personal protection in case of a large spill** : A self-contained breathing apparatus should be used to avoid inhalation of the product.
- Consult local authorities for acceptable exposure limits.**

Section 9. Physical and chemical properties

- Molecular weight** : 44.01 g/mole
- Molecular formula** : CO₂
- Bolling/condensation point** : -78.55°C (-109.4°F)
- Melting/freezing point** : Sublimation temperature: -78.5°C (-109.3°F)
- Critical temperature** : 30.9°C (87.6°F)
- Vapor pressure** : 830 psig
- Vapor density** : 1.53 (Air = 1)
- Specific Volume (ft³/lb)** : 8.77193
- Gas Density (lb/ft³)** : 0.114
- Physical chemical comments** : Not available.

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.

Section 11. Toxicological information

Toxicity data

- IDLH** : 40000 ppm
- Chronic effects on humans** : Causes damage to the following organs: lungs, cardiovascular system, skin, eyes, central nervous system (CNS), eye, lens or cornea.
- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material for humans.
- Specific effects**
- Carcinogenic effects** : No known significant effects or critical hazards.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

Carbon Dioxide**Section 12. Ecological information**

- Products of degradation** : These products are carbon oxides (CO, CO₂).
- Toxicity of the products of biodegradation** : The product itself and its products of degradation are not toxic.
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		Limited quantity Yes. Packaging instruction Passenger Aircraft Quantity limitation: 75 kg Cargo Aircraft Quantity limitation: 150 kg
TDG Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75
Mexico Classification	UN1013 UN2187	CARBON DIOXIDE Carbon dioxide, refrigerated liquid	2.2	Not applicable (gas).		-

Section 15. Regulatory information

United States

- U.S. Federal regulations** : TSCA 8(b) inventory: Carbon Dioxide
 SARA 302/304/311/312 extremely hazardous substances: No products were found.
 SARA 302/304 emergency planning and notification: No products were found.
 SARA 302/304/311/312 hazardous chemicals: Carbon Dioxide
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Carbon Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
 Clean Water Act (CWA) 307: No products were found.
 Clean Water Act (CWA) 311: No products were found.
 Clean air act (CAA) 112 accidental release prevention: No products were found.
 Clean air act (CAA) 112 regulated flammable substances: No products were found.
 Clean air act (CAA) 112 regulated toxic substances: No products were found.
- State regulations** : Pennsylvania RTK: Carbon Dioxide: (generic environmental hazard)
 Massachusetts RTK: Carbon Dioxide
 New Jersey: Carbon Dioxide

Canada

- WHMIS (Canada)** : Class A: Compressed gas.
 CEPA DSL: Carbon Dioxide

Section 16. Other information

United States

- Label Requirements** : CONTENTS UNDER PRESSURE.
 CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, CARDIOVASCULAR SYSTEM, SKIN, EYES, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
 MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

Canada

- Label Requirements** : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



liquid:



National Fire Protection Association (U.S.A.)



liquid:

Carbon Dioxide



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET



LANXESS Corporation
Sybron Chemicals, Inc
200 Birmingham Road
Birmingham, NJ 08011
USA

TRANSPORTATION EMERGENCY

CALL CHEMTREC: (800) 424-9300
INTERNATIONAL: (703) 527-3887

NON-TRANSPORTATION

LANXESS Emergency Phone: (609) 893-1100
LANXESS Information Phone: (609) 893-1100

1. Product and Company Identification

Product Name: Ionac SR-7 (5347)
Material Number: SY003407
Chemical Family: Ion Exchange Resin

2. Hazards Identification

Emergency Overview

Color: Opaque, White, Yellow, Tan **Form:** Solid Beads **Odor:** Slight.
Product poses little or no hazard if spilled.

Potential Health Effects

Primary Routes of Entry: Inhalation, Skin Contact, Eye Contact, Ingestion

Medical Conditions Aggravated by Exposure: Respiratory disorders

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

Eye

Acute Eye

For Product: Ionac SR-7 (5347)

May cause mechanical irritation.

General Effects of Exposure

Acute Effects of Exposure

For Product: Ionac SR-7 (5347)

Not expected to cause any adverse acute health effects.

Chronic Effects of Exposure

For Product: Ionac SR-7 (5347)

Not expected to cause any adverse chronic health effects.

Material Name: Ionac SR-7 (5347)

Article Number: SY003407

Carcinogenicity:

No Carcinogenic substances as defined by IARC, NTP and/or OSHA

3. Composition/Information on Ingredients

Hazardous Components

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

4. First Aid Measures

Eye Contact

In case of contact, flush eyes with plenty of lukewarm water. Get medical attention if irritation develops.

Skin Contact

In case of skin contact, wash affected areas with soap and water.

Inhalation

If inhaled, remove to fresh air. Get medical attention if irritation develops.

Ingestion

If ingested, do not induce vomiting unless directed to do so by medical personnel. Get medical attention.

5. Fire-Fighting Measures

Suitable Extinguishing Media: water, foam, dry chemical

Unsuitable Extinguishing Agents: carbon dioxide (CO₂)

Special Fire Fighting Procedures

Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

6. Accidental release measures

Spill and Leak Procedures

Spills should be swept up and placed in appropriate containers for disposal. Clean up promptly by scoop or vacuum. Avoid creating dusty conditions.

7. Handling and Storage

Storage Temperature:

minimum: 0 °C (32 °F)

maximum: 40 °C (104 °F)

Storage Period

5 Years: When stored in original sealed container.

Handling/Storage Precautions

Handle in accordance with good industrial hygiene and safety practices. Wash thoroughly after handling. Keep container closed when not in use. Avoid breathing dust.

Further Info on Storage Conditions

Protect from freezing.

8. Exposure Controls / Personal Protection

Country specific exposure limits have not been established or are not applicable

Industrial Hygiene/Ventilation Measures

Under normal conditions of use, special ventilation is not required.

Respiratory Protection

None required under normal conditions of use.

Eye Protection

safety glasses.

Skin and body protection

No special skin protection requirements during normal handling and use.

Additional Protective Measures

Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product.

9. Physical and chemical properties

Form:	Solid
Appearance:	Beads
Color:	Opaque, White, Yellow, Tan
Odor:	Slight
pH:	4 - 7
Freezing Point:	No Data Available
Boiling Point/Range:	No Data Available
Flash Point:	Not Applicable
Lower Explosion Limit:	Not Established
Upper Explosion Limit:	Not Established
Evaporation Rate:	1
Vapor Pressure:	17 mmHg @ 20 °C (68 °F) similar to water
Specific Gravity:	1.1 @ 20 °C (68 °F)
Solubility in Water:	Insoluble
Autoignition Temperature:	> 500 °C (> 932 °F)
Decomposition Temperature:	> 204 °C (> 399.2 °F)
Bulk Density:	No Data Available

10. Stability and Reactivity

Hazardous Reactions

Hazardous polymerization does not occur.

Stability

Stable

11. Toxicological Information

Toxicity Data for Ionac SR-7 (5347)

Skin Irritation

rabbit, Non-irritating

Eye Irritation

rabbit, Slightly irritating

12. Ecological Information

Ecological Data for Ionac SR-7 (5347)

Additional Ecotoxicological Remarks

No data available for this product.

13. Disposal considerations

Waste Disposal Method

Waste disposal should be in accordance with existing federal, state and local environmental control laws.

Empty Container Precautions

Recondition or dispose of empty container in accordance with governmental regulations.

14. Transportation information

Land transport (DOT)

Non-Regulated

Sea transport (IMDG)

Non-Regulated

Air transport (ICAO/IATA)

Non-Regulated

15. Regulatory Information

United States Federal Regulations

OSHA Hazcom Standard Rating: Non-Hazardous

US. Toxic Substances Control Act: Listed on the TSCA Inventory.

US. EPA CERCLA Hazardous Substances (40 CFR 302):

Components

None

SARA Section 311/312 Hazard Categories:

Non-hazardous under Section 311/312

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A):

Components

None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required:

Components

None

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):

If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

State Right-To-Know Information

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

<u>Weight %</u>	<u>Components</u>	<u>CAS-No.</u>
>=1%	Water	7732-18-5
>=1%	Ion exchange resin	119481-79-7

California Prop. 65:

To the best of our knowledge, this product does not contain any of the listed chemicals, which the state of California has found to cause cancer, birth defects or other reproductive harm.

16. Other Information

NFPA 704M Rating

Health	1
Flammability	1

Material Name: Ionac SR-7 (5347)

Article Number: SY003407

Reactivity	1
Other	

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

HMIS Rating

Health	1
Flammability	1
Physical Hazard	1

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

* = Chronic Health Hazard

LANXESS Corporation's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by LANXESS Corporation as a customer service.

Contact Person: Product Safety Department
 Telephone: (609) 893-1100
 MSDS Number: 000000003407
 Version Date: 04/01/2005
 Report Version: 1.2

This information is furnished without warranty, express or implied. This information is believed to be accurate to the best knowledge of LANXESS Corporation. The information in this MSDS relates only to the specific material designated herein. LANXESS Corporation assumes no legal responsibility for use of or reliance upon the information in this MSDS.

SIEMENS

Water Technologies

Material Safety Data Sheet

SECTION 1 – CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Type: Water Treatment Media

Product Names: SCU

Chemical Family: Proprietary

Manufacturer's Name: Siemens Water Technologies Corp.

Address: 2430 Rose Place, Roseville, MN 55113

Product/Technical Information Phone Number: (651) 638-1300

Medical/Handling Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day every day

Transportation Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day every day

Issue Date/Revision Number: December 2009 / Original

SECTION 2 – COMPOSITION INFORMATION

<u>Chemical Name</u>	<u>Percent by Weight</u>	<u>CAS#</u>
Proprietary	100	Proprietary

SECTION 3 – HAZARDS IDENTIFICATION

Appearance & Odor: Granular or powdered black solid

Emergency Overview:

- May cause eye irritation due to mechanical abrasion
- Spills make the floor slippery

Fire & Explosion Hazards: This material will smolder if ignited or heated to red heat. May form explosive dust concentrations in air.

Primary Route(s) of Exposure: Eye or skin contact

Inhalation – Acute Effects: Large quantities of dusts may irritate the respiratory tract.

Skin Contact – Acute Effects: No adverse effects are expected from brief skin contact.

Eye Contact – Acute Effects: The dusts may cause eye irritation, redness, and moderate corneal injury due to mechanical abrasion. The effects are likely to heal.

Ingestion – Acute Effects: Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operation. Swallowing large amounts may cause irritation to the gastrointestinal tract.

Material Safety Data Sheet

SECTION 4 – FIRST AID MEASURES

Inhalation First Aid: Remove affected person from area to fresh air. Give artificial respiration ONLY if breathing has stopped and give CPR ONLY if there is no breathing and no pulse. Obtain medical attention.

Skin Contact First Aid: Immediately remove clothing from affected and wash skin vigorously with flowing water. Clothing should be washed before reuse. Seek medical attention if irritation develops.

Eye Contact First Aid: Immediately irrigate eyes with flowing water continuously for 15 minutes while holding eyes open. Contacts should be removed before or during flushing. Obtain medical attention.

Ingestion First Aid: No adverse effects anticipated by this route of exposure incidental to proper industrial handling. If ingestion does occur, if victim is alert and not convulsing rinse mouth with water and give plenty of water to drink. If spontaneous vomiting occurs, have affected person lean forward with head down to avoid breathing in of vomitus. Rinse mouth again and give more water to drink. Obtain medical attention.

Medical Conditions Aggravated: Breathing large quantities of this material may aggravate chronic asthma and other pulmonary diseases.

Note to Physician: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

SECTION 5 – FIRE FIGHTING MEASURES

Flash Point/Method: Not applicable.

Extinguishing Media: Water, carbon dioxide, dry chemical

Fire Fighting Procedures: Keep people away. Isolate fire area and deny unnecessary entry. Cool surrounding area with water to localize fire zone. Soak thoroughly with water to cool and prevent reignition.

Use NIOSH approved positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots and gloves). If protective equipment is not available or not used, fight fire from a protected location or a safe distance.

Fire & Explosion Hazards: This material will smolder if ignited or heated to red heat. Carbon monoxide gas may be formed if this material is ignited under low oxygen conditions. Dusts at sufficient concentrations may form explosive mixtures in air.

Hazardous Products of Decomposition and/or Combustion: May include carbon monoxide and carbon dioxide.

NFPA Ratings:

HEALTH - 1 FLAMMABILITY - 1 REACTIVITY - 0

Material Safety Data Sheet

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

Cleanup: Clean up floor area. Sweep up.

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations.

Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

SECTION 7 – HANDLING AND STORAGE

Handling: Practice reasonable care and caution. Avoid dust cloud formation and control ignition sources.

Storage: Keep containers tightly closed when not in use. Store between 35° - 100°F.

General Comments: Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROL

Respiratory Protection: Wear a NIOSH-approved half-face respirator equipped with dust cartridges if use conditions generate dusts.

Skin Protection: Wear gloves impervious to this material to prevent skin contact.

Eye Protection: Wear safety glasses. Wear chemical goggles if product contact is likely. Do not wear contact lenses while working with this product.

Ventilation Protection: Provide local exhaust ventilation if use conditions generate dusts.

Other Protection: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

Material Safety Data Sheet

Exposure Limits:

Exposure limits have not been developed for this product.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Granular or powdered black solid.

Density: 35 – 45 lb / ft³ **Solubility in Water:** Insoluble

pH: 8.5 – 12 (aqueous solution)

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable under normal handling and storage conditions.

Incompatibilities: Avoid contact with strong mineral acids.

Polymerization: Hazardous polymerization cannot occur.

Decomposition: May liberate carbon monoxide and hydrogen sulfide gasses upon contact with strong mineral acids.

Conditions to Avoid: None known.

SECTION 11 – TOXICOLOGICAL INFORMATION

No information found relating to normal routes of occupational exposure.

SECTION 12 – ECOLOGICAL INFORMATION

The environmental fate and ecological toxicity are not known.

SECTION 13 – DISPOSAL CONSIDERATIONS

Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

Cleanup: Clean up floor area. Sweep up.

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations.

Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State Local and

Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

Material Safety Data Sheet

SECTION 14 – TRANSPORTATION INFORMATION

Domestic Transportation: This material is not regulated as a hazardous material for domestic transportation purposes.

International Transportation: This material is not regulated as a dangerous good for international transportation purposes.

SECTION 15 – REGULATORY INFORMATION

US Regulations:

SARA HAZARD CATEGORY:

Acute: yes

Chronic: no

Fire: no

Pressure Release: no

Reactivity: no

SECTION 16 – OTHER INFORMATION

Disclaimer: The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the user thereof. It is the buyer's responsibility to ensure that its activities comply with federal, state, provincial and local laws.

Siemens WT

Material Safety Data Sheet

*Valid only for
Silica.*

Print Date 04/01/2010

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Silica gel

*SCP media
in water*

Product Number
Brand

Company

*Siemens WT
2430 Roseville, MN 55014*

Telephone
Fax
Emergency Phone #

*651-638-1300
651-633-5874
651-543-4801*

2. COMPOSITION/INFORMATION ON INGREDIENTS

plus an amine polymer

CAS-No.	EC-No.	Index-No.	Concentration
Silica-Amorphous, precipitated			
112926-00-8	231-545-4	-	I-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect

Target Organs

Lungs

HMIS Classification

Health hazard: 0
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health hazard: 0
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.

*if material
allowed to
dry*

Ingestion

May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration

if allowed to dry and becomes air borne

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point not applicable

Ignition temperature no data available

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Avoid dust formation.

Environmental precautions

No special environmental precautions required.

Methods for cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Silica- Amorphous, precipitated	112926-00- 8	TWA	6 mg/m ³	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	20million particles per	2007-01-01	USA. Occupational Exposure Limits (OSHA) -

		cubic foot	Table Z-3 Mineral Dusts
Remarks	Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques. mppcf X 35.3 = million particles per cubic meter = particles per c.c		

Personal protective equipment

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

For prolonged or repeated contact use protective gloves.

Eye protection

Safety glasses

Hygiene measures

General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form

~~powder~~

shummy in water

Colour

white

Safety data

pH

no data available

Melting point

no data available

Boiling point

no data available

Flash point

not applicable

Ignition temperature

no data available

Lower explosion limit

no data available

Upper explosion limit

no data available

Water solubility

no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - silicon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

- IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
- IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Silica-Amorphous, precipitated)
- ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
- NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
- OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Amorphous silica is not classifiable as to its carcinogenicity to humans (Group 3); however, crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1, IARC). Therefore, amorphous silica should be handled as if possessing the same hazards as the crystalline form., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Lungs,

12. ECOLOGICAL INFORMATION

Elimination Information (persistence and degradability)

no data available

Ecotoxicity effects

no data available

Further Information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION



Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

*** Section 1 - PRODUCT AND COMPANY IDENTIFICATION ***

Synonyms

USALCO 38; USALCO 43; USALCO 45; LIQUID SODIUM ALUMINATE

Material Name: SODIUM ALUMINATE, SOLUTION

Manufacturer Information

USALCO, LLC
1120 Middle River Rd.
Baltimore, MD 21220

Emergency # 1-800-424-9300 (CHEMTREC)

Chemical Family

inorganic, salt

Product Use

water treatment, phosphorus removal, alumina source for catalyst, pigments and coatings

*** Section 2 - HAZARDS IDENTIFICATION ***

EMERGENCY OVERVIEW

Color: amber

Physical Form: liquid

Odor: odorless

Health Hazards: respiratory tract burns, skin burns, eye burns, mucous membrane burns

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: burns

Long Term: burns

Skin

Short Term: burns

Long Term: burns

Eye

Short Term: burns

Long Term: burns

Ingestion

Short Term: burns

Long Term: burns

*** Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS ***

CAS	Component	Percent	Symbol(s)	Risk Phrase(s)
11138-49-1	SODIUM ALUMINATE, SOLUTION	100	C	R:34
	234-391-6			

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Aluminium oxides.

Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

*** Section 4 - FIRST AID MEASURES ***

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

Eyes

Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

Note to Physicians

For inhalation, consider oxygen.
Avoid gastric lavage or emesis.

*** Section 5 - FIRE FIGHTING MEASURES ***

See Section 9 for Flammability Properties

NFPA Ratings: Health: 3 Fire: 0 Reactivity: 1

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Flammable Properties

Negligible fire hazard.

Extinguishing Media

regular dry chemical, carbon dioxide, water, regular foam
Large fires: Use regular foam or flood with fine water spray.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. Use extinguishing agents appropriate for surrounding fire. Do not get water directly on material. Large fires: Flood with fine water spray. Reduce vapors with water spray. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Thermal Decomposition Products

Combustion: miscellaneous decomposition products

Sensitivity to Mechanical Impact

Not sensitive

Sensitivity to Static Discharge

Not sensitive

Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

*** Section 6 - ACCIDENTAL RELEASE MEASURES ***

Occupational spill/release

Do not touch spilled material. Stop leak if possible without personal risk. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Small dry spills: Move containers away from spill to a safe area. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry.

*** Section 7 - HANDLING AND STORAGE ***

Store in a cool, dry place and in tightly sealed containers. Keep separated from incompatible substances.

Sodium aluminate solution is a suspended solids solution of alumina in sodium hydroxide. Under normal conditions, the solution is completely stable, however, there are several factors that may cause the material to precipitate. Do not let the material come into contact with moisture, dust or dirt. Avoid constant agitation or recirculation and do not put it under pressure. Any of the above actions may introduce contaminants to the solution which may cause precipitation.

*** Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION ***

Component Exposure Limits

ACGIH and EU have not developed exposure limits for any of this product's components.

Ventilation

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Protective Clothing

Wear appropriate chemical resistant clothing.

Glove Recommendations

Wear appropriate chemical resistant gloves.

While not normally required, respiratory protection may be required under conditions where extensive misting or fuming may occur due to insufficient or improper engineering controls.

*** Section 9 - PHYSICAL AND CHEMICAL PROPERTIES ***

Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

Physical State: Liquid	Appearance: Not available
Color: amber	Physical Form: liquid
Odor: odorless	Odor Threshold: Not available
pH: 14.0	Melting Point: 1650 - 1800 °C
Boiling Point: 116 °C	Flash Point: not flammable
Evaporation Rate: Not available	Vapor Pressure: Not available
Vapor Density (air = 1): Not available	Density: Not available
Specific Gravity (water = 1): >1.50 @ 49 °C	Water Solubility: soluble
Coeff. Water/Oil Dist: Not available	Viscosity: Not available
Volatility: Not available	Molecular Weight: 81.97
Molecular Formula: Na ₂ -Al ₂ -O ₄	

Solvent Solubility

Insoluble: alcohol

*** Section 10 - STABILITY AND REACTIVITY ***

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

None reported.

Materials to Avoid

acids

SODIUM ALUMINATE, SOLUTION:

ACIDS: May react violently with strong acids.

Thermal Decomposition Products

Combustion: miscellaneous decomposition products

Thermal decomposition products: sodium monoxide.

Possibility of Hazardous Reactions

Will not polymerize.

*** Section 11 - TOXICOLOGICAL INFORMATION ***

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and no selected endpoints have been identified.

RTECS Acute Toxicity (selected)

The components of this material have been reviewed and RTECS publishes no data as of the date on this document.

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, or DFG.

RTECS Irritation

The components of this material have been reviewed and RTECS publishes no data as of the date on this document.

Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

Local Effects

SODIUM ALUMINATE, SOLUTION (11138-49-1)

Corrosive: inhalation, skin, eye, ingestion.

HEALTH EFFECTS

Inhalation - Acute Exposure

CORROSIVE SUBSTANCES: May cause severe irritation of the respiratory tract with coughing, choking, pain and possibly burns of the mucous membranes. In some cases, pulmonary edema may develop, either immediately or more often within a period of 5-72 hours. The symptoms may include tightness in the chest, dyspnea, frothy sputum, cyanosis, and dizziness. Physical findings may include moist rales, low blood pressure and high pulse pressure. Severe cases may be fatal.

Inhalation - Chronic Exposure

CORROSIVE SUBSTANCES: Depending on the concentration and duration of exposure, repeated or prolonged exposure may cause inflammatory and ulcerative changes in the mouth and possibly bronchial and gastrointestinal disturbances.

Inhalation - Other Toxicity Information

SODIUM ALUMINATE, SOLUTION: See information on corrosive substances.

Skin Contact - Acute Exposure

CORROSIVE SUBSTANCES: Direct contact may cause severe irritation, pain, and possibly burns.

Skin Contact - Chronic Exposure

CORROSIVE SUBSTANCES: Effects depend on concentration and duration of exposure. Repeated or prolonged contact may result in dermatitis or effects similar to acute exposure.

Skin Contact - Other Toxicity Information

SODIUM ALUMINATE, SOLUTION: See information on corrosive substances.

Eye Contact - Acute Exposure

CORROSIVE SUBSTANCES: Direct contact may cause severe irritation, pain and burns, possibly severe. The degree of injury depends on the concentration and duration of contact. The full extent of the injury may not be immediately apparent.

Eye Contact - Chronic Exposure

CORROSIVE SUBSTANCES: Effects depend on concentration and duration of exposure. Repeated or prolonged contact may result in conjunctivitis or effects as in acute exposure.

Eye - Other Toxicity Information

SODIUM ALUMINATE, SOLUTION: See information on corrosive substances.

Ingestion - Acute Exposure

CORROSIVE SUBSTANCES: May cause immediate pain and severe burns of the mucous membranes. There may be discoloration of the tissues. Swallowing and speech may be difficult at first and then almost impossible. The effects on the esophagus and gastrointestinal tract may range from irritation to severe corrosion. Edema of the epiglottis and shock may occur.

Ingestion - Chronic Exposure

CORROSIVE SUBSTANCES: Depending on the concentration, repeated ingestion may cause effects as with acute ingestion.

Ingestion - Other Toxicity Information

SODIUM ALUMINATE, SOLUTION: See information on corrosive substances.



Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

*** Section 12 - ECOLOGICAL INFORMATION ***

Component Analysis - Aquatic Toxicity

No LOEL ecotoxicity data are available for this product's components.

*** Section 13 - DISPOSAL CONSIDERATIONS ***

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.
Hazardous Waste Number(s): D002.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

*** Section 14 - TRANSPORT INFORMATION ***

US DOT Information

Shipping Name: Sodium aluminate, solution
UN/NA #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8

TDG Information

Shipping Name: Sodium aluminate solution
UN #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8

ADR Information

Shipping Name: Sodium aluminate solution
UN #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8

RID Information

Shipping Name: Sodium aluminate solution
UN #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8

IATA Information

Shipping Name: Sodium aluminate solution
UN #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8

ICAO Information

Shipping Name: Sodium aluminate solution
UN #: UN1819 Hazard Class: 8 Packing Group: II
Required Label(s): 8



Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

IMDG Information

Shipping Name: Sodium aluminate solution

UN #: UN1819 Hazard Class: 8 Packing Group: II

*** Section 15 - REGULATORY INFORMATION ***

U.S. Federal Regulations

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 311/312 (40 CFR 370.21), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA Section 311/312 (40 CFR 370 Subparts B and C)

Acute Health: Yes Chronic Health: No Fire: No Pressure: No Reactive: No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
SODIUM ALUMINATE, SOLUTION	11138-49-1	No	No	No	Yes	No	No

Not regulated under California Proposition 65

EU Marking and Labelling

Symbols

C Corrosive

Risk Phrases

R34 Causes burns.

Safety Phrases

S2 Keep out of the reach of children. **S20** When using do not eat or drink. **S24** Avoid contact with skin. **S25** Avoid contact with eyes. **S26** In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. **S27** Take off immediately all contaminated clothing. **S39** Wear eye/face protection. **S46** If swallowed, seek medical advice immediately and show this container or label.

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
SODIUM ALUMINATE, SOLUTION	11138-49-1	No	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

Safety Data Sheet

Material Name: SODIUM ALUMINATE, SOLUTION

SDS ID: USA50543

*** Section 16 - OTHER INFORMATION ***

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Full text of R phrases in Section 3

R34 Causes burns.

Other Information

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End of Sheet USA50543



MATERIAL SAFETY DATA SHEET

HMIS RATING:
HEALTH 1
FLAMMABILITY 1
REACTIVITY 0
OTHER B

WEST W-126

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WEST W-126 Flocculent
PRODUCT DESCRIPTION: WEST W-124 is an ionic co-polymer used as a flocculent in wastewater treatment processes.

MANUFACTURER: Water & Energy Systems Technology, Inc.
13109 Arctic Circle
Santa Fe Springs, CA 92801
Customer Service: (562) 921-5191

24 HR. EMERGENCY TELEPHONE NUMBER
Chem-Tel (U.S.): (800) 255-3924

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS#</u>	<u>EXPOSURE LIMITS</u>	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
2-Propenoic acid, sodium salt, polymer with 2-propenamamide	25085-02-3	Not Established	Not Established
Petroleum distillates, hydro treated light	64742-47-8	Not Established	Not Established
Poly(oxy-1,2-ethanediyl), α -(4-nonylphenyl)- ϕ -hydroxy-, branched	127087-87-0	Not Established	Not Established

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PRIMARY ROUTES OF ENTRY: Eye or Skin contact.

PHYSICAL APPEARANCE: White or off-white liquid.

ODOR: Slight, mild odor.

IMMEDIATE CONCERNS: Eye and skin irritant.

PRECAUTIONARY MEASURES: Do not get in eyes, on skin, on clothing. Wash thoroughly after handling. Avoid prolonged or repeated inhalation of dust or skin contact. Slip hazard when wet.

SIGNS & SYMPTOMS OF EXPOSURE: Contact with the eye may produce irritation and/or redness. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to dry skin, irritation and/or dermatitis. Vapors may irritate eyes and respiratory tract, and result in headache or dizziness.

CONDITION AGGRAVATED BY EXPOSURE: Existing skin conditions.

CARCINOGENICITY: This product's ingredients are not found in the Federal or Cal OSHA, NTP, IARC lists of suspected cancer causing agents.

4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

SKIN: Remove contaminated clothing and launder before reuse. Wash effected area with soap and water.

INGESTION: Consult a physician. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If symptoms persist, consult a physician.

MATERIAL SAFETY DATA SHEET

WEST W-126

5. FIRE FIGHTING MEASURES

Flash Point: > 200° F (> 93 ° C)

Flash Point Method Used: PMCC

Flammable Limits In Air (Lower - % by volume): Not Evaluated

Flammable Limits In Air (Upper - % by volume): Not Evaluated

Autoignition: Not Evaluated

Sensitivity to Mechanical Impact: None

Sensitivity to Static Discharge: Not Evaluated.

Fire Fighting Extinguishing Media: Carbon dioxide, dry chemical or foam.

Fire Fighting Equipment: Firefighters should wear normal protective equipment. SCBA is recommended for confined areas. Cool exposed drums or tanks with water.

Fire and Explosion Hazards: Wetted product presents an extreme slip hazard. Pedestrian and vehicular traffic must proceed with caution where even a small amount of wet product may exist.

Extinguishing Media to Avoid: Water may create a slip hazard with product.

Hazardous Combustion Products: Oxides of carbon and nitrogen.

6. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Remove all ignition sources. Dike area to control run off and collect spill in appropriate container(s). Use an inert absorbent such as vermiculite to collect residual liquid. Then water wash area to waste treatment to eliminate slip hazard.

Water Spill: Note: The petroleum distillates in this product are classified as an oil under Section 311 of the Clean Water Act. Spills, entering (A) surface waters or (B) any water courses or sewers entering or leading to surface water, that cause a sheen must be reported to the National Response Center at 800-424-8802.

7. HANDLING AND STORAGE

Other Handling Information: Avoid high temperatures and open systems to minimize vapor release and exposures. Keep containers closed and properly labeled. Do not reuse containers before contents are completely removed, and the container is properly cleaned and reconditioned. (Refer also to Section VII). Good personal hygiene practices can reduce potential exposure. Wash with soap and water following any contact with this product, as well as before breaks and meals. Shower and change clothing at end of work shift. If clothing becomes contaminated, remove and launder or dry-clean before reuse.

Storage Information: Product may be difficult to handle if cold. Maintain temperature between 20°C and 30°C.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Skin Protection: Chemical resistant gloves.

Respiratory Protection: Not required under normal operating conditions.

Eye Protection: Full side shield safety glasses or goggles (ANSI Z87.1 standard).

Engineering Controls: Recommended general area ventilation.

Additional Information: Provide eyewash station(s). Select additional protective equipment (eg apron, face shield, etc.), depending on conditions of use.

MATERIAL SAFETY DATA SHEET
WEST W-126

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form:	Liquid
Color:	White to off-white
Odor:	Slight hydrocarbon oil like odor
Odor Threshold:	Not applicable
Physical State:	Liquid
Solubility In Water:	Soluble, solubility limited by viscosity
Vapor Pressure:	Not Evaluated
Specific Gravity:	~1
Boiling Point:	Not Established
Melting Point:	Not Applicable
Freezing Point:	Not Applicable
Decomposition Temperature:	Not Evaluated
Evaporation Rate:	Not Evaluated
Vapor Density:	Not Evaluated
VOC:	Not Evaluated
pH:	Not Established

10. STABILITY AND REACTIVITY

Materials to Avoid: Strong oxidants.

Stability: Stable.

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products: Thermal decomposition or combustion may produce oxides of carbon and nitrogen, various hydrocarbons, ammonia and/or hydrogen chloride vapor. Vapor may be irritating or harmful.

Incompatibility: Strong oxidants such as liquid chlorine, enriched gaseous or liquid oxygen, and sodium or calcium hypochlorite.

11. TOXICOLOGICAL INFORMATION

Acute and Chronic Toxicity:

A: General Product Information

Eye and skin irritant. May aggravate existing medical conditions such as rashes, allergies or other sensitive areas. Symptoms may include reddening, swelling of affected areas with possible itching, burning or other discomfort.

B: Acute Toxicity – LD50/LC50

LC50: Ceriodaphnia dubia
48 hours: 11.0 ppm

LC50: Pimphales promelas
48 hours: 31.4 ppm

Carcinogenicity: Not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

12. ECOLOGICAL INFORMATION

Ecotoxicity

A: General Product Information

C.O.D.: 2,176,000 mg/l

B.O.D.: 548,000 mg/l

MATERIAL SAFETY DATA SHEET
WEST W-126

13. DISPOSAL CONSIDERATIONS

RCRA Hazard Class: This product, when unadulterated, is not a RCRA regulated hazardous waste.
Waste Disposal Method: Disposal must be arranged in accordance with local, state and federal regulations. Care must be taken to prevent environmental contamination from the disposal of material, residues and containers.

14. TRANSPORT INFORMATION

DOT:
Proper Shipping Name: NOT A DOT/IMO HAZARDOUS MATERIAL

IATA:
Proper Shipping Name: NOT HAZARDOUS FOR TRANSPORT BY AIR

IMDG:
Proper Shipping Name: NOT A DOT/IMO HAZARDOUS MATERIAL

Department of Transportation: This product is considered to be an oil per the definitions in 49 CFR 130.2. If packed in a container with a capacity of 3,500 gallons or more, the Communication requirements at 49 CFR 130.11 and the Response Plan Requirements at 49 CFR 130.31 and 130.33 apply to Domestic transportation by motor vehicles and rolling stock.

Notification of releases to the National Response Center (NRC), 800-424-8802, may be necessary. In the Washington, DC metropolitan area, call 202-426-2675.

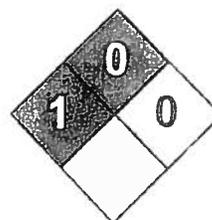
15. REGULATORY INFORMATION

US Federal Regulations:
Chemical Weapons Convention (CWC): This product does not contain any chemicals listed under the Chemical Weapons Convention Schedules of Chemicals.

16. OTHER INFORMATION

DATE PREPARED: 2/21/2006
MSDS No: W126

MANUFACTURER DISCLAIMER: The information contained herein is provided in good faith and believed to be correct as of the date hereof. However, WEST, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgement in determining its appropriateness for a particular purpose. Accordingly, WEST, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. No representations, or warranties, either expressed or implied, of merchantability fitness for a particular purpose or of any other nature are made hereunder with respect to the information set fourth herein or to the product to which the information refers.



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Magnesium sulfate anhydrous MSDS

Section 1: Chemical Product and Company Identification

Product Name: Magnesium sulfate anhydrous

Catalog Codes: SLM2992, SLM2227

CAS#: 7487-88-9

RTECS: OM4500000

TSCA: TSCA 8(b) inventory: Magnesium sulfate anhydrous

CI#: Not available.

Synonym:

Chemical Formula: MgSO₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: Sciencelab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Magnesium sulfate anhydrous	7487-88-9	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions: No specific safety phrase has been found applicable for this product.

Storage:

No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 120.38 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: Not available.

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water

Solubility: Easily soluble in cold water

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Magnesium sulfate anhydrous

Other Regulations: Not available.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

This product is not classified according to the EU regulations.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 11/01/2010 12:00 PM

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Material Safety Data Sheet
 May be used to comply with
 OSHA's Hazard Communication Standard,
 29 CFR 1910.1200. Standard must be
 consulted for specific requirements

U.S. Department of Labor
 Occupational Safety and Health Administration
 (Non-Mandatory Form)
 Form Approved
 OMB No. 1218-0072

IDENTITY (As Used on Label and List)

EDTA
 Product # 07 7051, 07 7052, 07 6011, 07 8050

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name KABE Labortechnik GmbH	Emergency Telephone Number 1-800-535-6734
Address (Number, Street, City, State, and Zip Code) c/o RAM Scientific, Inc.	Telephone Number for Information 1-800-535-6734
P.O. Box 586, 124 Crescent Road	Date Prepared 10/25/93
Needham, MA 02194	Signature of Preparer (optional)

The information supplied is based on data available to us and is believed to be correct. However, no guarantee or warranty of any kind expressed or implied, is made with respect to the information presented and RAM Scientific, Inc. assumes no responsibility from the results of the use of this product. This information is furnished upon the condition that the person responsible for its use shall make his or her own determination of the suitability of the material for his or her particular purpose.

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Names(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
EDTA - Ethylenediamine tetra acetic acid dipotassium salt dihydrate C ₁₀ H ₁₄ K ₂ N ₂ O ₈ - 2H ₂ O CAS #2001-94-7	N.A.	N.A.	N.A.	

Section III - Physical/Chemical Characteristics

Boiling Point	N.A.	Specific Gravity (H ₂ O = 1)	N.A.
Vapor Pressure (mm Hg.)	N.A.	Melting Point	225 - 228° dec
Vapor Density (AIR - 1)	N.A.	Evaporation Rate (Butyl Acetate = 1)	N.A.

Solubility in Water

Lightly soluble in water. 1650 g/L at 22o C. pH 4.0-4.5 @ (1% in water)

Appearance and Odor

Clear liquid. No odor. White powdery crystals if exposed to air.

Section IV - Fire and Explosion Hazard Data

Flash Point Flammable	Flammable Limits N.A.	LEL	UEL
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Extinguishing Media

CO₂, foam, water, or dry chemicals

Special Fire Fighting Procedures
None

Unusual Fire and Explosion Hazards
None

EDTA Product # 07 7051, 07 7052, 07 6011, 07 8050

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid Product is flammable. Do not expose to heat or flame.
	Stable	X	

Incompatibility (Materials to Avoid)

Hazardous Decomposition or Byproducts
None

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation? No	Skin? Slight	Ingestion? No
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Health Hazards (Acute and Chronic)

Carcinogenicity: No	NTP?	IARC Monographs?	OSHA Regulated?
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Signs and Symptoms of Exposure

Medical Conditions

General Aggravated by Exposure

Emergency and First Aid Procedures

Skin Contact - Wash immediately with water

Eye Contact - Rinse immediately with water. Contact a physician immediately

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Small quantities can be rinsed with water. Collect, place in enclosed container and dispose accordingly.

Waste Disposal Method

All chemical disposal must be in accordance with current local, state, and federal regulations.

Precautions to Be Taken in Handling and Storing
Store at room temperature, 25° C. No special handling.

Other Procedures

Section VIII - Control Measure

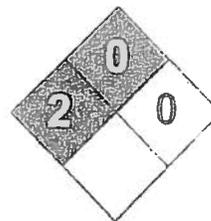
Respiratory Protection (*Specify Type*)

Ventilation Yes	Local Exhaust	Special		
	Mechanical (<i>General</i>)	Other		

Protective Gloves Yes	Eye Protection Safety glasses
--------------------------	----------------------------------

Other Protective Clothing or Equipment

Work/Hygienic Practices



Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Sodium metabisulfite MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium metabisulfite

Catalog Codes: SLS3025

CAS#: 7681-57-4

RTECS: VZ2000000

TSCA: TSCA 8(b) inventory: Sodium metabisulfite

CI#: Not available.

Synonym: Disodium disulfite; Disodium pyrosulfite;
Sodium Pyrosulfite; Sodium Metabisulphite

Chemical Name: Pyrosulfurous acid, disodium salt

Chemical Formula: Na₂S₂O₅

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: Sciencelab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1 703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium metabisulfite	7681-57-4	100

Toxicological Data on Ingredients: Sodium metabisulfite: ORAL (LD50): Acute: 1131 mg/kg [Rat]. DERMAL (LD50): Acute: >2000 mg/kg [Rat]. >1000 mg/kg [Guinea pig].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant).

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer), of ingestion, of inhalation (lung irritant). **CARCINOGENIC EFFECTS:** 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When heated to decomposition it emits toxic fumes of SO_x, Na₂O. Decomposes on heating to form sodium sulfate

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up. Do not ingest. Do not breathe dust. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Moisture sensitive. Air Sensitive

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 5 (mg/m³) [United Kingdom (UK)] TWA: 5 (mg/m³) from ACGIH (TLV) [United States] TWA: 5 (mg/m³) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystals solid or Powdered solid.)

Odor: odor of sulfur dioxide

Taste: Not available.

Molecular Weight: 190.13 g/mole

Color: White to yellowish.

pH (1% soln/water): 4.3 [Acidic.]

Boiling Point: Not available.

Melting Point: Decomposition temperature: 150°C (302°F)

Critical Temperature: Not available.

Specific Gravity: 1.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water

Solubility:

Easily soluble in cold water hot water Freely soluble in glycerol. Slightly soluble in alcohol. Moderately soluble in ethanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, heat, moisture, air, dust generation.

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Moisture sensitive Air sensitive. It slowly oxidizes to sodium sulfate upon exposure to air and moisture. Incompatible with sodium nitrite

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 1131 mg/kg [Rat]. Acute dermal toxicity (LD50): >1000 mg/kg [Guinea pig].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenic) based on animal test data. May cause adverse reproductive effects based on animal test data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation. Inhalation: May cause respiratory tract irritation with coughing and wheezing. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation with abdominal pain, nausea, vomiting, diarrhea, violent colic, and possible gastric hemorrhaging. May affect behavior/central nervous system and cause central nervous system depression/seizures. It may also affect the cardiovascular system (hypotension, tachycardia, cardiovascular collapse). Ingestion of sulfite compounds may cause a severe allergic reaction (anaphylactoid symptoms) in sensitive individuals and some asthmatics. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may cause allergic dermatitis. Ingestion: Prolonged or repeated ingestion may affect the liver, urinary system, and metabolism (weight loss). Future exposures may also cause asthma like allergy with coughing, shortness of breath, wheezing and/or chest tightness. Inhalation: Prolonged or repeated inhalation may irritate the lungs, may cause bronchitis to develop with cough, phlegm and/or shortness of breath.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey. Sodium metabisulfite Illinois toxic substances disclosure to employee act. Sodium metabisulfite Rhode Island RTK hazardous substances: Sodium metabisulfite Pennsylvania RTK: Sodium metabisulfite Minnesota: Sodium metabisulfite Massachusetts RTK: Sodium metabisulfite New Jersey: Sodium metabisulfite California Director's List of Hazardous Substances: Sodium metabisulfite TSCA 8(b) inventory: Sodium metabisulfite TSCA 4(a) ITC priority list: Sodium metabisulfite TSCA 8(a) PAIR: Sodium metabisulfite TSCA 8(d) H and S data reporting: Sodium metabisulfite; effective: 1/26/94; sunset: 6/30/98

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effect: (VERY TOXIC).

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

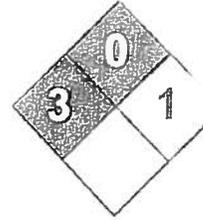
References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:35 PM

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Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CI#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1 703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target

organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, or shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammable gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrogen gas.

Special Remarks on Explosion Hazards:

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl). Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4 , Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

CEIL. 5 (ppm) from OSHA (PEL) [United States] CEIL. 7 (mg/m3) from OSHA (PEL) [United States] CEIL. 5 from NIOSH CEIL. 7 (mg/m3) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:

108.58 C @ 760 mm Hg (for 20.22% HCl in water) 83 C @ 760 mm Hg (for 31% HCl in water) 50.5 C (for 37% HCl in water)

Melting Point:

-62.25°C (-80°F) (20.69% HCl in water) -46.2 C (31.24% HCl in water) -25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:

1.1 - 1.19 (Water = 1) 1.10 (20% and 22% HCl solutions) 1.12 (24% HCl solution) 1.15 (29.57% HCl solution) 1.16 (32% HCl solution) 1.19 (37% and 38% HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether

Solubility: Soluble in cold water, hot water, diethyl ether

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:

Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water

Corrosivity:

Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphide and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates). amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid (increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothermic reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the following can cause explosion or ignition on contact or

Special Remarks on Corrosivity:

Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinum, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

Polymerization: Will not occur

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral: 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (fetotoxicity). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjunctivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well as headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey: Hydrochloric acid Illinois toxic substances disclosure to employee act: Hydrochloric acid Illinois chemical safety act: Hydrochloric acid New York release reporting list: Hydrochloric acid Rhode Island RTK hazardous substances: Hydrochloric acid Pennsylvania RTK: Hydrochloric acid Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid Massachusetts spill list: Hydrochloric acid New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid Louisiana RTK reporting list: Hydrochloric acid Louisiana spill reporting: Hydrochloric acid California Director's List of Hazardous Substances: Hydrochloric acid TSCA 8(b) inventory: Hydrochloric acid TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid CERCLA: Hazardous substances. Hydrochloric acid: 5000 lbs. (2268 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R34- Causes burns. R37- Irritating to respiratory system. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References:

-Hawley, G.G. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987 -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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Material Safety Data Sheet

Sodium hydroxide, solid, pellets or beads

ACC# 21300

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium hydroxide, solid, pellets or beads**Catalog Numbers:** S71990, S71990-1, S71991, S71992, S71993, S71993-1, S71993-2, S71993-3, S71993-4, S78605, BP359-212, BP359-500, BW13580500, BW1358350, BW13583500, S318-1, S318-10, S318-100, S318-3, S318-3LC, S318-5, S318-50, S318-500, S318-50LC, S320-1, S320-10, S320-3, S320-50, S320-500, S612-3, S612-50, S612-500LB, S613-10, S613-3, S613-50, S613-500LB**Synonyms:** Caustic soda; Soda lye; Sodium hydrate; Lye.**Company Identification:**Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
497-19-8	Sodium carbonate	<3	207-838-8
1310-73-2	Sodium hydroxide	95-100	215-185-5

Hazard Symbols: C

Risk Phrases: 35

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white. **Danger!** Corrosive. Causes eye and skin burns. Hygroscopic. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.

Target Organs: Eyes, skin, mucous membranes.

Eye: Causes eye burns. May cause chemical conjunctivitis and corneal damage.

Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.

Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. Causes severe pain, nausea, vomiting, diarrhea, and shock. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May cause systemic effects.

Inhalation: Irritation may lead to chemical pneumonitis and pulmonary edema. Causes severe irritation of upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Causes chemical burns to the respiratory tract.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Effects may be delayed.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Contact with moisture or water may generate sufficient heat to ignite nearby combustible materials. Contact with metals may evolve flammable hydrogen gas.

Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Do NOT get water inside containers.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Do not get water on spilled substances or inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Do not allow water to get into the container because of violent reaction. Minimize dust generation and accumulation. Do not get in eyes; on skin, or on clothing. Keep container tightly closed. Avoid ingestion and inhalation. Discard contaminated shoes. Use only with adequate ventilation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Corrosives area. Keep away from acids. Store protected from moisture. Containers must be tightly closed to prevent the conversion of NaOH to sodium carbonate by the CO₂ in air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium carbonate	none listed	none listed	none listed
Sodium hydroxide	C 2 mg/m ³	10 mg/m ³ IDLH	2 mg/m ³ TWA

OSHA Vacated PELs: Sodium carbonate: No OSHA Vacated PELs are listed for this chemical.
Sodium hydroxide: C 2 mg/m³

Personal Protective Equipment

Eyes: Wear chemical goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Appearance: white

Odor: Odorless

pH: 14 (5% aq soln)

Vapor Pressure: 1 mm Hg @739 deg C

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 1390 deg C @ 760 mm Hg

Freezing/Melting Point: 318 deg C

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Decomposition Temperature: Not available.

NFPA Rating: (estimated) Health: 3; Flammability: 0; Reactivity: 1

Explosion Limits, Lower: Not available.

Upper: Not available

Solubility: Soluble.

Specific Gravity/Density: 2.13 g/cm³

Molecular Formula: NaOH

Molecular Weight: 40.00

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Moisture, contact with water, exposure to moist air or water, prolonged

exposure to air.

Incompatibilities with Other Materials: Acids, water, flammable liquids, organic halogens, metals, aluminum, zinc, tin, leather, wool, nitromethane.

Hazardous Decomposition Products: Toxic fumes of sodium oxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 497-19-8: VZ4050000

CAS# 1310-73-2: WB4900000

LD50/LC50:

CAS# 497-19-8:

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, eye: 50 mg Severe;

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, mouse: LC50 = 1200 mg/m³/2H;

Inhalation, rat: LC50 = 2300 mg/m³/2H;

Oral, mouse: LD50 = 6600 mg/kg;

Oral, rat: LD50 = 4090 mg/kg;

CAS# 1310-73-2:

Draize test, rabbit, eye: 400 ug Mild;

Draize test, rabbit, eye: 1% Severe;

Draize test, rabbit, eye: 50 ug/24H Severe;

Draize test, rabbit, eye: 1 mg/24H Severe;

Draize test, rabbit, skin: 500 mg/24H Severe;

Carcinogenicity:

CAS# 497-19-8: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA. **CAS# 1310-73-2:** Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: No information available.

Neurotoxicity: No information available.

Mutagenicity: No information available.

Other Studies: See actual entry in RTECS for complete information

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	SODIUM HYDROXIDE, SOLID				SODIUM HYDROXIDE
Hazard Class:	8				8(9.2)
UN Number:	UN1823				UN1823
Packing Group:	II				II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 497-19-8 is listed on the TSCA inventory.

CAS# 1310-73-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

CAS# 1310-73-2: final PQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 497-19-8: acute CAS # 1310-73-2: acute, reactive.

Section 313

No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 1310-73-2 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 497-19-8 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 1310-73-2 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

PROCTER & GAMBLE -- DAWN LIQUID DISHWASHING DETERGENT

MATERIAL SAFETY DATA SHEET

NSN: 793000N018770

Manufacturer's CAGE: 74186

Part No. Indicator: A

Part Number/Trade Name: DAWN LIQUID DISHWASHING DETERGENT

=====

General Information

=====

Company's Name: PROCTER & GAMBLE
Company's Street: 301 E SIXTH ST
Company's P. O. Box: 599
Company's City: CINCINNATI
Company's State: OH
Company's Country: US
Company's Zip Code: 45201
Company's Emerg Ph #: 800-543-0485
Company's Info Ph #: 800-543-0485
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 26JUL88
Safety Data Review Date: 17APR95
MSDS Serial Number: BLFYH
Hazard Characteristic Code: F4

=====

Ingredients/Identity Information

=====

Proprietary: NO
Ingredient: ETHYL ALCOHOL (ETHANOL)
Ingredient Sequence Number: 01

NIOSH (RTECS) Number: KQ6300000

CAS Number: 64-17-5

OSHA PEL: 1000 PPM

ACGIH TLV: 1000 PPM; 9192

Physical/Chemical Characteristics

Appearance And Odor: CLEAR BLUE LIQUID. PRODUCT IS PERFUMED.

Specific Gravity: 1.03

Solubility In Water: COMPLETELY SOLUBLE

Percent Volatiles By Volume: 60

Fire and Explosion Hazard Data

Flash Point: 116F, 47C

Flash Point Method: CC

Lower Explosive Limit: N/A

Upper Explosive Limit: N/A

Extinguishing Media: CO*2, WATER, OR DRY CHEMICAL.

Special Fire Fighting Proc: ALTHOUGH THIS PRODUCT HAS A FLASH PT BELOW 200F (CLOSED CUP), IT IS AN AQUEOUS SOLUTION CONTAINING ETHYL ALCOHOL WHICH DOES NOT SUSTAIN COMBUSTION. (SUPP DATA)

Unusual Fire And Expl Hazrds: NONE.

Reactivity Data

Stability: YES

Cond To Avoid (Stability): NONE KNOWN.

Materials To Avoid: CHLORINE BLEACH.

Hazardous Decomp Products: NONE KNOWN.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT RELEVANT

=====
Health Hazard Data
=====

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route Of Entry - Inhalation: NO

Route Of Entry - Skin: NO

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: EYE: MAY CAUSE MILD TRANSIENT IRRITATION.

INGEST: MAY CAUSE TRANSIENT GASTROINTESTINAL IRRITATION. SKIN: TRANSIENT IRRITATION W/PROLONGED EXPOSURE TO CONCENTRATED MATERIAL.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NOT RELEVANT

Signs/Symptoms Of Overexp: EYE: MAY CAUSE STINGING, TEARING, ITCHING, SWELLING, &/OR REDNESS. INGEST: MAY RESULT IN NAUSEA, VOMITING, &/OR DIARRHEA. SKIN: PROLONGED CONTACT W/CONCENTRATED MATERIAL MAY BE DRYING.

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: EYE: FLUSH W/WATER FOR A MINIMUM OF 15 MINUTES.

INGEST: DRINK 1 OR 2 GLASSES OF WATER. SKIN: IF PROLONGED CONTACT OCCURS, RINSE THOROUGHLY W/WATER. IF SPILLED ON CLOTHING, CHANGE CLOTHES. IF SYMPTOMS PERSIST OR REOCCUR, SEEK MEDICAL ATTN. INHAL: REMOVE TO FRESH AIR. SUPPORT BRTHG (GIVE O*2/ARTF RESP) (FP N).

=====
Precautions for Safe Handling and Use
=====

Steps If Matl Released/Spill: FLUSH DOWN ACCEPTABLE SEWER (CONTAINS BIODEGRADABLE SURFACTANTS). PREVENT LARGE SPILLS FROM REACHING A WATERWAY. SORBENTS MAY BE USED.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: DISPOSAL IS TO BE PERFORMED IN COMPLIANCE W/

FEDERAL, STATE, & LOCAL REGULATIONS. SMALL OR HOUSEHOLD QUANTITIES MAY BE DIPOSED OF IN SEWER. FOR LARGER QUANTITIES, INCINERATION IS PREFERRED. DO NOT LANDFILL.

Precautions-Handling/Storing: NO UNUSUAL PRECAUTIONS NECESSARY.

Other Precautions: CONSUMER PRODUCT PACKAGE HAS NO CAUTION STATEMENT. DO NOT MIX WITH CHLORINE BLEACH AS HAZARDOUS FUMES MAY RESULT.

=====
Control Measures
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Respiratory Protection: NONE REQUIRED WITH NORMAL USE. IF NECESSARY, USE NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N). NORMAL/GENERAL DILUTION VENTILATION IS ACCEPTABLE.

Protective Gloves: NONE REQUIRED W/NORMAL USE. (SUPP DATA)

Eye Protection: NONE REQUIRED W/NORMAL USE. (SUPP DATA)

Other Protective Equipment: NONE NECESSARY UNDER NORMAL USE.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: FIRE FIGHT PROC: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N). PROT GLOVES: RUBBER, NEOPRENE GLOVES SHOULD BE USED FOR PROLONGED DIRECT CONTACT. EYE PROT: IF A SPLASH IS LIKELY, CHEMICAL WORKERS GOGGLES MAY BE NEEDED.

=====
Transportation Data
=====

Trans Data Review Date: 91339

DOT PSN Code: GJL

DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.

DOT Class: 3

DOT ID Number: UN1993

DOT Pack Group: III

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: HIA

IMO Proper Shipping Name: FLAMMAELE LIQUID, N.O.S. o

IMO Regulations Page Number: 3345

IMO UN Number: 1993

IMO UN Class: 3.3

IMO Subsidiary Risk Label: -

IATA PSN Code: MCA

IATA UN ID Number: 1993

IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *

IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID

AFI PSN Code: MCA

AFI Prop. Shipping Name: FLAMMABLE LIQUIDS, N.O.S.

AFI Class: 3

AFI ID Number: UN1993

AFI Pack Group: III

AFI Basic Pac Ref: 7-7

=====
Disposal Data
=====

=====
Label Data
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Label Required: P

Technical Review Date: 23SEP91

Label Date: 23SEP91

Label Status: G

Common Name: DAWN LIQUID DISHWASHING DETERGENT

Chronic Hazard: NO

Signal Word: CAUTION!

Acute Health Hazard-Slight: X

Contact Hazard-Slight: X

Fire Hazard-Slight: X

Reactivity Hazard-Slight: X

Special Hazard Precautions: ACUTE: MAY CAUSE MILD TRANSIENT EYE AND SKIN IRRITATION. AVOID CONTACT WITH EYES, SKIN, AND CLOTHING. WASH THOROUGHLY AFTER HANDLING. DO NOT MIX WITH CHLORINE BLEACH, AS HAZARDOUS FUMES MAY RESULT. CHRONIC: NONE LISTED BY MANUFACTURER.

Protect Eye: Y

Protect Skin: Y

Label Name: PROCTER & GAMBLE

Label Street: 301 E SIXTH ST

Label P.O. Box: 599

Label City: CINCINNATI

Label State: OH

Label Zip Code: 45201

Label Country: US

Label Emergency Number: 800-543-0485

APPENDIX A
Historical and Existing NPDES Outfall Status Summary

APPENDIX A
Historical and Existing Outfall Status

Outfall ID No.	TA	Building	Watershed	Status
Outfalls to be Re-Permitted in 2012				
01A001	3	22	Sandia	Re-Permit 2012
13S	46	347	Canada del Buey	Re-Permit (Potential No Flow Outfall)
051	50	1	Mortandad	Re-Permit 2012
03A022	3	66	Mortandad	Re-Permit (Potential No Flow Outfall)
03A027	3	2327	Sandia	Re-Permit 2012
03A048	53	964, 979	Los Alamos	Re-Permit 2012
03A113	53	293, 952	Sandia	Re-Permit 2012
03A160	3	124	Mortandad	Re-Permit 2012
03A181	55	6	Mortandad	Re-Permit 2012
03A199	3	1837	Sandia	Re-Permit 2012
05A055	16	1508	Canyon de Valle	Re-Permit (Potential No Flow Outfall)
Historical Outfalls Removed from the Permit				
01S	3		Sandia	Prior to 95
02S	9		Pajarito	Prior to 94
01A 002	3	22		Combined with 001
03S	16		Water	Prior to 94
01A 003	3	22		Combined with 001
04S	18		Pajarito	Prior to 94
01A 004	3	22		Combined with 001
05S	21	STP	Los Alamos	3/10/1998
01A 005	3	22		Combined with 001
06S	41	STP		Prior to 94
02A 006	21	357		Eliminated
07S	46		Canada del Buey	Prior to 94
02A 007	16	540	Valle	5/15/1998
08S	48	5		Combined with 10S
02A 008	22	6		Eliminated 6/84
09S	53		Los Alamos	Prior to 94
03A 009	3	102	Two Mile	7/31/1996

Outfall ID No.	TA	Building	Watershed	Status
10S	35		Mortandad	Deleted Prior to 94
04A 010	3	105		Eliminated 4/87
11S	8	9		Combined with 02S
04A 011	22	5		Eliminated 4/87
12S	46		Canada del Buey	Prior to 94
04A 012	35	67		Eliminated 4/87
04A 013	46	30	Canada del Buey	Deleted 12/6/1995
04A 014	46	88	Canada del Buey	Deleted 7/11/1995
04A 015	48	1		Combined with 045
04A 016	48	1	Mortandad	Deleted 9/19/1997
04A 017	53	2		Combined with 114
04A 018	46	24, 59, 76	Canada del Buey	Deleted 12/6/1995
03A 019	2	44		Eliminated 5/16/90
03A 020	2	49	Los Alamos	Deleted 7/11/1995
03A 021	3	29	Mortandad	October 2011
03A 023	3	163, 287	Sandia	Deleted 7/11/1995
03A 024	3	187	Sandia	Request deletion 8-04
03A 025	3	208	Two Mile	Deleted 7/20/1998
03A 026	3	208		Combined with 025
03A 028	15	185, 202	Water	Deleted August 2007
03A 029	16	340		Combined with 054
03A 030	21	2		Eliminated 4/87
03A 031	21	143	Los Alamos	Deleted 7/11/1995
03A 032	21	150	Los Alamos	Deleted 7/31/1996
03A 033	21	152	Los Alamos	Deleted 3/1/1986
03A 034	21	166, 167	Los Alamos	Deleted 9/19/1997
03A 035	21	210	Los Alamos	Deleted 9/19/1997
03A 036	21	152, 155, 220	Los Alamos	Deleted 9/19/1997
03A 037	21	314	Los Alamos	Deleted 7/31/1996
03A 038	33	114	Chaquehi	Deleted 9/19/1997
03A 039	35	33		Eliminated
03A 040	43	1	Los Alamos	Deleted 1/11/1999

Outfall ID No.	TA	Building	Watershed	Status
03A 041	43	1		Combined with 040
03A 042	46	1	Canada del Buey	Deleted 3/10/1998
03A 043	46	31	Canada del Buey	Deleted 7/31/1996
03A 044	46	86		Eliminated 4/87
03A 045	48	1	Mortandad	Deleted 12/6/1999
03A 046	48	1		Combined with 045
03A 047	53	60	Los Alamos	Request deletion 8-04
03A 049	53	64	Los Alamos	Request deletion 8-04
03A158	21	209	Los Alamos	Deleted August 2007
50	21	257	Los Alamos	Last DMR 6/65
05A 052	16	380	Water	Deleted Prior to 94
05A 053	16	410	Water	Deleted 1/14/1998
05A 054	16	340	Valle	Deleted 7/20/1998
05A 056	16	260	Valle	Deleted 1/14/1998
05A 057	16	265,267	Valle	Prior to 94
05A 058	16	300-306	Water	Deleted 7/31/1996
04A 059	16	460		Combined with 072
03A 060	16	430	Water	Deleted 7/31/1996
05A 061	16	280	Valle	Deleted 7/31/1996
05A 062	16	342	Valle	Deleted 7/31/1996
05A 063	16	400	Water	Deleted 12/5/1995
05A 064	22	34	Pajarito	Eliminated
05A 065	22	1	Pajarito	Eliminated
05A 066	9A	21, 28, 29, 32, 33, 34, 35, 37, 38, 40	Valle	Deleted 3/10/1998
05A 067	9B	41, 42, 43, 45, 46	Valle	Deleted 3/10/1998
05A 068	9	48	Valle	Deleted 3/10/1998
05A 069	11	50	Water	Deleted 5/15/1998
04A 070	16	220	Valle	Deleted 9/19/1997
05A 071	16	430	Water	Deleted 3/10/1998
05A 072	16	460	Water	Deleted 9/19/1997

Outfall ID No.	TA	Building	Watershed	Status
06A 073	16	222	Valle	Deleted 1/14/1998
06A 074	8	22	Valle	Deleted 9/19/1997
06A 075	8	21	Valle	Deleted 1/14/1998
04A 076	8	70	Valle	Combined with 115
06A 077	22	52	Pajarito	Eliminated
06A 078	22	34	Pajarito	Deleted 7/31/1996
06A 079	40	4	Pajarito	Deleted 5/15/1998
06A 080	40	5	Pajarito	Deleted 5/15/1998
06A 081	40	8	Pajarito	Deleted 3/10/1998
06A 082	40	12	Pajarito	Deleted 1/14/1998
04A 083	16	202	Water	Deleted 9/19/1997
04A 084	22	5		Eliminated 4/87
04A 085	22	6		Eliminated
04A 086	3	216		Eliminated 4/87
04A 087	35	46		Eliminated 4/87
04A 088	35	67		Eliminated 4/87
04A 089	35	34		Eliminated
04A 090	35	85		Eliminated 4/87
04A 091	16	450	Water	Deleted 9/19/1997
04A 092	16	370	Water	Deleted 1/14/1998
04A 093	15	203	Valle	Deleted Prior to 94
04A 094	3	170	Sandia	9/19/1997
95	3	170		Eliminated 4/87
05A 096	11	51	Valle	Deleted 5/15/1998
05A 097	11	52	Water	Request deletion 8-04
03A 098	59	1	Two Mile	Deleted 12/6/1995
06A 099	40	23	Pajarito	Deleted 9/19/1997
06A 100	40	15	Pajarito	Deleted 5/15/1998
04A 101	40	9	Pajarito	Deleted 9/19/1997
04A 102	1	40		Eliminated 6/25/91
04A 103	15	40		Eliminated 6/25/91
06A 104	18	30, 31		Eliminated 4/87

Outfall ID No.	TA	Building	Watershed	Status
04A 105	15	138		Eliminated
06A 106	36	1	Three Mile	Deleted 1/11/1999
02A 108	0			Eliminated
07A 109	3	73	Sandia	Deleted 8/4/1995
04A 110	3	73		Eliminated 2/89
04A 111	52	1		Eliminated 4/87
04A 112	52	11		Eliminated 4/87
03A 114	53	2	Sandia	Deleted 7/11/1995
04A 115	8	70	Valle	Deleted 9/19/1997
04A 116	35	29		Eliminated 4/87
04A 117	46	41	Canada del Buey	Deleted 7/11/1995
04A 118	Paj #4		Canada del Buey	Deleted 10/13/1999
04A 119	Paj #5			Eliminated 4/87
120	3		discharge	Eliminated
04A 121	15	263		Eliminated 4/87
04A 122	15	45		Eliminated 4/87
06A 123	15	R183	Valle	Deleted 1/14/1998
03A 124	46	169	Canada del Buey	Deleted 12/6/1995
03A 125	53	28	Sandia	Deleted 7/20/1998
04A 126	48	8	Mortandad	Deleted 12/6/1995
04A 127	35	213	Mortandad	Deleted 9/19/1997
128	22	91	Two Mile	Deleted 12/5/1995
02A 129	21	357	Los Alamos	Deleted October 2011
03A 130	11	30	Water	Deleted October 2011
04A 131	48	1	Mortandad	Deleted 1/14/1998
06A 132	35	87	Mortandad	Deleted 3/10/1998
04A 133	53	19	Sandia	Eliminated
04A 134	16	478		Eliminated 5/16/90
04A 135	53	18	Sandia	Deleted 8/16/1995
03A 136	46	200	Canada del Buey	Deleted 12/6/1995
04A 176	Guaje # 6		Rendija	Deleted 8/23/1999
04A 177	Guaje Booster 1		Guaje	Deleted 10/13/1999

Outfall ID No.	TA	Building	Watershed	Status
04A 178	LA Booster 1		Los Alamos	Prior to 94
04A 179	Paj.		Water blwdwn	
03A 180	43	44	Los Alamos	Deleted 7/11/1995
04A 182	21	1003	Los Alamos	Deleted 5/15/1998
06A 183	3	510	Sandia	Deleted 8/16/1995
03A 184	53	17	Sandia	Deleted 8/16/1995
03A 185	15 (DARHT)	312	Water	Deleted October 2011
04A 186	Otowi #4		Los Alamos	Deleted 10/13/1999

APPENDIX B
Notice of Changed Condition/Planned Changes
(August 2007 – September 2011)

APPENDIX B
Notices of Changed Conditions and/or Planned Changes (August 2007 – September 2011)

Outfall ID No.	Document No.	Title	Date	Description
Outfall 001, Power/Steam Plant				
001	ENV-RCRA-07-118	Notice of Changed Condition at NPDES Outfall 001, NPDES Permit No. NM0028355	May 22, 2007	Steam condensate leaking from a return line is being trucked from TA-43-1 HRL to a TA-3 Power Plant Cooling Tower Basin. Condensate is being trucked in order to prevent discharge to Los Alamos Canyon.
001	ENV-RCRA-08-022	Notice of Changed Condition at NPDES Outfall 001, NPDES Permit No. NM0028355	January 24, 2008	Temporary by-pass of secondary environmental tank to remove obstruction in effluent line.
001	ENV-RCRA-09-171	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Changed Condition at the TA-3 Power Plant and Sanitary Effluent Recycling Facility.	September 16, 2009	New connection from the SERF into the TA-3 Power Plant to allow for SERF effluent to be used by the power plant boilers.
001	ENV-RCRA-10-007	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Changed Condition at NPDES Outfall 001	January 19, 2010	Permanently re-routing boiler blow down, reverse osmosis reject, and de-mineralizer regeneration waste water directly to an off-line cooling tower basin (south basin) designated as TA-03-58 to meet the future temperature limit at Outfall 001.
001	ENV-RCRA-10-109	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 001.	June 15, 2010	Boiler blow down will be diverted from the boiler blow down tank to a heat exchanger to drop the temperature prior to discharge into the sanitary collection system. Additionally from 3 – 4 months during the summer season the RO reject stream will be diverted to the SWWS plant. During the remaining months of the year the RO reject stream will be diverted back to the power plant and discharged into manhole B where the stream will flow directly to NPDES outfall 001.

Outfall ID No.	Document No.	Title	Date	Description
Outfall 13S, Sanitary Waste Water System (SWWS) Treatment Facility				
13S	ENV-RCRA-09-0092	Notice of Changed Condition at NPDES Outfall 13S, NPDES Permit No. NM0028355	May 28, 2009	Lift station from Los Alamos County Transfer Station was shut down to allow for proper characterization of non-sanitary waste water being discharged from the station to SWWS.
13S	ENV-RCRA-10-099	Los Alamos national Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 13S	June 1, 2010	Start of a pilot study to determine benefits of feeding glycerin at the head works of SWWS to create a more robust microorganism population for plant operations.
13S	ENV-RCRA-11-0106	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 13S	June 14, 2011	Permanent use of glycerin at the head works of SWWS to create a more robust microorganism population for plant operations.
Outfall 051, Radioactive Liquid Waste Treatment Facility (RLWTF)				
051	ENV-RCRA-07-097	Notice of Changed Condition at NPDES Outfall 051, NPDES Permit No. NM0028355	May 14, 2007	Plans to construct three new concrete evaporation tanks at TA-52 to receive fully treated RLW form the RLWTF (i.e., Zero Liquid Discharge (ZLD) Project).
051	ENV-DO-08-009	Notice of Planned Change at NPDES Outfall 051, NPDES Permit No. NM 0028355	May 6, 2008	Installing a pilot-scale ion exchange equipment to polish waters that have been processed through all existing treatment steps.
051	ENV-RCRA-09-103	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Changed Condition at NPDES Outfall 051	June 10, 2009	Transfer of approximately 20,000 gallons of treated waste water from the RLWTF to the TA-53 RLW basins for evaporation.
051	ENV-RCRA-09-197	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	October 30, 2009	Transfer of approximately 200,000 gallons of treated wastewater from the TA-50 RLWTF to the TA-53 RLW tanks for evaporation.
051	ENV-RCRA-10-002	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at	January 4, 2010	Discharge of elevated tritium water to the tanks at TA-53.

Outfall ID No.	Document No.	Title	Date	Description
		NPDES Outfall 051		
051	ENV-RCRA-10-104	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	June 3, 2010	<ul style="list-style-type: none"> Bench-scale column testing of IX and adsorption media to remove copper and zinc. A full-scale IX system has been installed at the RLWTF and will be approved for operation by June 11, 2010.
051	ENV-RCRA-10-162	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	August 19, 2010	<ul style="list-style-type: none"> A double contained pipe will be installed from the effluent tanks to both the existing cooling towers associated with the waste evaporator. The blow down from the cooling tower and over flow lines from the cooling towers will be routed for reprocessing. Alternatives are currently being evaluated to procure a trailer mounted evaporation system for effluent water.
051	ENV-RCRA-10-175	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	September 16, 2010	<ul style="list-style-type: none"> A new 1,000 gallon polymeric tank will be installed in Room 38 of the RLWTF to receive water treated for copper/zinc removal through the ion exchange media effluent water (TK-38). RLWTF effluent waters that are not within discharge limits to the outfall may need to be stored in the TA-50-250 WMRM facility tanks.
051	ENV-RCRA-10-239	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	December 9, 2010	RLWTF plans to add hardness to the facility effluent waters. Hardness will be added by the addition of soluble calcium and/or magnesium salts to the RLWTF process water or effluent water. The purpose is to reduce the toxicity of copper and zinc to the <i>Daphnia Pulex</i> organism.
051	ENV-RCRA-11-0027	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	February 23, 2011	<ul style="list-style-type: none"> Installing pipes and components to bypass the existing RLWTF gravity sand filter and tubular ultra-filter and replace the bypassed treatment processes with a pressure media filtration and cartridge filtration capability. The secondary RO unit and associated reject tank have been removed from the treatment system. The RLWTF will initiate the use of magnesium hydroxide instead of calcium hydroxide in the facility's treatment

Outfall ID No.	Document No.	Title	Date	Description
				system clarifier
051	ENV-RCRA-11-0034	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Supplemental Information for Notice of Planned Change for the Addition of Hardness to Outfall 051 Effluent	February 23, 2011	The enclosed report is an evaluation of how hardness contributes to the whole effluent toxicity of Outfall 051 effluent.
051	ENV-RCRA-11-0204	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 051	September 28, 2011	<ul style="list-style-type: none"> • The treatment process will be modified to bypass the perchlorate ion exchange treatment process when treated water will be evaporated. The treatment process will include ion exchange for perchlorate when the water will be discharged to Outfall 051. • A Secondary RO Unit will be added to the treatment process to replace the existing waste evaporator. The Secondary RO Unit will generate two streams. The concentrate stream will be the equivalent of the evaporator bottoms and will be shipped offsite for treatment and disposal as LLW. The permeate stream will be the equivalent of evaporator overheads and will be re-treated through the LLW treatment plant. • The ZLD Project design has been updated to include two concrete tanks with HDPE liners that will be installed at TA52 to be used as solar evaporation of the treated effluent from the RLWTF. This project will include a length of buried transfer piping that will connect the RLWTF to the tanks which be located approximately 2/3 mile from the RLWTF.
Outfall 03A022				
03A022	ENV-RCRA-10-0110	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfalls 03A022 and 03A160.	June 2, 2010	Added ion exchange to reduce copper (Cu) in the blow down prior to discharge to the outfall.

Outfall ID No.	Document No.	Title	Date	Description
03A022	ENV-RCRA-11-0268	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfall 03A022	December 6, 2011	The Cooling Tower blow down from the cooling tower at TA-3-66 has been connected to SWWS per the long term solution as reported in the October 2011 NPDES quarterly report. The IX treated system will be removed but the holding tanks will remain in place.
Outfall 03A027				
None				
Outfall 03A048				
None				
Outfall 03A113				
None				
Outfall 03A160				
03A160	ENV-RCRA-10-0110	Los Alamos National Laboratory, NPDES Permit No. NM0028355, Notice of Planned Change at NPDES Outfalls 03A022 and 03A160.	June 2, 2010	Added ion exchange to reduce copper (Cu) in the blow down prior to discharge to the outfall.
Outfall 03A181				
None				
Outfall 03A199				
None				
Outfall 05A055				
None				



Environmental Protection Division
Water Quality & RCRA (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: May 22, 2007
Refer To: ENV-RCRA: 07-118
LA-UR: 07-3506

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**SUBJECT: NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 001,
NPDES PERMIT NO. NM0028355**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification regarding the transfer of steam condensate from a leaking condensate return line from Technical Area 43 Building 1 (TA-43-1) to an off-line cooling tower basin (TA-03-58) at the Laboratory's Power Plant. The condensate return line coming from TA-43-1 is badly corroded and currently out of service. Waste water from the cooling tower basin discharges to NPDES Outfall 001.

Steam condensate is transferred via tanker truck to prevent leaking condensate from reaching the Los Alamos Canyon watercourse. Normally, return condensate is routed to the Power Plant for treatment in the primary and secondary environmental tanks. The cooling tower basin will serve as a comparable holding tank where condensate is monitored for pH, TSS, and conductivity prior to batch discharge to Outfall 001. This condition will remain in effect until an alternate method of steam supply to TA-43 Building 1 has been identified and put in service.

Please contact Marc Bailey of the Laboratory's Water Quality and RCRA Group (ENV-RCRA) at (505) 665-8135, if you have any questions.

Sincerely,

Anthony R. Grieggs
Group Leader
Water Quality & RCRA (ENV-RCRA) Group

ARG/MB:tag

Cy:

Isaac Chen, USEPA, Region VI, Dallas, TX
Marcy Leavitt, NMED/SWQB, Santa Fe, NM
Robert George, NMED/GWQB, Santa Fe, NM
Gene Turner, DOE/LASO, MS A316
Richard V. Bynum, PADOPS, MS A102
Richard S. Watkins, ADESHQ, MS K491
Victoria George, ENV-DO, MS J978
Mike Saladen, ENV-RCRA, MS K490
Bob Beers, ENV-RCRA, MS K490
Marc Bailey, ENV-RCRA, MS K490
David Padilla, FM-UI, MS K718
Jerome Gonzales, FM-UI, MS K718
Phil Wardwell, LC-ESH, MS A187
ENV-RCRA File, MS K490
IRM-RMMSO, MS A150



*Environmental Protection Division
Water Quality & RCRA (ENV-RCRA)*

P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: January 24, 2008
Refer To: ENV-RCRA-08-022
LAUR: 08-0363

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Ms. Hall:

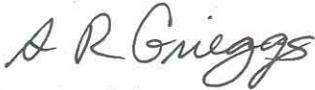
**SUBJECT: NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 001,
NPDES PERMIT NO. NM0028355**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification regarding the temporary re-routing of boiler blowdown, reverse osmosis reject, and demineralizer regeneration wastewater from the secondary environmental tank to an off-line cooling tower basin designated as TA-03-58 (See Enclosure 1).

This temporary re-route is necessary to assess and repair the secondary environmental tank piping. A plastic water sample bottle was accidentally dropped into the tank and could not be recovered. Within a few days, the flow rate from the secondary environmental tank's effluent line had been reduced to approximately half the normal rate. It is suspected that the sample bottle has created a blockage in the 4" effluent line. The secondary environmental tank needs to be drained in order to assess and remove the blockage in the line. The cooling tower basin will serve as a comparable holding tank where condensate is monitored for pH, TSS, and conductivity prior to batch discharge to Outfall 001. This condition will remain in effect until the flow rate through the effluent line has been restored to normal. The Laboratory will notify EPA upon completion of these corrective actions.

Please contact Marc Bailey at (505) 665-8135, of the Water Quality and RCRA Group (ENV-RCRA), if you have any questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)

ARG:MB/lm

Enclosure: a/s

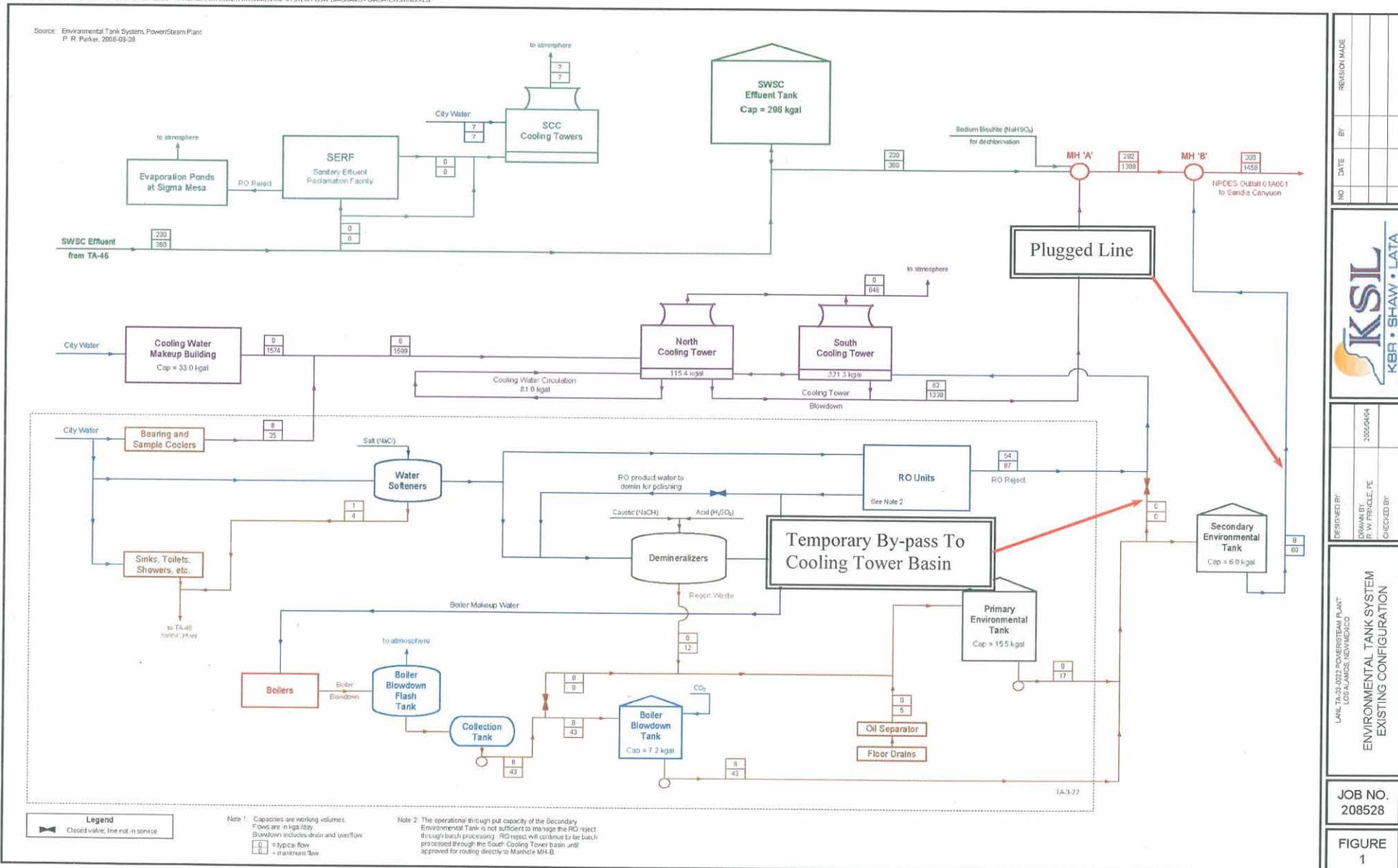
Cy: Isaac Chen, USEPA, Region VI, Dallas, TX, w/enc.
Marcy Leavitt, NMED/SWQB, Santa Fe, NM, w/enc.
Robert George, NMED/GWQB, Santa Fe, NM, w/enc.
Gene Turner, LASO-EO, w/o enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
Richard S. Watkins, ADESHQ, w/o enc., K491
Tori George, ENV-DO, w/o enc., J978
Mike Saladen, ENV-RCRA, w/o enc., K490
Bob Beers, ENV-RCRA, w/enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
Andy Erickson, FWO-UI, w/o enc., K718
Terrill Lemke, ENV-RCRA, w/o enc., K490
Phil Wardwell, LC-LESH, w/o enc., A187
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

LOS ALAMOS NATIONAL LABORATORY TA-3 POWER PLANT FLOW DIAGRAM JANUARY 22, 2008

FILE NAME: Z:\FEMA_1\A-03-0027\RO REJECT WATER PURWAINES ENVIRONMENTAL SYSTEM FLOW DIAGRAMS - DADR-EXISTING.XLS

Source: Environmental Tank System, PowerSteam Plant
P. R. Parker, 2006-09-28



NO.	DATE	BY	REVISION MADE

DESIGNED BY:
 DRAWN BY: P. W. FRIDDLE, PE
 CHECKED BY:
 20080604

KSIL
 KBR • SHAW • LATA

LAL TA-03-0027 POWERSTEAM PLANT
 LOS ALAMOS, NEW MEXICO
**ENVIRONMENTAL TANK SYSTEM
 EXISTING CONFIGURATION**

JOB NO.
 208528

FIGURE
 1



*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
P.O. Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

*National Nuclear Security Administration
Los Alamos Site Office, A316*
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-7203/FAX (505) 667-5948

Date: September 16, 2009
Refer To: ENV-RCRA-09-171
LAUR: 09-06028

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355,
NOTICE OF CHANGED CONDITION AT THE TA-3 POWER PLANT AND
SANITARY EFFLUENT RECYCLING FACILITY**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Los Alamos National Laboratory requires the permittees to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) are providing written notification regarding a new connection from the Sanitary Effluent Recycle Facility (SERF) into the TA-3 Power Plant. This project will allow a portion of the SERF product water to be used by the Power Plant's boilers while reducing consumption of potable water. Enclosed for your review is the most current TA-3 Power Plant treatment schematic (see Enclosure 1).

Additionally, NNSA/LANS are planning to conduct a functional test run of the SERF facility starting September 21, 2009. The test run will encompass an estimated 10 working days over a two-week period and operate approximately 4-6 hours per day. The LANS Water Quality and RCRA Group will be collecting operational sampling and chemical analysis at various points within the SERF unit operations/treatment train to determine the efficacy of PCB removal via a given unit operation (precipitation, microfiltration, reverse osmosis).

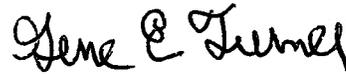
Please contact Marc Bailey at (505) 665-8135 or Gene Turner at (505) 667-5794 if you have questions regarding this notice.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group
Los Alamos National Laboratory

Sincerely,



Gene E. Turner
Environmental Permitting
Environmental Operations
Los Alamos Site Office

AD:GT:MS/lm

Enclosure: a/s

Cy: Isaac Chen, USEPA/Region VI, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
Isaac Valdez, LASO-NSM, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
Chris Cantwell, ADESHQ, w/o enc., K491
Andrew Erickson, UI-DO, w/enc., K760
Charlie Barnett, UI-DO, w/enc., J972
Richard Nelson, CM-DO, w/enc., K718
Mark Trujillo, ES-SE, w/enc., K718
Robert Wingo, C-CDE, w/enc., J964
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-DO File, w/o enc., J978
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150



*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
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(505) 667-0666/FAX: (505) 667-5224

*National Nuclear Security Administration
Los Alamos Site Office, A316*
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-7203/FAX (505) 667-5948

Date: January 19, 2010
Refer To: ENV-RCRA-10-007
LAUR: 10-00157

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance and Assurance Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355,
NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 001**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Los Alamos National Laboratory (LANL) requires the permittees to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the LANL NPDES Permit, the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) are providing written notification regarding permanently re-routing boiler blowdown, reverse osmosis reject, and demineralizer regeneration wastewater directly to an off-line cooling tower basin (south basin) designated as TA-03-58 (See Enclosure 1).

The current Laboratory's NPDES permit requires NNSA/LANS to meet a new temperature effluent limit at Outfall 001 by August 1, 2010. In the existing configuration, the secondary environmental tank is not capable of enhancing any type of cooling due to its small size (6,000-gallon capacity). Additionally, the fiberglass construction acts as a heat sink during hot summer months. The south cooling tower basin will be utilized to enhance cooling beginning in June 2010. It is anticipated that the cooling tower structure above the basin will provide shade and assist in the cooling process during the hottest summer months when effluent temperatures have historically approached or exceeded the future limit. Currently the secondary environmental tank is used as operational monitoring (i.e. pH and TSS) prior to discharge to Outfall 001.

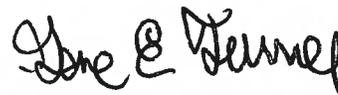
These parameters in addition to temperature will be monitored at the south basin once the re-route is completed. The secondary environmental tank will no longer be needed and will be taken out of service.

Please contact Marc Bailey at (505) 665-8135 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,

Sincerely,


for Anthony R. Grieggs



Group Leader
Water Quality & RCRA Group
Los Alamos National Security, LLC

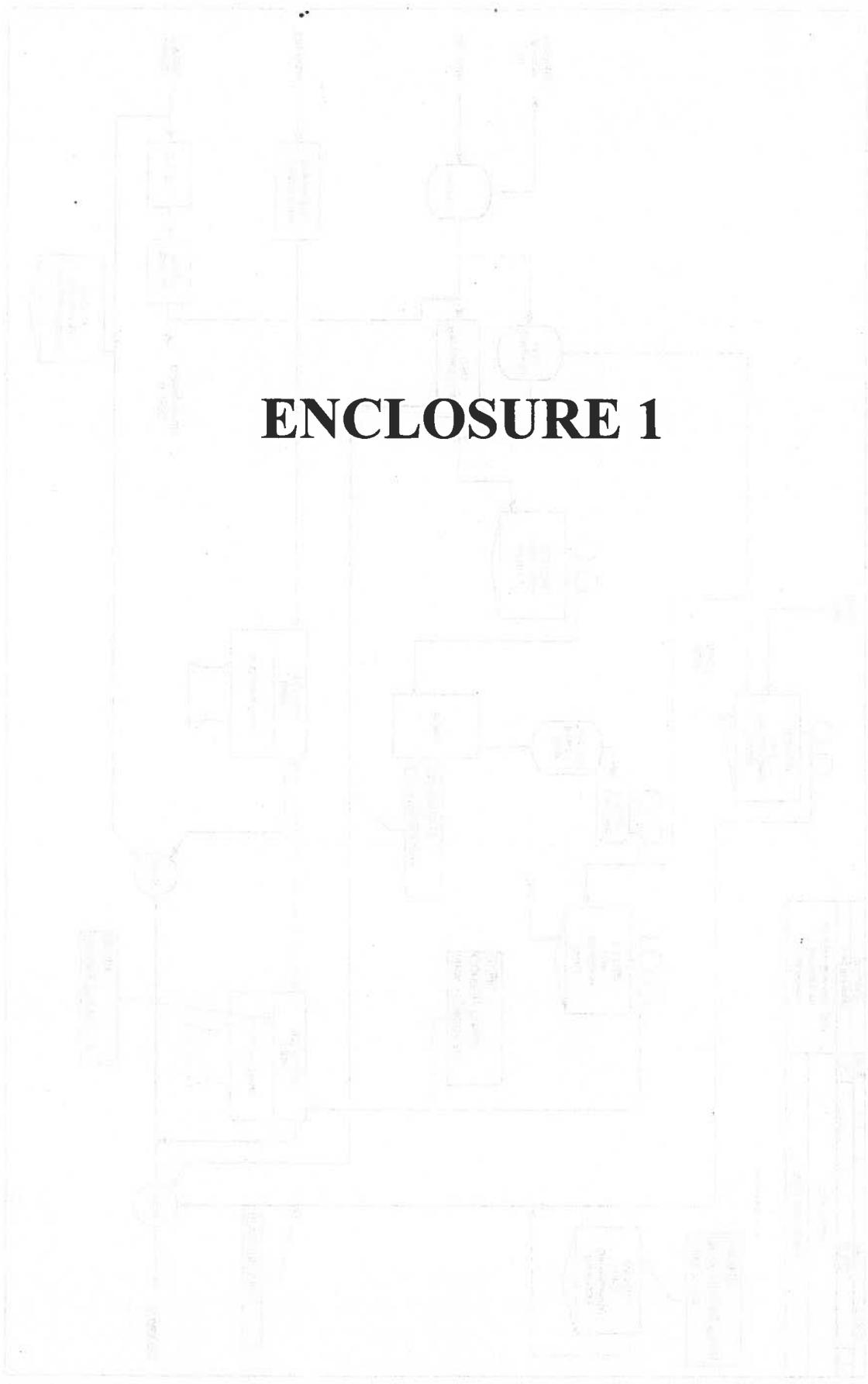
Gene E. Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

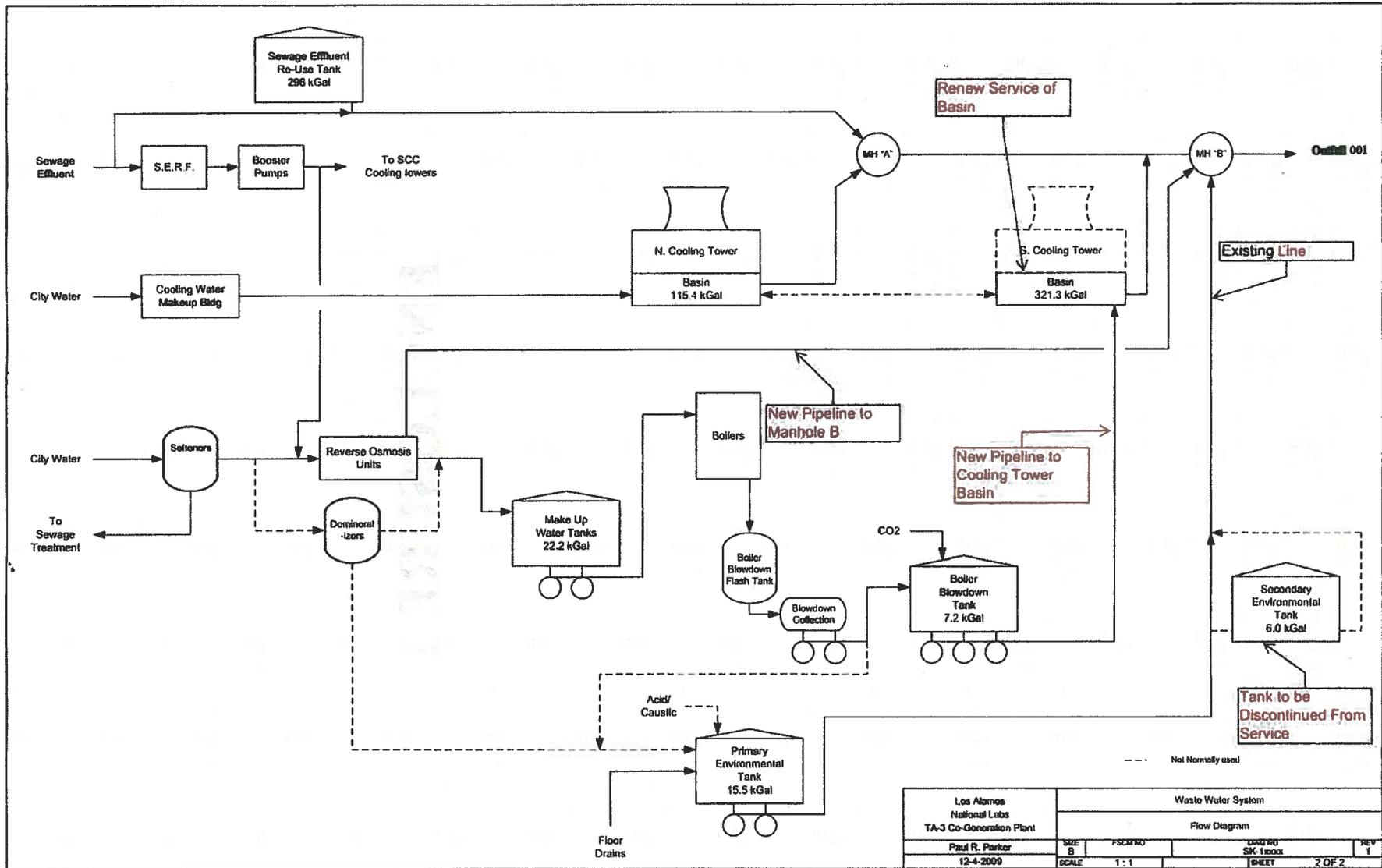
ARG:GET/lm

Enclosure: a/s

Cy: Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Bill Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
Thomas Skibitski, NMED/DOE/OB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M893
Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Andrew Erickson, UI-DO, w/o enc., K760
Lawrence Chavez, UI-DO, w/o enc., K760
Gary Blauert, ES-UI, w/o enc., K718
Paul Parker, ES-UI w/o enc., K762
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1







Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: June 15, 2010
Refer To: ENV-RCRA-10-109
LAUR: 10-03720

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Hall:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 001

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

Enclosed for your review is the treatment schematic for two changes that are being made to the boiler blow-down and Reverse Osmosis (RO) reject waste streams at the Laboratory's TA-3-22 Power Plant (See Enclosure 1). Boiler blow-down will be diverted from the boiler blow-down tank to a heat exchanger to drop the temperature from 200 degrees Fahrenheit (F) to 140 degrees F. Blow-down will then be discharged into the sanitary collection system to the TA-46 Sanitary Wastewater System (SWWS) Plant. Additionally, for three to four months during the summer season, the RO reject stream will be diverted to the SWWS Plant. During the remaining months of the year, the RO reject stream will be diverted back to the Power Plant and discharged into Manhole "B" where the stream will flow directly through NPDES Outfall 001.

NNSA/LANS will continue to keep the option of discharging boiler blow-down into the south cooling tower basin to reduce effluent temperature as documented in "*The Notice of Changed Condition at NPDES Outfall 001* (ENV-RCRA-10-007), dated January 19, 2010 (See Enclosure 2). However, the secondary environmental tank will not be taken out of service as previously documented in the January 19th notification. Additionally, on selective occasions, due to demineralizer operation, the secondary environmental tank will be required to operate in batch mode.

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality & RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



FOR

Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



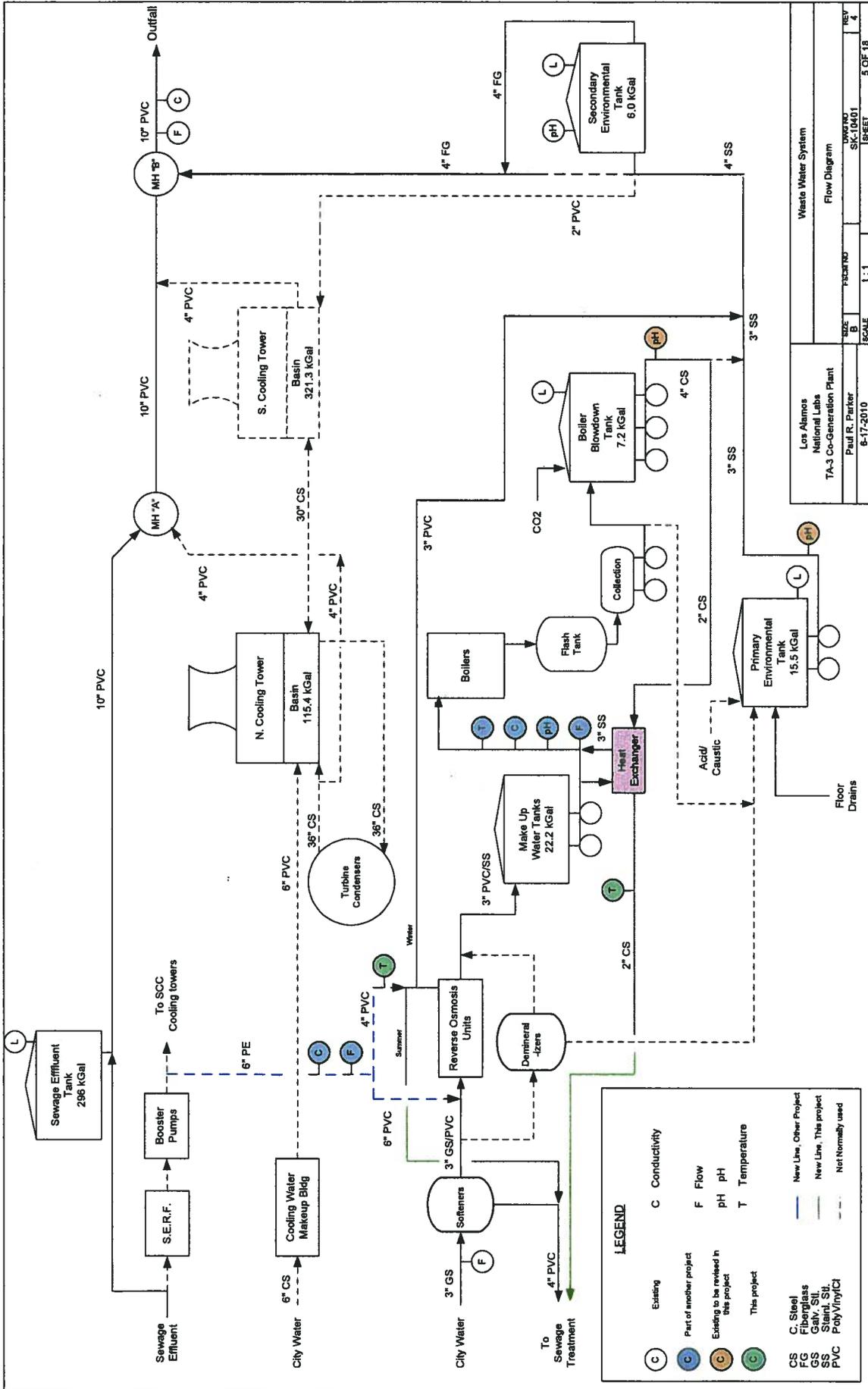
Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosures: a/s

Cy: Willie Lane, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EPO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Andy Erickson, UI-DO, w/o enc., K760
Charlie Barnett, UI-DO, w/enc., J972
Robert Wingo, C-CDE, w/enc., J964
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
Bob Beers, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1



LEGEND

(C)	Existing	(C)	Conductivity
(F)	Part of another project	(F)	Flow
(G)	Existing to be revised in this project	(pH)	pH
(T)	This project	(T)	Temperature
CS	C. Steel	---	New Line, Other Project
FG	Fiberglass	---	New Line, This project
GS	Galv. Stl.	---	Not Normally used
SS	Stainless		
PVC	PolyVinylCl		

Los Alamos National Labs		TA-3 Co-Generation Plant
Paul R. Parker		6-17-2010
SIZE	B	WORKNO
SCALE	1 : 1	SK-10401
REV	4	5 OF 18

Waste Water System
Flow Diagram

ENCLOSURE 2



*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
P.O. Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

*National Nuclear Security Administration
Los Alamos Site Office, A316*
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-7203/FAX (505) 667-5948

Date: January 19, 2010
Refer To: ENV-RCRA-10-007
LAUR: 10-00157

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance and Assurance Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355,
NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 001**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Los Alamos National Laboratory (LANL) requires the permittees to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the LANL NPDES Permit, the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) are providing written notification regarding permanently re-routing boiler blowdown, reverse osmosis reject, and demineralizer regeneration wastewater directly to an off-line cooling tower basin (south basin) designated as TA-03-58 (See Enclosure 1).

The current Laboratory's NPDES permit requires NNSA/LANS to meet a new temperature effluent limit at Outfall 001 by August 1, 2010. In the existing configuration, the secondary environmental tank is not capable of enhancing any type of cooling due to its small size (6,000-gallon capacity). Additionally, the fiberglass construction acts as a heat sink during hot summer months. The south cooling tower basin will be utilized to enhance cooling beginning in June 2010. It is anticipated that the cooling tower structure above the basin will provide shade and assist in the cooling process during the hottest summer months when effluent temperatures have historically approached or exceeded the future limit. Currently the secondary environmental tank is used as operational monitoring (i.e. pH and TSS) prior to discharge to Outfall 001.

These parameters in addition to temperature will be monitored at the south basin once the re-route is completed. The secondary environmental tank will no longer be needed and will be taken out of service.

Please contact Marc Bailey at (505) 665-8135 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



for Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group
Los Alamos National Security, LLC

ARG:GET/lm

Enclosure: a/s

Cy: Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Bill Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
Thomas Skibitski, NMED/DOE/OB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M893
Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Andrew Erickson, UI-DO, w/o enc., K760
Lawrence Chavez, UI-DO, w/o enc., K760
Gary Blauert, ES-UI, w/o enc., K718
Paul Parker, ES-UI w/o enc., K762
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

Sincerely,



Gene E. Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration



Environmental Protection Division
Water Quality & RCRA (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: May 28, 2009
Refer To: ENV-RCRA: 09-0092
LA-UR: 09-03388

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

**SUBJECT: NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 13S,
NPDES PERMIT NO. NM0028355**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification regarding additional waste streams entering the sanitary collection system for treatment prior to discharge through NPDES Outfall 13S. This information was not included with the Laboratory's NPDES Permit Re-application (August 2004).

On May 22, 2009, it was determined that there may be an issue with non-sanitary wastewater from the new Los Alamos County Transfer Station Facility into the Laboratory's Sanitary Wastewater System (SWWS) collection system. This facility has been in operation since March 23, 2009. Waste streams at the Transfer Station (See Enclosures 1 and 2) include administration building sanitary facilities (approximately 2125 gallons per week), a truck washing station (660 gallons per week), roof drains (2800 gallons per week during monsoon season), and a trench drain located inside the high bays (*de minimus*). Due to the non-sanitary waste streams, the lift station that receives wastewater from the Los Alamos County Transfer Station was shut off to allow proper characterization of the contents to ensure compliance with the Laboratory's NPDES Permit and SWWS' Waste Acceptance Criteria. EPA Form 2C analytes have been collected and the results will be evaluated for their acceptability into the sanitary collection system. The analytical results will be forwarded to you, upon receipt.

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 if you have questions regarding this notice.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)

ARG:MS/tav

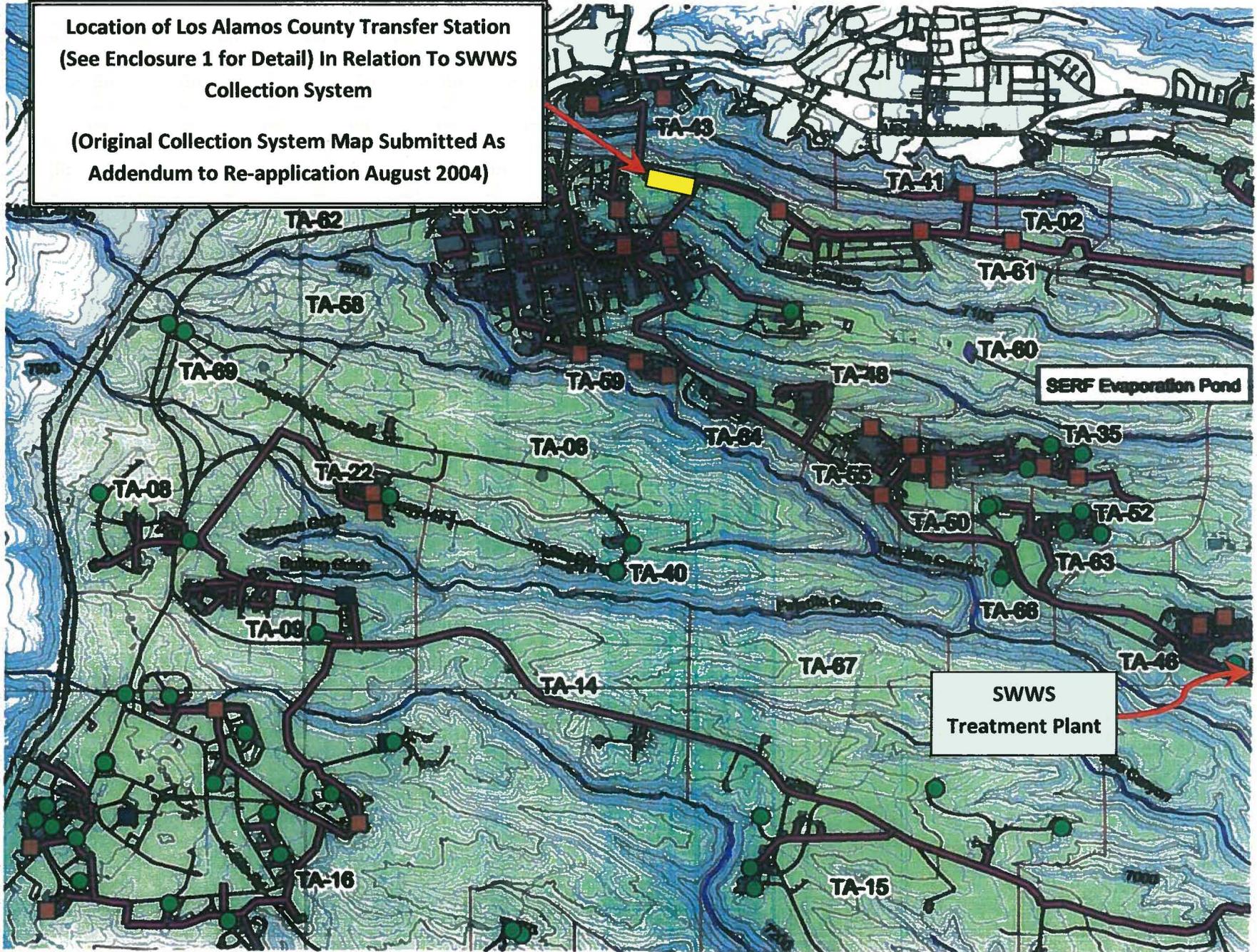
Enclosures: a/s

Cy: Isaac Chen, USEPA, Region VI, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
John Volkerding, NMED/DOE/OB, Santa Fe, NM, w/enc.
Gene Turner, LASO/EO, w/enc., MS A316
Michael B. Mallory, PADOPS, w/o enc., MS A102
J. Chris Cantwell, ADESHQ, w/o enc., MS K491
Jim Jones, SP-DO, w/o enc., MS J590
Andrew Erickson, UI-DO, w/o enc., MS K760
Reanna Sharp-Geiger, w/o enc., MS C925
Darrik Stafford, FIRP-DISP, w/enc., MS J590
Charlie Barnett, UI-DO, w/enc., MS J972
Tina Sandoval, ENV-RCRA, w/enc., MS K490
Mike Saladen, ENV-RCRA, w/o enc., MS K490
Marc Bailey, ENV-RCRA, w/enc., MS K490
ENV-DO, w/enc., J978
ENV-RCRA, File, w/enc., MS K490
IRM-RMMSO, w/enc., MS A150

ENCLOSURE 2

Location of Los Alamos County Transfer Station
(See Enclosure 1 for Detail) In Relation To SWWS
Collection System

(Original Collection System Map Submitted As
Addendum to Re-application August 2004)





*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX (505) 667-5224*

*National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5105/FAX (505) 667-5948*

Date: June 1, 2010
Refer To: ENV-RCRA-10-099
LAUR: 10-03551

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 13S**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

Starting in July, 2010, a short-term pilot study of approximately 90 days will be conducted at Los Alamos National Laboratory's Sanitary Wastewater System (SWWS) Plant. This pilot study is intended to investigate systematic increases in Biological Oxygen Demand (BOD) up to specifications for plant design, via the addition of crude glycerol (glycerine). The SWWS is operated with BOD typically lower than its design criteria. Increasing BOD at the SWWS would likely allow a more robust microorganism population and therein improve plant operations. Investigators will add BOD into the northwest Aeration Basin (NW AB) allowing glycerol equilibration and dissolution, and then transfer the wastewater from the NW AB back to the Equalization Basins for processing using current operations (See Enclosure 1). There will be no direct discharge from the pilot study to Outfall 13S.

Operating parameters will be closely monitored via on-site measurement and off-site sample analysis, including: BOD, Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), total coliform, pH, total Nitrogen, total Phosphorus, Iron and other elemental or chemical constituents of interest.

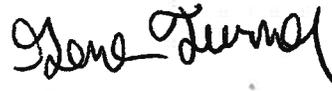
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality & RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosures: a/s

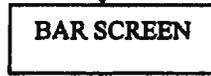
Cy: Willie Lane, USEPA Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olsen, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EPO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Andy Erickson, UI-DO, w/enc., K760
Charlie Barnett, UI-DO, w/enc., J972
Robert Wingo, C-CDE, w/enc., J964
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
Bob Beers, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

SANITARY WASTEWATER SYSTEMS (SWWS) PLANT
 TA-46 BUILDING 333 (ADMIN. /CONTROL ROOM/LAB)
 OUTFALL #13S
 SWWS BOD Pilot Study

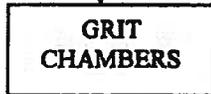
INFLUENT
 0.280 MGD DAILY AVE*
 0.454 MGD DAILY MAX*

SCREENING

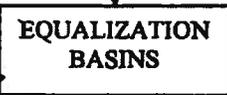
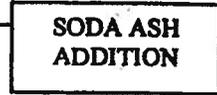


REMOVED SOLIDS
 TO APPROVED
 LANDFILL

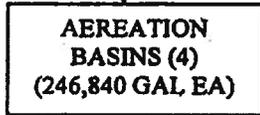
GRIT REMOVAL



TO APPROVED
 LANDFILL



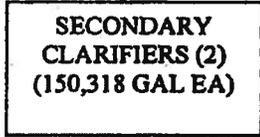
ACTIVATED SLUDGE



RETURN
 ACTIVATED
 SLUDGE
 (RAS)

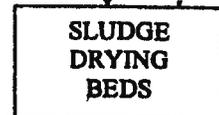
WATER REMOVED
 FROM SLUDGE

SEDIMENTATION

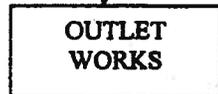
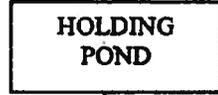


WASTE
 ACTIVATED
 SLUDGE
 (WAS)

MIXED Oxidant (MIOX)
 DISINFECTION



DECHLORINATION
 NOTE: NOT
 CURRENTLY IN USE



SLUDGE TO
 APPROVED LANDFILL
 (27 DRY TONS/YR)
 ESTIMATE BASED ON
 DISCHARGE LOGS

REUSE AND
 DISCHARGE TO
 SURFACE WATER

EFFLUENT TO TA3
 REUSE/001 (SANDIA CANYON)
 0.298 MGD DAILY AVE.
 0.690 MGD DAILY MAX

*AVERAGE DAILY AND
 MAX DAILY FLOW
 ESTIMATES BASED ON
 ACTUAL DATA FROM
 NOV. 1, '97 TO DEC. 31 '03



Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-4218/FAX: (505) 665-3811

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: June 14, 2011
Refer To: ENV-RCRA-11-0106
LAUR: 11-10818

Ms. Hannah Branning
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Branning:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 13S**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

On June 1, 2010, NNSA/LANS notified EPA staff of a pilot study conducted at the Los Alamos National Laboratory Sanitary Wastewater System (SWWS) Plant. The pilot study was intended to investigate systematic increases in Biological Oxygen Demand (BOD) up to specifications for plant design, via the addition of crude glycerol (glycerine). The SWWS has been operating with BOD typically lower than its design criteria. The pilot study evaluated if the increase of BOD at the SWWS resulted in a more robust microorganism population and therein improved plant operations. Investigators added glycerine into the northwest Aeration Basin (NW AB), and after equilibration and dissolution, the BOD enhanced wastewater was then transferred from the NW AB back to the Equalization Basins for processing using current operations. There was never a direct discharge from the pilot study to Outfall 13S. Operating parameters were closely monitored via on-site measurement and off-site sample analysis.

Results from the study demonstrated that the wastewater treatment plant had more diverse microorganisms and healthier populations with the addition of glycerine. Therefore, NNSA/LANS are formally notifying EPA of the permanent feeding of glycerin at the head works into SWWS.

SWWS operators will continue to conduct operational monitoring to evaluate treatment plant performance.

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



for Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Cy: Isaac Chen, USEPA/Region 6, Dallas, TX
Glenn Saums, NMED/SWQB, Santa Fe, NM
William Olson, NMED/GWQB, Santa Fe, NM
Jim Davis, NMED, Santa Fe, NM
George Rael, LASO-EO, A316
Steve Yanicak, LASO-GOV, M894
Carl A. Beard, PADOPS, AI02
J. Chris Cantwell, ADESHQ, K491
Andy Erickson, UI-DO, K760
Charlie Barnett, UI-OPS, J972
Robert Wingo, C-CDE, J964
Mike Saladen, ENV-RCRA, K490, (E-File)
Marc Bailey, ENV-RCRA, K490, (E-File)
Bob Beers, ENV-RCRA, K490, (E-File)
ENV-RCRA File, K490
IRM-RMMSO, AI50



Environmental Protection Division
Water Quality & RCRA (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: May 14, 2007
Refer To: ENV-RCRA: 07-097
LA-UR: 07-3266

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**SUBJECT: NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 051,
NPDES PERMIT NO. NM0028355**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any planned physical alterations or additions to a NPDES permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. The Laboratory's Radioactive Waste Treatment Facility (RLWTF) is planning to construct three new concrete evaporation tanks at Technical Area 52 to receive fully treated radioactive liquid effluent from RLWTF. These tanks are being constructed to reduce the volume of treated effluent being discharged through NPDES Outfall 051. Each tank will cover approximately one surface acre. The transfer line from the RLWTF to the tanks will be approximately 0.75 mile long. A copy of the proposed site location is enclosed for your review (Enclosure 1). Final drawings and specifications will be provided when completed.

Since the new evaporation tanks will be part of an existing wastewater treatment facility (i.e., RLWTF) which discharges under an NPDES permit, they will be exempt from RCRA permitting requirements pursuant to 40 CFR 264.1(g)(6) ("The requirements of this part do not apply to . . . (6) The owner or operator of . . . a wastewater treatment unit . . .").

We intend to submit a detailed letter to the New Mexico Environment Department in the near future regarding these issues. We will provide your office with a copy of this correspondence.

Please contact Marc Bailey of the Laboratory's Water Quality and RCRA Group (ENV-RCRA) at (505) 665-8135, if you have any questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA (ENV-RCRA) Group

ARG:MB/lm

Enclosures: a/s

Cy: Isaac Chen, USEPA, Region VI, Dallas, TX, w/enc.
Marcy Leavitt, NMED/SWQB, Santa Fe, NM, w/enc.
Robert George, NMED/GWQB, Santa Fe, NM, w/enc.
James Bearzi, NMED HWB, Santa Fe, NM, w/enc.
Gene Turner, NNSA/LASO, w/o enc., MS A316
Richard V. Bynum, PADOPS, w/o enc., MS A102
Richard S. Watkins, ADESHQ, w/o enc., MS K491
Victoria George, ENV-DO, w/o enc. MS J978
Tina Sandoval, ENV-RCRA, w/o enc., MS K490
Mike Saladen, ENV-RCRA, w/o enc., MS K490
Bob Beers, ENV-RCRA, w/enc., MS K490
Marc Bailey, ENV-RCRA, w/enc., MS K490
Pete Worland, EWMO-RLW, w/enc., MS E518
Dave Moss, RLW, w/enc., MS E518
Phil Wardwell, LC-LESH, w/o enc., MS A187
ENV-RCRA, File, w/enc., MS K490
IRM-RMMSO, w/enc., MS A150

ENCLOSURE 1

NPDES PERMIT NO. NM0028355
Proposed RLWTF Concrete Evaporation Tanks





Environmental Protection Division
P.O. Box 1663, Mail Stop J978
Los Alamos, New Mexico 87545
(505) 667-2211/FAX: (505) 665-8858

Date: May 6, 2008
Refer To: ENV-DO-08-009

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**SUBJECT: NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051,
NPDES PERMIT NO. NM0028355**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification that the Radioactive Liquid Waste Treatment Facility (RLWTF) will be modifying its treatment process by installing pilot-scale ion exchange equipment to polish waters that have been processed through all existing treatment steps. The additional treatment is a scale-up of tests conducted in the summer of 2007 to use effluent polishing as a means of addressing contaminants. Equipment will likely be operated with different ion exchange resins to monitor treatment effectiveness.

The ion exchange step should not generate secondary liquid wastes, but will generate solid wastes in the form of spent resins. Spent resins will be characterized and disposed of properly.

Please contact Marc Bailey of the Laboratory's Water Quality and RCRA Group (ENV-RCRA) at (505) 665-8135, if you have any questions.

Sincerely,


Anthony R. Grieggs
Group Leader
Water Quality & RCRA (ENV-RCRA) Group

Cy:

Isaac Chen, USEPA, Region VI, Dallas, TX
Marcy Leavitt, NMED/SWQB, Santa Fe, NM
Robert George, NMED/GWQB, Santa Fe, NM
Gene Turner, DOE/LASO, MS A316
Richard S. Watkins, ADESHQ, MS K491
Victoria George, ENV-DO, MS J978
Pete Worland, EWMO-RLW, MS E518
Steve Hanson, EWMO-RLW, MS E518
Chris Del Signore, EWMO-RLW, MS E518
Mike Saladen, ENV-RCRA, MS K490
Bob Beers, ENV-RCRA, MS K490
Marc Bailey, ENV-RCRA, MS K490
Bob Lechel, ENV-EAQ, MS J593
Phil Wardwell, LC-ESH, MS A187
ENV-DO File, MS J978
ENV-RCRA File, MS K490
IRM-RMMSO, MS A150



Environmental Protection Division
P.O. Box 1663, Mail Stop J978
Los Alamos, New Mexico 87545
(505) 667-2211/FAX: (505) 665-8858

Date: May 6, 2008
Refer To: ENV-DO-08-009

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**SUBJECT: NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051,
NPDES PERMIT NO. NM0028355**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification that the Radioactive Liquid Waste Treatment Facility (RLWTF) will be modifying its treatment process by installing pilot-scale ion exchange equipment to polish waters that have been processed through all existing treatment steps. The additional treatment is a scale-up of tests conducted in the summer of 2007 to use effluent polishing as a means of addressing contaminants. Equipment will likely be operated with different ion exchange resins to monitor treatment effectiveness.

The ion exchange step should not generate secondary liquid wastes, but will generate solid wastes in the form of spent resins. Spent resins will be characterized and disposed of properly.

Please contact Marc Bailey of the Laboratory's Water Quality and RCRA Group (ENV-RCRA) at (505) 665-8135, if you have any questions.

Sincerely,


Anthony R. Grieggs
Group Leader
Water Quality & RCRA (ENV-RCRA) Group

Cy:

Isaac Chen, USEPA, Region VI, Dallas, TX
Marcy Leavitt, NMED/SWQB, Santa Fe, NM
Robert George, NMED/GWQB, Santa Fe, NM
Gene Turner, DOE/LASO, MS A316
Richard S. Watkins, ADESHQ, MS K491
Victoria George, ENV-DO, MS J978
Pete Worland, EWMO-RLW, MS E518
Steve Hanson, EWMO-RLW, MS E518
Chris Del Signore, EWMO-RLW, MS E518
Mike Saladen, ENV-RCRA, MS K490
Bob Beers, ENV-RCRA, MS K490
Marc Bailey, ENV-RCRA, MS K490
Bob Lechel, ENV-EAQ, MS J593
Phil Wardwell, LC-ESH, MS A187
ENV-DO File, MS J978
ENV-RCRA File, MS K490
IRM-RMMSO, MS A150



*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
P.O. Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

*National Nuclear Security Administration
Los Alamos Site Office, A316*
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-7203/FAX (505) 667-5948

Date: June 10, 2009
Refer To: ENV-RCRA-09-103
LAUR: 09-03647

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Ms. Hall:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF CHANGED CONDITION AT NPDES OUTFALL 051

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification regarding the transfer of approximately 20,000 gallons of treated wastewater from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) to the TA-53 Radioactive Liquid Wastewater (RLW) basins for evaporation.

The treated effluent from RLWTF meets all NPDES effluent requirements but contains tritium at a concentration of 22,000 pCi/L. This level of tritium is well below the Department of Energy's (DOE) Derived Concentration Guidelines (DCGs) but above New Mexico's water quality standard of 20,000 pCi/l. Please note, tritium is not a "pollutant" as defined under the Clean Water Act and consequently, monitoring requirements for tritium were removed from the Laboratory's NPDES permit, effective August 1, 2007. Even though there is no requirement in the NPDES permit, the RLWTF continues to monitor tritium in their effluent. Rather than discharge to Outfall 051, the Laboratory feels the best option is to evaporate the tritiated effluent at the TA-53 basins. The source of high tritium is currently under investigation.

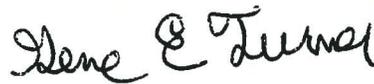
As documented in the 2004 NPDES Re-application, transferring treated effluent from the RLWTF to the basins at TA-53 for evaporation has occurred on two occasions and the Laboratory submitted a Notice of Changed Condition each time. The Los Alamos National Security, LLC (LANS) and National Nuclear Security Administration (NNSA) are asking for review and concurrence from EPA Region 6 that the configuration of trucking the treated effluent from RLWTF to the TA-53 RLW basin is compliant with the Clean Water Act and the LANS/NNSA NPDES permit. Enclosed for your review is the RLWTF treatment schematic (see Enclosure 1).

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 if you have questions regarding this notice.

Sincerely,

Sincerely,


for Anthony R. Grieggs
Water Quality & RCRA Group
Los Alamos National Laboratory


Gene E. Turner
Environmental Permitting Manager
Los Alamos Site Office
National Nuclear Security Administration

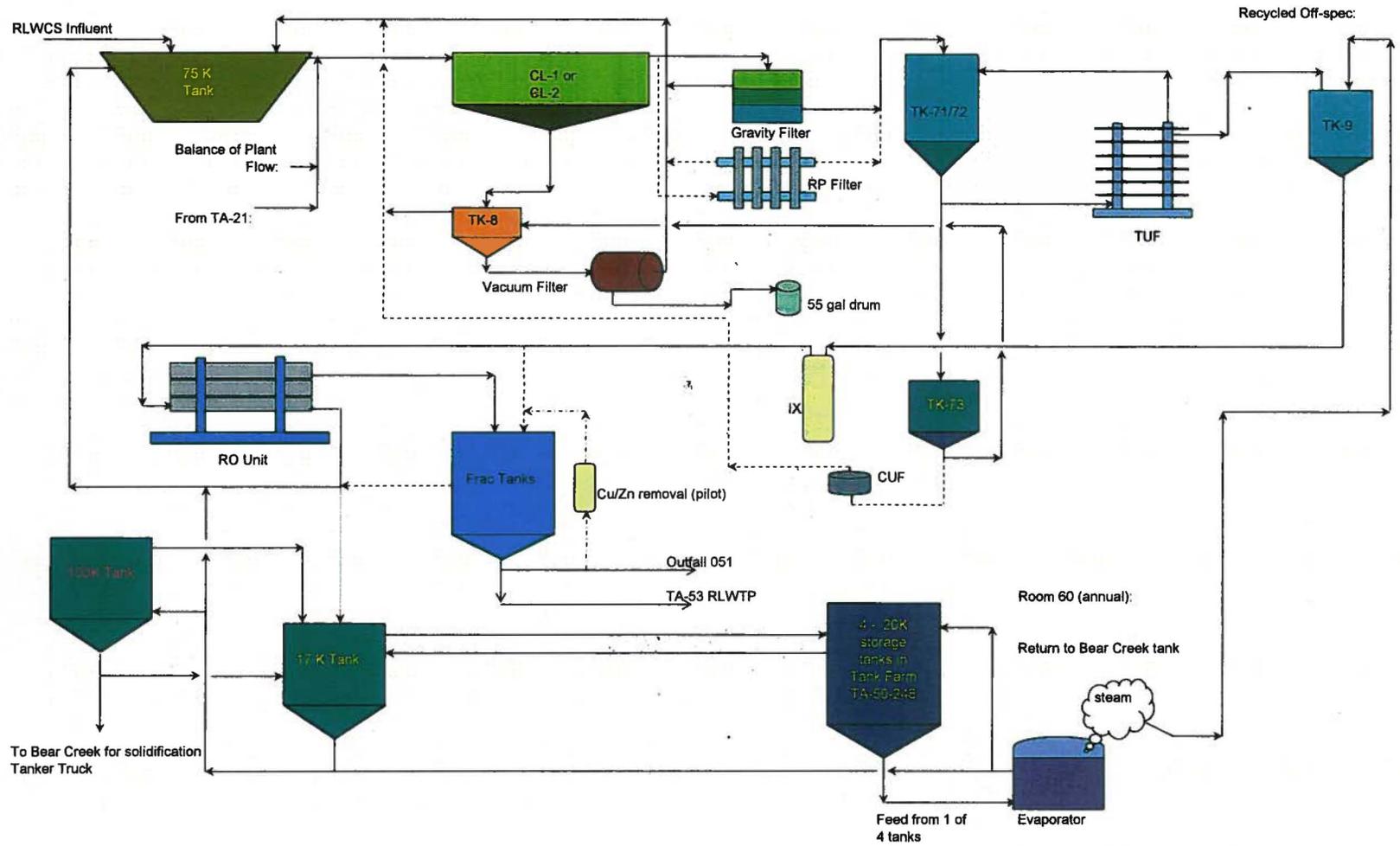
ARG:GT:MB/lm

Enclosure: a/s

Cy: Isaac Chen, USEPA, Region VI, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
John Volkerding, NMED/DOE/OB, Santa Fe, NM, w/enc.
Isaac Valdez, LASO-NSM, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
Chris Cantwell, ADESHQ, w/o enc., K491
Robert Mason, TA55-DO, w/enc., E583
Craig Douglass, RLW, w/o enc., E518
Peter Rice, TA-55-RLW, w/o enc., E518
Pete Worland, PMT-2, w/enc., E518
ENV-DO, File, w/o enc., J978
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

RLW Plant Flow Schematic





*Environmental Protection Division
Water Quality & RCRA (ENV-RCRA)*
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: October 30, 2009
Refer To: ENV-RCRA: 09-197
LA-UR: 09-07052

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance and Assurance Division
Water Enforcement Branch (6EN-W)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355,
NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051**

Dear Ms. Hall:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged. In accordance with Part III.D.1.a. *Reporting Requirements* of the Laboratory's NPDES Permit, we are providing written notification regarding the transfer of approximately 200,000 gallons of treated wastewater from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) to the TA-53 Radioactive Liquid Wastewater (RLW) tanks for evaporation.

The treated effluent from RLWTF meets all NPDES effluent requirements but contains tritium at concentrations of 21,000 – 26,000 pCi/L. These levels of tritium are well below the Department of Energy's (DOE) Derived Concentration Guidelines (DCGs) but above New Mexico's water quality standard of 20,000 pCi/l. Please note, tritium is not a "pollutant" as defined under the Clean Water Act and consequently, monitoring requirements for tritium were removed from the Laboratory's NPDES permit, effective August 1, 2007. Even though there is no requirement in the NPDES permit, the RLWTF continues to monitor tritium in their effluent. Rather than discharge to Outfall 051, the Laboratory feels the best option is to evaporate the tritiated effluent at the TA-53 tanks.

On June 10, 2009, the Los Alamos National Security, LLC (LANS) and National Nuclear Security Administration (NNSA) requested EPA review and concurrence for the transfer of 20,000 gallons of treated effluent with 23,000 pCi/l tritium from the RLWTF to the tanks at TA-53 for evaporation (see Enclosure 1). EPA responded on June 11, 2009 stating, in part: "EPA has no objection to the no-discharge alternative" (see Enclosure 2). Although the RLWTF has been investigating the source of elevated tritium since May 2009, it has not yet been identified. Therefore, we are submitting this notice regarding the discharge of elevated tritium water to the tanks at TA-53 and request EPA's acknowledgement. LANS and NNSA will continue to investigate the source of elevated tritium water and evaluate short-term/long-term solutions to address this issue.

Ms. Sonia Hall
ENV-RCRA-09-0197

- 2 -

October 30, 2009

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 if you have questions regarding this notice.

Sincerely,


Anthony R. Grieggs
Group Leader
Water Quality & RCRA (ENV-RCRA) Group

Enclosures: a/s

Cy: Willie Lane, USEPA, Region VI, Dallas, TX, w/enc.
Isaac Chen, USEPA, Region VI, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
John Volkerding, NMED/DOE/OB, Santa Fe, NM, w/enc.
Isaac Valdez, LASO/EO, w/enc., A316
Gene Turner, LASO/EO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert Masson, TA-55-DO, w/enc., E518
Pete Worland, PMT-2, w/enc., E518
Steve Hanson, PMT-2, w/enc., E518
Chris Del Signore, PMT-2, w/enc., E518
Tina Sandoval, ENV-RCRA, w/enc., K490
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150



Environmental Protection Division
Water Quality & RCRA GROUP (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: January 4, 2010
Refer To: ENV-RCRA-10-002
LAUR: 09-08304

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance and Assurance Division
Water Enforcement Branch (6EN-WC)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

**SUBJECT LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for Los Alamos National Laboratory requires the permittee to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*). On June 10, 2009 and October 30, 2009, we provided written notifications regarding the discharge of elevated tritium water to the tanks at TA-53 and requested EPA's acknowledgement. The National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) have continued to investigate the source of elevated tritium water and have evaluated short-term/long-term solutions to address this issue.

The TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) at Los Alamos National Laboratory discharges to the environment via Outfall 051 in accordance with NPDES Permit No. NM0028355. Waste Acceptance Criteria (WAC) limit the constituents and their concentrations that waste generators send to the RLWTF. The wastewater treatment process, which operates in a semi-continuous batch mode, is designed to remove constituents to meet NPDES regulatory limits. The main wastewater treatment units include influent equalization, pH adjustment, coagulation-flocculation-precipitation, sand filtration, ultra-filtration, ion exchange (IX) and reverse osmosis (RO). Secondary waste treatment units include sludge dewatering using a rotary vacuum filter, evaporation to volume reduce RO concentrate, and off-site drying of evaporator concentrate.

The RLWTF employs strategies to ensure that the effluent waters are in compliance with NPDES requirements to include WAC compliance, treatment of the wastewater through Best Available Technologies and, if needed, reprocessing of off-spec effluent waters. No RCRA hazardous wastes are allowed in the RLWTF influent with the exception of small quantities of corrosive (D002) hazardous wastewater.

Effluent from the main treatment units is collected in batch mode in a tank. Prior to discharge of the effluent, a representative sample of the effluent is analyzed for indicator constituents to ensure compliance with the NPDES permit. If indicator constituent concentrations exceed permit limits, the water is reprocessed. Reprocessing options include: treatment through the polishing IX units, retreatment through one or more of the main treatment units (e.g., RO, or RO and IX), retreatment through the entire main treatment process and/or combining treated water with other in-plant waters. The diagram that accompanies this notice, entitled "LANL Radioactive Liquid Waste Treatment Facility (TA-50) Process Schematic" shows primary RLWTF process flow paths (See Enclosure 1). Dashed outlines indicate a unit operation or tank that is presently not always used, or planned future installation as in the case of the pressure filter, but which could be brought into service, if needed.

Note that tritium, as defined under the Clean Water Act, is not a pollutant and consequently monitoring requirements for tritium were removed from the Laboratory's NPDES permit, effective August 1, 2007. However, the RLWTF continues to monitor tritium in their effluent. If the above described RLWTF process cannot produce effluent water that meets drinking water standards for tritium, the water may be trucked to the TA-53 evaporation tanks.

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,


Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,


Gene Turner
Environmental Permitting
Environmental Operations
Los Alamos Site Office

ARG:GT:MS/lm

Enclosure: a/s

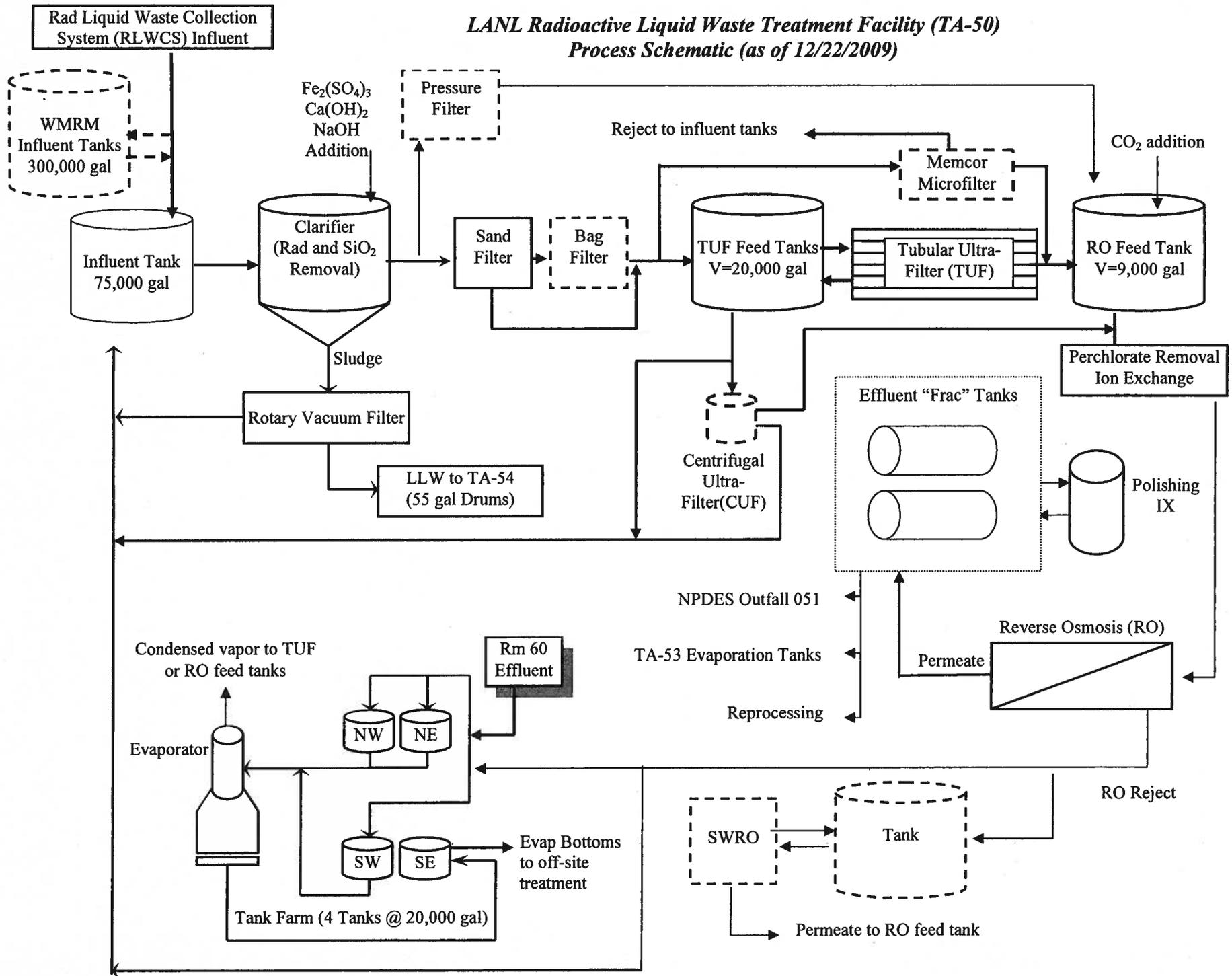
Cy: Willie Lane, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
John Volkerding, NMED/DOE/OB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
Isaac Valdez, LASO-NSM, w/enc., A316
Gene Turner, LASO-EO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert Mason, TA55-DO, w/enc., E583
Hugh McGovern, TA-55-RLW, w/enc., E518

Cy (continued):

Pete Worland, PMT-3, w/enc., E518
Steve Hanson, PMT-3, w/enc., E518
Chris Del Signore, PMT-3, w/enc., E518
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

LANL Radioactive Liquid Waste Treatment Facility (TA-50)
Process Schematic (as of 12/22/2009)





Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5105/FAX (505) 667-5948

Date: June 3, 2010
Refer To: ENV-RCRA-10-104
LAUR: 10-03618

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*). On August 1, 2010, new copper (Cu) limits of 0.14 µg/L and new zinc (Zn) limits of 2.2 µg/L will be effective. Typical copper and zinc concentrations in the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) effluent range from 20-60 µg/L Cu and 5-15 µg/L Zn. The following activities have been completed or are on-going to meet the new copper and zinc limits:

- The RLWTF is performing bench-scale column testing of ion exchange and adsorption media to remove copper and zinc from the RLWTF effluent waters. To date, nine different media have been tested at various flow rates, pH and oxidation conditions. Two of the nine media have reduced copper and zinc concentrations in the RLWTF effluent to below 1 µg/L. Only one media has been able to reduce the copper concentrations to below the 0.14 µg/L NPDES concentration as required on August 1, 2010. Long duration, bench-scale capacity/breakthrough studies are continuing. Study cost to date: \$125K.
- A full-scale ion exchange system has been installed at the RLWTF to treat the effluent waters for removal of copper and zinc. The system will be approved for operation by June 11, 2010. System installation cost: \$519K.

- Copper air lines are presently used for sparging air into the two RLWTF effluent tanks to enhance mixing of the RLWTF effluent. These copper air lines are being removed from the effluent tanks to remove any source of copper in the effluent. Activity cost: \$15K.
- Two types of ion exchange media and vessels have been ordered from a vendor. Expected delivery of one media type is mid-June. The second media type delivery is expected in early July, 2010. Both media are not commercially available. LANS has a non-disclosure agreement with the vendor pertaining to the experimentation with and use of these media. Media cost: \$56K.

In addition to these new ion exchange media, the RLWTF employs strategies to ensure that the effluent waters are in compliance with NPDES requirements. These strategies include Waste Acceptance Criteria (WAC) compliance, treatment of the wastewater through Best Available Technologies and, if needed, reprocessing of off-spec effluent waters. Effluent from the main treatment units is collected in batch mode in a tank. Prior to discharge of the effluent, a representative sample of the effluent is analyzed for indicator constituents to ensure compliance with the NPDES permit. If indicator constituent concentrations exceed permit limits, the water is reprocessed. Reprocessing options include: treatment through the polishing ion exchange (IX) units, retreatment through one or more of the main treatment units (e.g., Reverse Osmosis (RO), or RO and IX), retreatment through the entire main treatment process and/or combining treated water with other in-plant waters. The diagram that accompanies this notice, entitled "LANL Radioactive Liquid Waste Treatment Facility (TA-50) Process Schematic" shows primary RLWTF process flow paths (See Enclosure 1). Dashed outlines indicate a unit operation or tank that is presently not always used, or planned future installation as in the case of the pressure filter, but which could be brought into service, if needed.

The Minimum Quantification Level (MQL) in Part II of the NPDES Permit No. NM0028355 for copper is 10 µg/L, and the MQL for zinc is 20µg/L. As specified in Section A. of PART II – OTHER CONDITIONS of the NPDES permit, a value of zero (0) may be used on the Discharge Monitoring Report (DMR) if the copper and zinc concentrations in the required monthly samples are less than the MQL.

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality & RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosure: a/s

Cy: Willie Lane, USEPA Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EPO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert Mason, TA55-DO, w/enc., E583
Hugh McGovern, TA-55-RLW, w/enc., E518
Pete Worland, TA-55-RLW, w/enc., E518
Steve Hanson, TA-55-RLW, w/enc., E518
Chris Del Signore, TA-55-RLW, w/enc., E518
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
Bob Beers, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150



Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-4218/FAX: (505) 665-3811

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5105/FAX (505) 667-5948

Date: August 19, 2010
Refer To: ENV-RCRA-10-162
LAUR: 10-05550

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6WQ-N)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051**

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*). The following changes are being made at the TA-50 Radioactive Liquid Waste Treatment Facility to reduce and/or eliminate the volume of treated effluent being discharged to Outfall 051 due to the new stringent copper and zinc limits that became effective August 1, 2010:

Short-term

A double-contained pipe will be installed from the effluent "Frac" tanks to allow for flows to both the existing cooling towers (Code 1-E) associated with the evaporator (Code 1-E) and for reprocessing. The blowdown from the cooling tower and over flow lines from the cooling towers will be routed for reprocessing.

Long-term

Alternatives are currently being evaluated to procure a trailer mounted evaporation system for effluent water entering the system that has sufficient capacity to ensure evaporation is greater than current effluent production and to account for cooling loss during winter months. Both the short-term and long-term changes are documented in the revised schematic for RLWTF (see Enclosure 1).

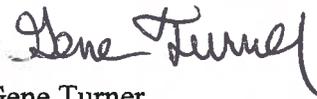
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

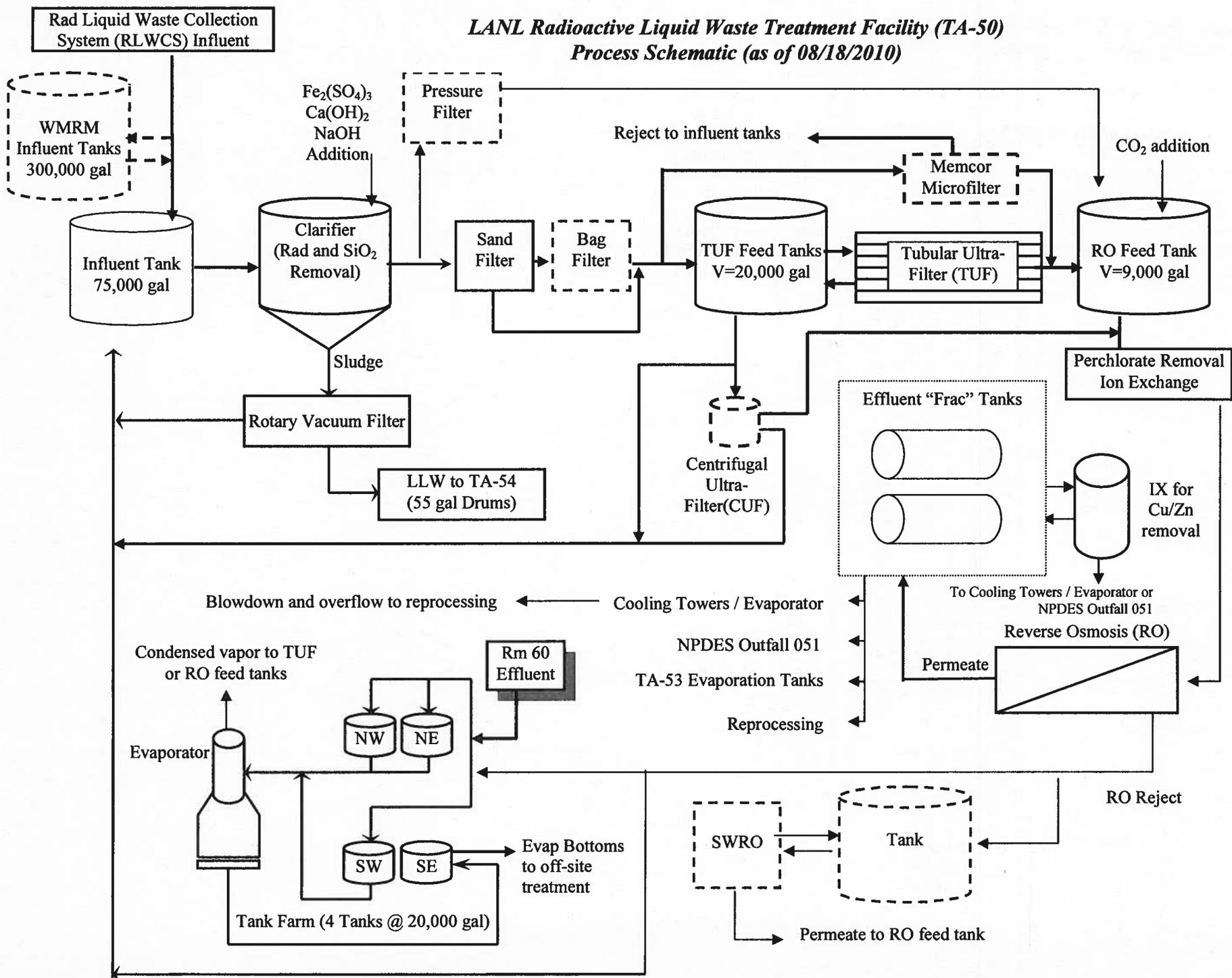
ARG:GT:MB/lm

Enclosure: a/s

Cy: Brent Larson, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EO, w/enc., A316
Michael B. Mallory, PADOPS, w/enc., A102
Robert McQuinn, ADNHHO, w/enc., K778
Carl Beard, ADSMS, w/enc., E585
Michael B. Mallory, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert Mason, TA55-DO, w/enc., E583
Hugh McGovern, TA-55-RLW, w/enc., E518
Pete Worland, TA-55-RLW, w/enc., E518
Steve Hanson, TA-55-RLW, w/enc., E518
Chris Del Signore, TA-55-RLW, w/enc., E518
Denny L. Hjeresen, ENV-DO, w/enc., (E-File)
Mike Saladen, ENV-RCRA, w/o enc., (E-File)
Marc Bailey, ENV-RCRA, w/enc., (E-File)
Bob Beers, ENV-RCRA, w/enc., (E-File)
Cindy Blackwell, LC-LESH, w/enc., A187
Deborah Woitte, LC-LESH, w/enc., A187
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

LANL Radioactive Liquid Waste Treatment Facility (TA-50)
Process Schematic (as of 08/18/2010)





*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224*

*National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948*

Date: September 16, 2010
Refer To: ENV-RCRA-10-175
LAUR: 10-06070

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Hall:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

The Radioactive Liquid Waste Treatment Facility (RLWTF) has recently made a number of operational treatment changes to reduce concentrations of copper and zinc being discharged to Outfall 051 due to the new stringent effluent limits, effective August 1, 2010. The newly installed ion exchange media to remove copper and zinc to the new effluent limits appear to be effective. However, when the ion exchange media effluent waters are placed in the existing RLWTF effluent tanks (referred to as the N. and S. Frac tanks), the water is then found to be greater than the discharge limits. NNSA/LANS will install a new 1,000 gallon polymeric tank in Room 38 of the RLWTF to receive the ion exchange media effluent water. This new tank will be referred to as Tank 38. This new tank should eliminate any residual copper and zinc contamination that is suspected to be in the N. and S. Frac tanks. New hoses will be installed in Rooms 34B, 36 and 38 at the RLWTF to move water from the ion exchange vessels in Room 34B to Tank 38. New hoses, also, will be installed to transfer the Tank 38 water back to either Frac tank in Room 34B for reprocessing and for connecting Tank 38 to the line used to discharge effluent to Outfall 051. To determine if Tank 38 contents meet discharge requirements, a representative sample of the Tank 38 contents will be collected. The representative sample will be obtained from the re-circulation line after the 1,000 gallon contents of Tank 38 have

been re-circulated for 80 minutes at a rate of 50 gpm. If discharge to the outfall is from Tank 38, a new NPDES compliance sampling location is proposed. This location will be in Room 38, on the discharge side of the pump that will pump the Tank 38 contents to the outfall. Enclosure 1 shows an isometric drawing of Tank 38, associated piping, recirculation/discharge pump, proposed NPDES sampling location and flow paths during discharge to Outfall 051. If discharges to Outfall 051 are made from the Frac tanks, the presently approved NPDES compliance sampling location in Room 116 at the RLWTF will continue to be used.

Additionally, RLWTF effluent waters that are not within discharge limits to the outfall may need to be stored in the TA-50-250 Waste Management Risk Mitigation (WMRM) facility. New hoses will be installed to move water from the Frac tanks in Room 34B to tank #6 in the WMRM facility. A copy of the revised treatment schematic is enclosed (see Enclosure 2).

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions or need additional information.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosures: a/s

Cy: Brent Larsen, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
George Rael, LASO-EO, w/enc., A316
Steve Yanicak, LASO-GOV, w/enc., M894
Michael B. Mallory, PADOPS, w/o enc., AI02
Robert L. McQuinn, ADHHO, w/o enc., K778
Carl A. Beard, ADSMS, w/o enc., E585
J. Chris Cantwell, ADESHQ, w/o enc., K491
Dennis Hjeresen, ENV-DO, w/o enc., (E-File)
Robert Mason, TA55-DO, w/enc., E583
Hugh McGovern, TA-55-RLW, w/enc., E518
Pete Worland, TA-55-RLW, w/enc., E518

Cy (continued):

Mike Saladen, ENV-RCRA, w/enc., (E-File)

Marc Bailey, ENV-RCRA, w/enc., (E-File)

Bob Beers, ENV-RCRA, w/enc., (E-File)

Cindy Blackwell, LC-LESH, w/o enc., A187

ENV-RCRA File, w/enc., K490

IRM-RMMSO, w/enc., A150

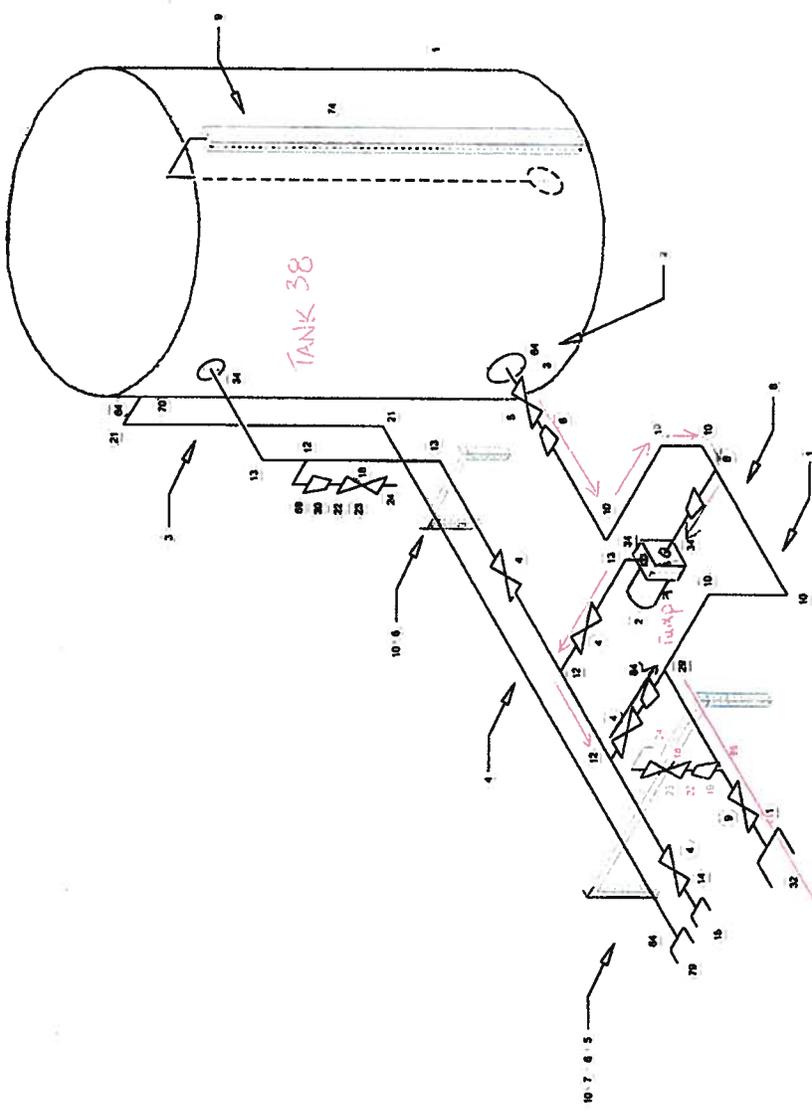
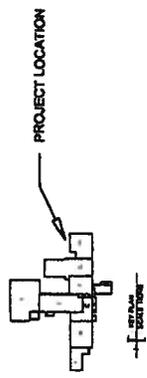
ENCLOSURE 1

GENERAL NOTES

1. SCALE - NONE.
2. FOR APPROVED EQUAL IS ALWAYS IMPLIED AFTER A BRAND NAME, PATENTED PROCESS OR CATALOG NUMBER, THE CONTRACTOR MAY SUBSTITUTE ANY BRAND OR PROCESS APPROVED AN EQUAL BY SPECIFYING ARCHITECT/ENGINEER THE ONLY EXCEPTION IS WHERE "NO SUBSTITUTION" IS SPECIFIED.
3. REFER TO BILL OF MATERIALS (BOM) IN REFERENCED DCF FOR MATERIAL CALLOUTS AND INSPECTION REQUIREMENTS
4. ALL ITEMS ML-4.
5. ALL INSTALLATION SHALL CONFORM WITH TO LANS STANDARDS
6. FIELD ADJUST PIPE DIMENSIONS

KEYED NOTES

- 1 DISCHARGE HOSE & ASSOCIATED PIPING - 4" MINIMUM
- 2 TANK CONNECTION - 2" NPTT (DISCHARGE)
- 3 TANK CONNECTION - 1-1/2" NPTT (INLET)
- 4 EXTEND 2" LINE TO PIPE SUPPORT AND CONNECT HOSE TO DRAIN IN ROOM 38 IF EXISTING DRAIN IN ROOM 38 IS PERMANENTLY BLOCKED. INSTALL THROUGH-WALL FITTING AS HIGH AS POSSIBLE
- 5 INSTALL PIPE SECTIONS AT LEAST 3' APART
- 6 PIPING WEIGHTS LESS THAN 5 LB/SFT ANCHORING NON STRUCTURAL. NO SSI REQUIRED
- 7 ATTEMPT TO EQUATE OUTLET LINE HEIGHT TO THE SAME HEIGHT AS THE TANK DISCHARGE (UNION STRUT FOOTING MIGHT NOT BE REQUIRED OR CONSIDER ADDING A PIECE OF UNISTRUT UNDERNEATH PIPE SUPPORT)
- 8 ANCHOR PUMP TO THE FLOOR OR CONSIDER USING UNISTRUT 1/2" STEEL PLATE AND 1/2" ANCHORS IN ADDITION TO THE PUMP FOOT AND ANCHOR TO THE FLOOR
- 9 INSTALL LEVEL, FLOATS & SCALE PER MANUFACTURER INSTRUCTIONS
- 10 BOM ITEMS 63 TO 69



1000 GAL. TANK PARTIAL PIPING - ISOMETRIC
SCALE NONE

No.	Date	Drawn	ADC	Description	DFT	CHK	APP

ENGINEERING STANDARDS PROGRAM
Radioactive Liquid Waste Treatment Facility (RLWTF)

INTERNAL DRAWING SUPPORTING DCF-10-7488-0001-048

TANK-0001 1000 GAL TANK PARTIAL PIPING

PARTIAL PIPING ISOMETRIC

PROJECT: 6100-0001 ROOM: 38 TA-50 DATE: 10/11/11

APPROVED FOR: [Signature] DATE: 10/11/11

Los Alamos National Laboratory
Los Alamos, NM 87545

CLASSIFICATION: UNCLASSIFIED
PROJECT NUMBER: N/A

SCALE: F-9000
1 OF 2

DATE: 10/11/11

PROJECT NUMBER: 6100-7488-0001-048-01

ENCLOSURE 2



Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-4218/FAX: (505) 665-3811

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: December 9, 2010
Refer To: ENV-RCRA-10-239
LAUR: 10-08215

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6 EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear: Ms. Hall:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

The Radioactive Liquid Waste Treatment Facility (RLWTF) plans to add hardness to the facility effluent waters. Hardness will be added by the addition of soluble calcium and/or magnesium salts to the RLWTF process water or effluent water. The purpose of adding hardness to the water is to reduce the toxicity of copper and zinc to the *Daphnia Pulex* organism. These metals have been shown to be major contributors to the failed Whole Effluent Toxicity (WET) tests at Outfall 051.

The RLWTF treatment processes reduce the hardness of the effluent water to essentially zero hardness by the use of the clarifier (which operates as a softener) and the reverse osmosis treatment operation. This reduction of hardness exacerbates the toxicity of the copper and zinc to the *Daphnia Pulex* organism.

The hardness salts will be added either to the North or South Frac Tanks or to Tank 38. The hardness of the RLWTF effluent water will be adjusted to approximately 75 mg/L as CaCO₃ using the calcium and/or magnesium salts.



Environment, Safety, Health & Quality
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Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: February 23, 2011
Refer To: ENV-RCRA-11-0027
LAUR: 11-00881

Ms. Mary Simmons
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6SF)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Ms. Simmons:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

The Radioactive Liquid Waste Treatment Facility (RLWTF) is making modifications to the low-level wastewater treatment system. Modifications include installing pipes and components to bypass the existing RLWTF gravity sand filter and tubular ultra-filter and replace the bypassed treatment processes with a pressure media filtration and cartridge filtration capability. The installation of these new filtration capabilities will provide the RLWTF with reliable filtration downstream of the process clarifier and upstream of the reverse osmosis unit. Additionally, the seawater reverse osmosis unit (SWRO) and associated reject tank have been removed from the treatment system. A pilot study was conducted by RLWTF representatives to evaluate if the volume of the regular reverse osmosis (RO) concentrate stream could be reduced using a SWRO unit. The pilot study has been completed and the hoses to the SWRO have been disconnected. Enclosure 1 highlights the aforementioned treatment system modifications. Enclosure 2 represents the modified treatment schematic to be in operation in late July or early August 2011.

Additionally, in April 2011, the RLWTF will initiate the use of magnesium hydroxide instead of calcium hydroxide in the facility's treatment system clarifier. Magnesium hydroxide raises the pH in

the clarifier and is the source of the hydroxide ion that precipitates with the ferric iron. RLWTF treatment operators would like to use magnesium hydroxide rather than calcium hydroxide because it has been proven to be more effective in silica removal in the clarifier, which then reduces silica fouling of the reverse osmosis (RO) membranes and the Hydrochem waste evaporator heat exchanger plates. The Material Safety Data Sheet (MSDS) for magnesium hydroxide is enclosed for your review (See Enclosure 3).

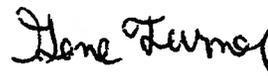
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

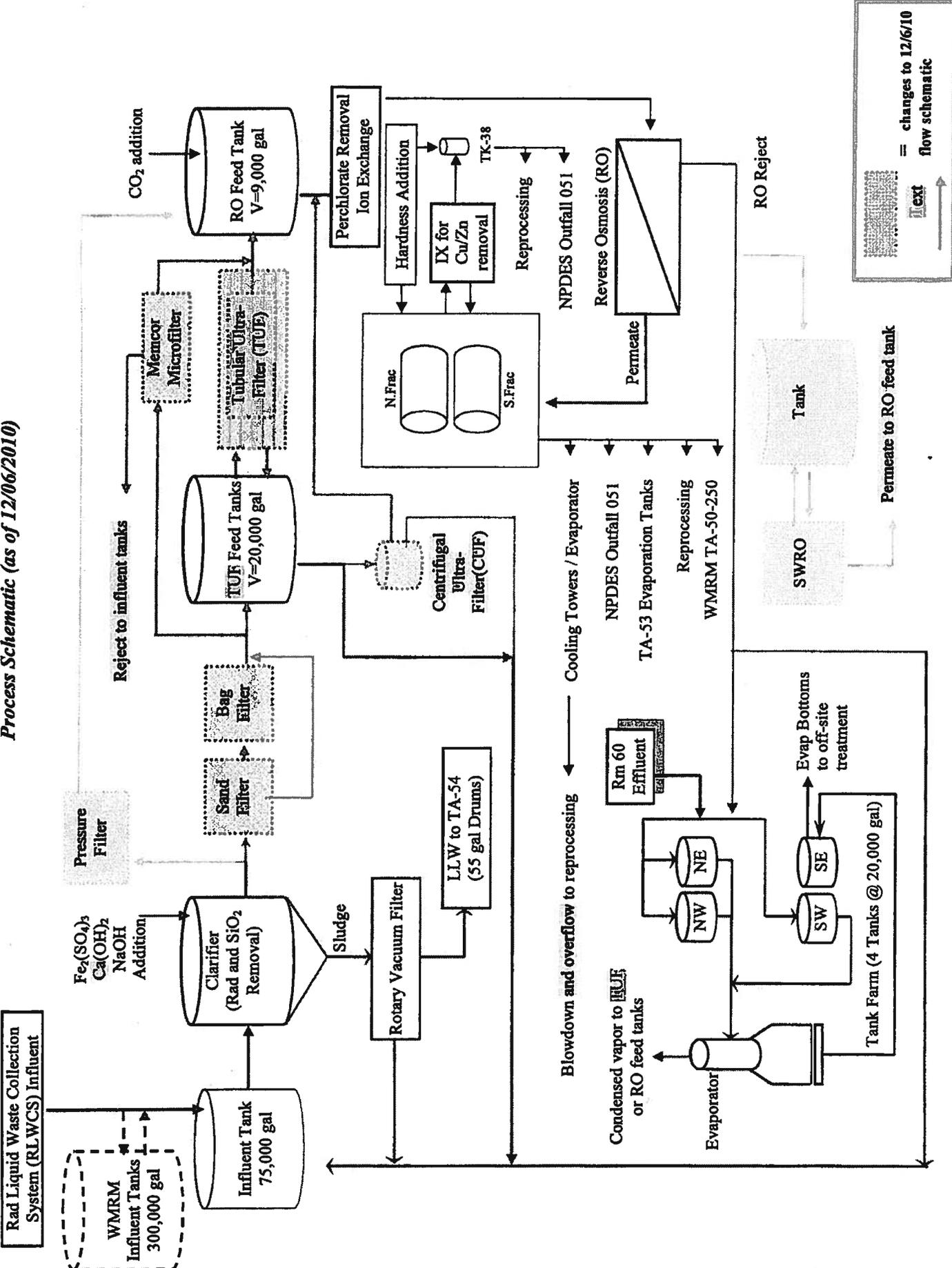
ARG:GT:MS/lm

Enclosure: a/s

Cy: Brent Larsen, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
George Rael, LASO-EO, w/enc., A316
Steve Yanicak, LASO-GOV, w/enc., M894
Michael B. Mallory, PADOPS, w/o enc., AI02
Robert L. McQuinn, ADHHO, w/o enc., K778
Carl A. Beard, ADPMS, w/o enc., E585
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert Mason, TA55-DO, w/enc., E583
Hugh McGovern, TA-55-RLW, w/enc., E518
Pete Worland, TA-55-RLW, w/enc., E518
Mike Saladen, ENV-RCRA, w/enc., K490, (E-File)
Marc Bailey, ENV-RCRA, w/enc., K490, (E-File)
Bob Beers, ENV-RCRA, w/enc., K490, (E-File)
Cindy Blackwell, LC-LESH, w/o enc., A187
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

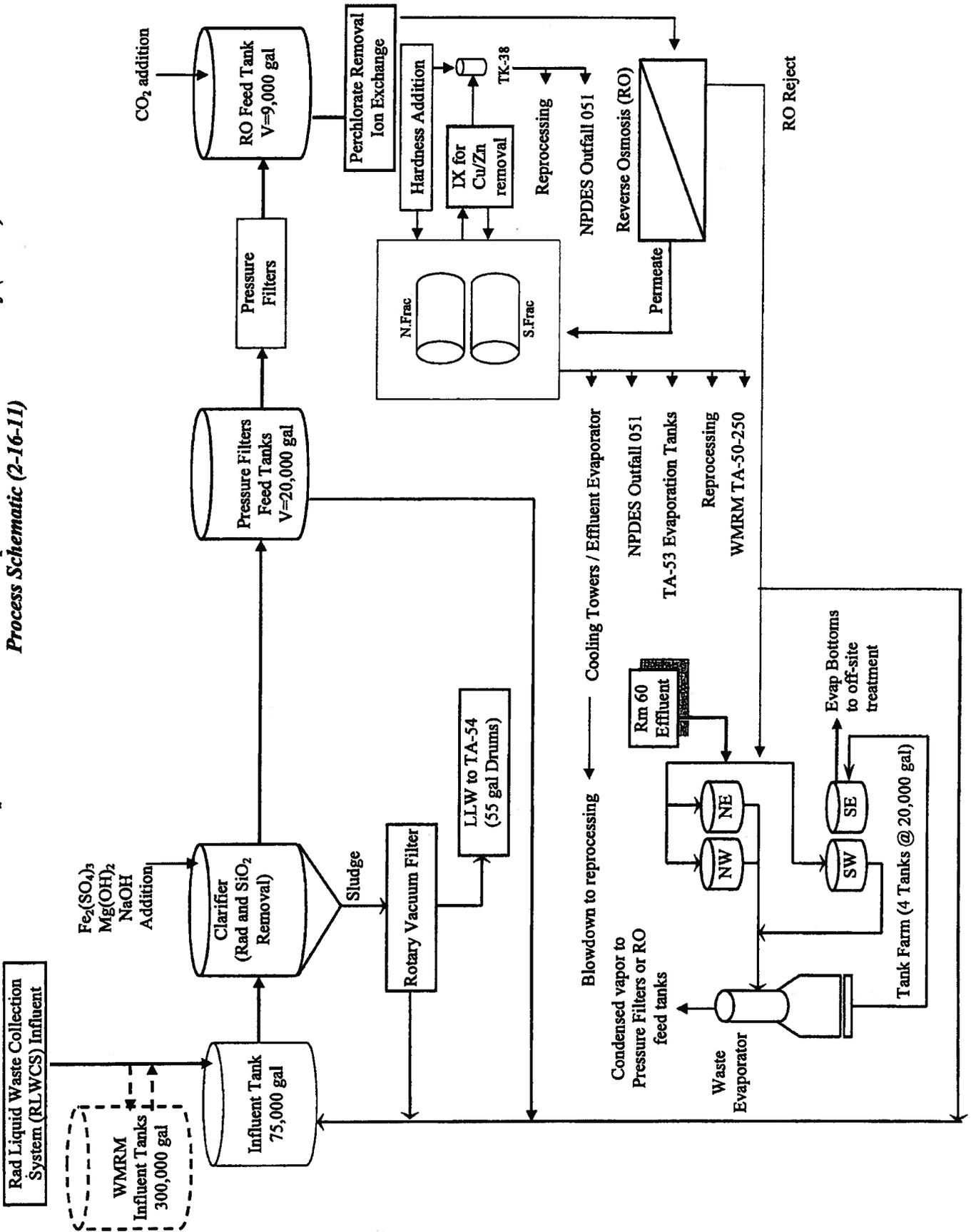
**Changes to LANL Radioactive Liquid Waste Treatment Facility (TA-50)
Process Schematic (as of 12/06/2010)**



changes to 12/6/10
flow schematic

ENCLOSURE 2

**Proposed LANL Radioactive Liquid Waste Treatment Facility (TA-50)
Process Schematic (2-16-11)**



ENCLOSURE 3

Mag Hydrocode



Univar USA Inc Material Safety Data Sheet

MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300

UNIVAR USA INC.
ISSUE DATE:2000-04-17
Annotation:

MSDS NO:P14725V
VERSION:010 2006-08-18

The Version Date and Number for this MSDS is : 08/18/2006 - #010

SECTION I PRODUCT IDENTIFICATION

PRODUCT NAME: MAGNESIUM HYDROXIDE SOLUTION

MSDS #: P14725V

DATE ISSUED: 04/17/2000

SUPERSEDES: 08/08/1997

ISSUED BY: 008497

REVIEWED DATE: 07/16/2004

This MSDS has been reviewed on 07/16/2004, and is
current as of the DATE ISSUED above.

SECTION I Chemical Product And Company Identification

Product Name: Magnesium Hydroxide Solution
 Hi-Chem Mag-50

CAS NUMBER: 1309-42-8

Distributed by:
Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
425-889-3400

Section II Composition/Information On Ingredients

Chemical Name	CAS Number	%	Exposure Limits (TWAs) in Air		
			ACGIH TLV	OSHA PEL	STEL
Magnesium Hydroxide	1309-42-8	51-65	10 mg/m3	15 mg/m3	N/A
			(total dust)	(total dust)	
			5 mg/m3		
			(respirable dust)		

Section III Hazard Identification

ROUTES OF EXPOSURE: N/A

SUMMARY OF ACUTE HEALTH HAZARDS The product presents a very low health

UNIVAR USA INC.
ISSUE DATE:2000-04-17

MSDS NO:P14725V
VERSION:010 2006-08-18

Annotation:

risk. Magnesium hydroxide is a general purpose food additive. Dust generated from the dried product is classified as a nuisance dust.

INGESTION: Ingestion is unlikely. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain and diarrhea.

INHALATION: May irritate the respiratory tract on prolonged or repeated contact. May aggravate preexisting respiratory conditions.

SKIN: Repeated or prolonged contact may cause irritation

EYES: May irritate or injure eyes.

SUMMARY OF CHRONIC HEALTH HAZARDS: The excessive inhalation above (TLV) of mineral dust, over long periods of time, may cause industrial bronchitis, reduce breathing capacity, and lead to increased susceptibility to other lung disease.

SIGNS AND SYMPTOMS OF EXPOSURE: N/A

EFFECTS OF OVEREXPOSURE: N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Dust from the dried product may aggravate pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

NOTES TO PHYSICIANS: N/A

Section IV First Aid Measures

INGESTION: Low toxicity. Give 1-2 glasses of water and seek immediate medical attention. Never give anything of mouth to an unconscious person. Leave decision to induce vomiting for medical personnel, since some particles may be aspirated into the lungs.

INHALATION: Move to fresh air; if discomfort persists, get medical attention.

SKIN: Wash with soap and water

EYES: Irrigate immediately with plenty of water. Obtain medical attention if necessary.

Section V Fire Fighting Measures

FLASH POINT: N/A

AUTOIGNITION TEMPERATURE: N/A

LOWER EXPLOSIVE LIMIT: N/A

UPPER EXPLOSIVE LIMIT: N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A

EXTINGUISHING MEDIA: N/A

SPECIAL FIREFIGHTING PROCEDURES:

FIREFIGHTERS SHOULD WEAR NIOSH-APPROVED, POSITIVE PRESSURE, SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING WHEN APPROPRIATE.

UNIVAR USA INC.
ISSUE DATE:2000-04-17
Annotation:

MSDS NO:P14725V
VERSION:010 2006-08-18

Section VI Accidental Release Measures

Dike the spilled liquid, and either pump back into original container or cover with clay-type substance for absorption.

Section VII Handling and Storage

Store at ambient temperature. Prevent possible eye and skin contact by wearing protective clothing and equipment.

Section VIII Exposure Controls/Personal Protection

RESPIRATORY PROTECTION: Respirator approved by NIOSH/MSHA are adequate for contaminate concentrations encountered.

VENTILATION: N/A

PROTECTIVE CLOTHING: Gloves are recommended, rubber gloves re recommended when repeated or prolonged contact is likely.

EYE PROTECTION: Safety glasses are recommended.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: N/A

WORK/HYGIENIC PRACTICES: Avoid contact with the eyes and skin.

Section IX Physical and Chemical Properties

PHYSICAL STATE:	Milky liquid
MELTING POINT/RANGE:	N/A
pH:	10-11
BOILING POINT/RANGE:	212 DEG F, 100 DEG C
APPEARANCE/COLOR ODOR:	White - Off white, No odor
SOLUBILITY IN WATER:	NIL
SPECIFIC GRAVITY (Water = 1):	1.4-1.5
VAPOR DENSITY (Air = 1):	N/A
VAPOR PRESSURE (mmHg):	N/A
MOLECULAR WEIGHT:	N/A
‡ OF SOLUTION:	48-51 51-55 61-65
‡ VOLATILES:	49-52 45-49 35-39

Section X Stability and Reactivity

STABILITY: Stable HAZARDOUS POLYMERIZATION: Will Not Occur

CONDITIONS TO AVOID: N/A

MATERIALS TO AVOID: Acids and maleic anhydride Magnesium hydroxide is soluble in aqueous acids generating heat.

HAZARDOUS DECOMPOSITION PRODUCTS: HEAT AND STEAM

Section XI Toxicological Information

UNIVAR USA INC.
ISSUE DATE:2000-04-17
Annotation:

MSDS NO:P14725V
VERSION:010 2006-08-18

N/A

Section XII Ecological Information

N/A

Section XIII disposal Considerations

May be disposed of in a secured sanitary landfill. Disposal must be done in accordance with Local, State, and Federal regulations.

Section XIV Transport Information

DOT Proper Shipping Name: N/A

DOT Hazard Class/I.D. No: N/A

Section XV Regulatory Information

Reportable Quantity: N/A

NFPA Rating: Health - 1; Fire - 0; Reactivity - 0

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

Carcinogenicity Lists: No NTP: No IARC Monograph: No OSHA Regulated: No

Section XVI Other information

SYNONYMS/ COMMON NAMES: Brucite

CHEMICAL FAMILY TYPE: Magnesium Hydroxide

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process



Environment, Safety, Health & Quality
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(505) 667-0666/FAX: (505) 667-5224

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: February 23, 2011
Refer To: ENV-RCRA-11-0034
LAUR: 11-10030

Mr. Isaac Chen
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Permits and Technical Assistance Section (6WQ-PP)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Mr. Chen:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, SUPPLEMENTAL INFORMATION FOR NOTICE OF PLANNED CHANGE FOR THE ADDITION OF HARDNESS TO OUTFALL 051 EFFLUENT

Per your request, additional information is being provided regarding the Notice of Planned Change sent to the U. S. Environmental Protection Agency's Region 6 in December 2010 (reference ENV-RCRA-10-239) concerning plans to restore hardness to the Radioactive Liquid Waste Treatment Facility (RLWTF) effluent waters. The enclosed report is an evaluation of how hardness contributes to the whole effluent toxicity of Outfall 051 effluent. This report was prepared by Pacific EcoRisk in Fairfield, California (See Enclosure 1).

This information is provided as a follow-up to e-mail correspondence sent to you from Mike Saladen on December 23, 2010. Los Alamos National Security, Inc. (LANS) and National Nuclear Security Administration (NNSA) representatives will be scheduling a visit to your office in early March 2011 to continue this discussion.

Mr. Isaac Chen
ENV-RCRA-11-0034

- 2 -

February 23, 2011

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions or need additional information.

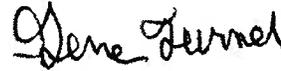
Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

ARG:GET:MB/lm

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

Enclosure: a/s

Cy: Brent Larsen, USEPA/Region 6, Dallas, TX, w/enc.
Mary Simmons, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
Michael Mallory, PADOPS, w/o enc., A102
J. Chris Cantwell, ADESHQ, w/o enc., K491
Hugh McGovern, TA-55-RLW, w/enc., E518
Pete Worland, TA-55-RLW, w/enc., E518
Mike Saladen, ENV-RCRA, w/enc., K490, (E-File)
Marc Bailey, ENV-RCRA, w/enc., K490, (E-File)
Bob Beers, ENV-RCRA, w/enc., K490, (E-File)
Randy Johnson, ENV-ES, w/enc., E500
Cindy Blackwell, LC-LESH, w/o enc., A187
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1

**An Evaluation of the Role of “Hardness”
in the Amelioration and/or Exacerbation of
Los Alamos National Laboratory
Outfall 051 Effluent Toxicity**

Prepared For:

**Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, NM 87545**

Prepared By:

**Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534**

**February 2011
Report Revised February 23, 2011**



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

1. INTRODUCTION

The NPDES Permit No. NM0028355 issued to the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) for the Los Alamos National Laboratory (LANL) requires the permittee(s) to perform acute and/or chronic aquatic toxicity bioassays for several discharge outfalls throughout the Laboratory. Pacific EcoRisk, Inc. (PER) has been performing acute toxicity testing on LANL's Radioactive Liquid Waste Treatment Facility (RLWTF) Outfall 051 effluent using the freshwater crustacean *Daphnia pulex* since 2007. During this time sporadic occurrences of toxicity have been observed. Examination of the basic water quality characteristics of the 051 effluent suggests that the hardness of the effluent is playing a role in the observed toxicity.

1.1 Hardness in LANL Surface Water and Groundwater

Hardness is a natural component of water and is defined as the concentration of multivalent cations (mainly divalent cations). The primary hardness cations are generally calcium (Ca^{2+}) and magnesium (Mg^{2+}). The U.S. Geological Survey reports that some of the United States' hardest surface waters are found in New Mexico, Arizona, and Texas. Interestingly, while the Los Alamos region is surrounded by surface waters categorized as "very hard" (> 181 mg/L), it can be considered an "island" of surface water hardnesses typically in the "moderately hard" (60-120 mg/L) and "hard" (121-180 mg/L) range (<http://water.usgs.gov/owq/hardness-alkalinity.html#map>). This is consistent with the surface water hardnesses ranging from 52-159 mg/L that were measured for LANL ambient surface waters that were previously received and analyzed (Table 1) at the PER laboratory (PER 2005).

Table 1. Surface water quality characteristics of the Los Alamos ambient water samples.

Sample ID	Sample Date	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
CAMO-05-61170	7/26/05	10.8	7.72	10.7	119	111	357	<1.0
CAMO-05-61172	7/26/05	9.7	7.13	10.2	170	159	422	<1.0
CAMO-05-61174	7/26/05	7.9	7.24	11.3	138	117	423	<1.0
CAMO-05-61176	7/26/05	6.7	7.66	12.2	130	90	483	<1.0
CALA-05-61185	7/26/05	6.9	7.64	10.9	64	93	199	<1.0
CAMO-05-61166	8/18/05	6.0	7.05	10.2	90	99	244	<1.0
CAMO-05-61178	8/18/05	8.9	7.33	9.8	78	52	265	<1.0
CAMO-05-61180	8/18/05	8.9	7.80	11.1	92	82	271	<1.0

Data from PER 2005; water quality characteristics were measured at the time of sample log-in at the testing lab.

However, the source of water used at LANL is not surface water, but rather is domestic "tapwater" provided by Los Alamos County which pumps high-quality groundwater from the

local aquifer via three water supply well fields (Otowi, Pajarito and Guaje), each of which has different hardness characteristics (Environmental Surveillance at Los Alamos during 2000, LA-13861-ENV):

- The Otowi field - The water hardness ranges from 63-89 mg/L (as CaCO₃);
 - calcium concentrations range from 20-22 mg/L;
 - magnesium concentrations range from 3-8 mg/L;
- The Pajarito field – The water hardness ranges from 42-96 mg/L;
 - calcium concentrations range from 11-27 mg/L;
 - magnesium concentrations range from 3-8 mg/L;
- The Guaje field - The water hardness ranges from 29 to 56 mg/L;
 - calcium concentrations range from 11-17 mg/L;
 - magnesium concentrations range from 1-3 mg/L.

Note – Due to the unique hydrogeology of the aquifer that serves Los Alamos, its water hardness is comprised almost completely by calcium and magnesium.

This “tapwater” is used in LANL’s radiological and nuclear facilities in a variety of applications. Wastewater from these facilities is collected and routed via a collection system to the influent tank at the RLWTF for treatment. Wastewater fed from this influent tank to the RLWTF treatment process is termed “RAW” influent. The treated water discharged from the RLWTF treatment process is termed “FINAL” effluent. The “RAW” influent to the RLWTF starts out with a hardness of approximately 40-45 mg/L (Table 2). However, the RLWTF’s various wastewater treatment processes have the indirect effect of reducing the hardness in the Outfall 051 “FINAL” effluent to approximately 1-3 mg/L (range = 0.2-12 mg/L in 2008-09).

Water Quality Parameter	1994-1997 ^a	2008 ^b		2009 ^b	
	“Tapwater”	“RAW” Influent	“FINAL” Effluent	“RAW” Influent	“FINAL” Effluent
Hardness (mg/L as CaCO ₃)	48.9	41.8	1.47	44.6	2.7
Calcium (mg/L)	13	11.4	0.31	12.0	0.40
Magnesium (mg/L)	4	3.2	0.17	3.6	0.41

a - A Mathematical Model (AMIGA) of Solution Chemistry and Silica Solubility in High Silica Water at LANL, V. P. Worland, May 1997.

b - Data from 2008 and 2009 Annual Reports for the LANL Rad Liquid Waste Treatment Facility.

1.2 Importance of Hardness Ca²⁺ and Mg²⁺ Ions in Biological Systems

While the RLWTF’s wastewater treatment processes effectively reduce the concentrations of many effluent contaminants (e.g., metals, etc.), the concomitant reduction of Ca²⁺ and Mg²⁺ concentrations could be problematic in that all organisms (i.e., plants, invertebrates, and vertebrates) require Ca²⁺ and Mg²⁺ in order to exist. These two elements are considered “the

most important and abundant dissolved solids in freshwater" (Rand et al., 1995). There are numerous critical biological processes that are dependent on Ca^{2+} in order to function. It is essential for metabolic processes in all living organisms (Goldman and Horne 1983), a regulator of cell permeability (Ricklefs 1979), the main skeletal component of many animals and some plants (Goldman and Horne 1983). Ca^{2+} release is the trigger for many cellular events including muscle contraction (Lehninger et al., 1993). Mg^{2+} , which has a similar water chemistry to Ca^{2+} , is vital for energy transfer in every cell since it catalyzes the change from ATP to ADP (Goldman and Horne 1983). Plants also require Mg^{2+} to form the active center of the primary photosynthetic pigment, chlorophyll *a* (Goldman and Horne 1983).

A summary of the biological functions of calcium and magnesium is presented in Table 3.

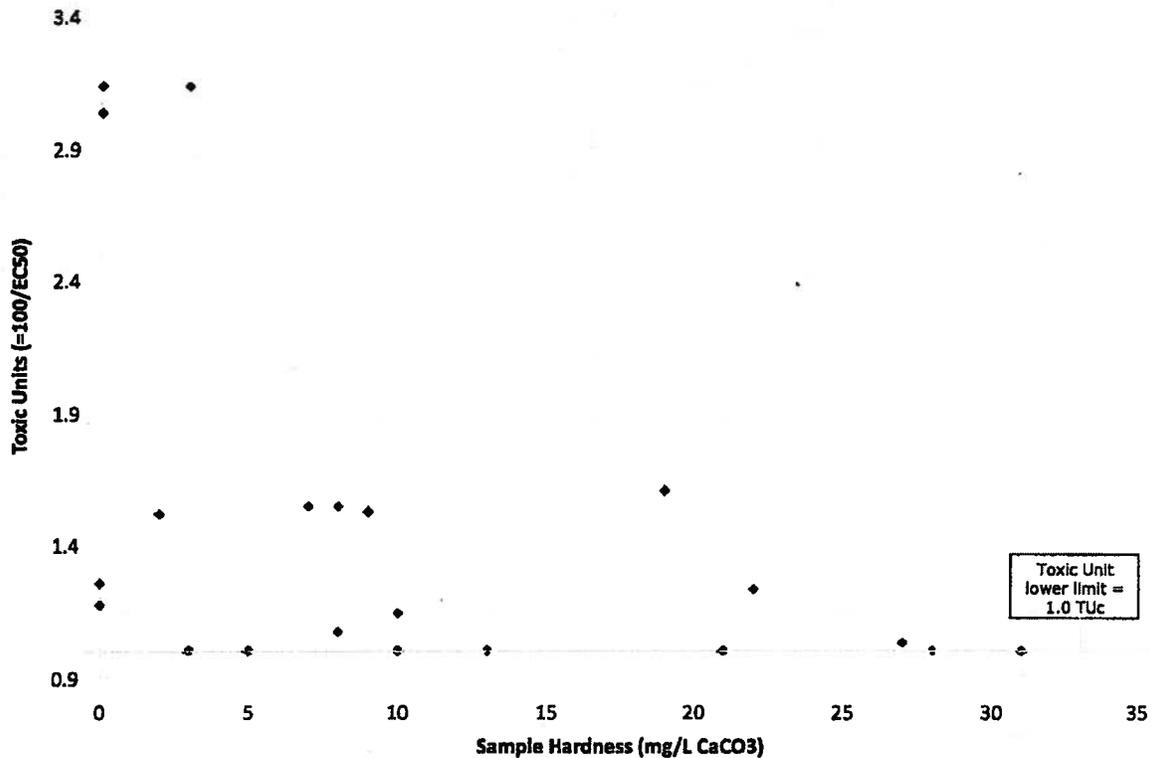
Micronutrient	Biological Function
Calcium (Ca^{2+})	Regulator of cell permeability Structural component of bone and skeletal structures Antagonistic influence on the uptake of metals Essential for metabolic processes in all living organisms Controlling factor in muscle contraction
Magnesium (Mg^{2+})	Structural component of chlorophyll Involved in function of many enzymes Vital for cell metabolism as the catalyst for transformation of ATP to ADP.

1.3 Low Hardness and Toxicity of RLWTF Outfall 051 Effluent

The roles of calcium and magnesium as essential to organism health appears to be reflected in the results of the 24 acute toxicity tests of the Outfall 051 effluent that PER has performed since 2007: when hardness levels are extremely low, there is generally an increase in the apparent toxicity of the effluent, and when hardness levels are >25 mg/L, virtually no toxicity is observed (Table 4 and Figure 1).

While there seems to be a correlation between extreme low hardness levels and increased toxicity, it is difficult to ascribe that completely to calcium and magnesium deficiencies. While the essential role for Ca^{2+} and Mg^{2+} in organism health is well known, few studies on adverse effects of extreme low hardness on aquatic organisms, and particularly daphnids, have been reported. Cowgill and Milazzo (1991) reported that daphnid (*Daphnia magna* and *Ceriodaphnia dubia*) reproduction declined below hardness levels of 72 mg/L, with 'total number of offspring' EC_{50} 's of 5 mg/L and 38 mg/L, respectively (in this context, EC_{50} is the hardness concentration predicted to have a 50% effect on the organisms). Cowgill and Milazzo also reported that *C. dubia* exhibited signs of stress when water hardness was below 9 mg/L.

Figure 1. Effects of Outfall 051 Hardness on Acute Toxicity



Note – Toxic Units (TU) are standard measures of the magnitude of toxicity, where $TU > 1$ indicates the presence of toxicity, with the magnitude of the toxicity increasing as the TU increases.

Lasier et al. (2006) similarly reported that *C. dubia* cultured in higher hardness waters (~100 mg/L) suffered reduced reproduction when exposed to low-hardness waters (40-50 mg/L); no such effects were observed for low-hardness organisms transferred to high-hardness waters. This suggests that the low hardness of the Outfall 051 effluent could cause adverse effects as it dilutes and lowers the hardness of any downstream ambient waters.

The Outfall 051 effluent is discharged into the Mortandad Canyon “receiving water”, which is an ephemeral stream. Generally, the effluent infiltrates below the ground surface within 100 yards downstream of the outfall, although it may reach as far as 1-2 miles downstream before complete infiltration following significant storm events. However, as a precautionary ‘worst case scenario’ approach, it is responsible to be protective of the downstream aquatic ecosystems that do have established populations of aquatic organisms. The scientific studies cited above suggest that the reduction (and in some cases complete removal) of the hardness that is present in the “tapwater” and “RAW” influent to the low levels observed for the Outfall 051 effluent (and hence, in ambient waters downstream of the Outfall 051 effluent discharge) could directly or indirectly affect downstream receiving waters.

Table 4: Hardness levels and acute toxicity of LANL Outfall 051 samples (2007-2010)

Sample Collection Date	Sample Hardness (mg/L CaCO ₃)	NOEC (% Effluent)	EC ₅₀ (% Effluent)	Toxic Units (100/EC ₅₀)
1/23/07	5	100	>100	<1
9/27/07	9	56	65.9	1.52
10/30/07	8	56	65.0	1.54
12/12/07	2	56	66.2	1.51
12/19/07	19	56	62.4	1.60
2/25/08	27	100	96.7	1.03
6/25/08	8	75	93.4	1.07
8/6/08	3	100	>100	<1
11/17/08	7	56	64.8	1.54
2/10/09	10	100	>100	<1
4/16/09	13	100	>100	<1
7/9/09	22	75	77.7	1.23
7/28/09	31	100	>100	<1
12/1/09	0	<32 ^a	<32 ^a	>3.13
1/4/10	0	<32	33	1.33
1/11/10	0	75	79.7	1.25
1/25/10	0	75	85.5	1.17
3/8/10	28	100	>100	<1
3/22/10	10	75	87.6	1.14
4/26/10	3	<32 ^a	<32 ^a	>3.13
6/8/10	21	100	>100	<1
7/12/10	0	<32	<32	>3.13
7/19/10	0	<32 ^a	<32 ^a	>3.13
11/18/10	31	100	>100	<1

a – There was complete mortality at all effluent concentrations.

Based upon this information, it is recommended that the hardness of the Outfall 051 effluent be restored to the hardness levels originally present in the “RAW” water prior to discharge. It is worth noting that this is recognized by regulatory agencies in their own guidelines for the performance of Toxicity Identification Evaluations (TIEs): California regulatory guidelines state that after performing ion-exchange treatment, “essential” ions Ca²⁺ and Mg²⁺ be added back to the effluent (Connor and Deanovic 1991).

1.4 Interaction Between Hardness and Contaminant Toxicity

The scientific literature clearly indicates the essentiality of Ca²⁺ and Mg²⁺ in ambient waters in order to maintain the health of aquatic organisms. The observation of toxicity at extreme low

hardness levels may also be due in part to the general antagonistic effect of hardness (and particularly Ca^{2+}) on the toxicity of contaminants, and metals in particular. For instance, numerous studies have reported that hardness is protective of metals toxicity to the Outfall 051 test organism *Daphnia pulex* (or to closely-related *Daphnia magna*), typically with Ca^{2+} having a greater protective effect than Mg^{2+} (Santore et al. 2001; deSchampheleare and Janssen 2002; Heijerick et al., 2002; Naddy et al. 2002; Kozlova et al. 2008; Clifford and McGeer 2009, 2010). In fact, the protective effect of hardness on metals toxicity to a wide variety of aquatic organisms is so well established that contemporary water quality criteria for metals generally are normalized to hardness levels of waters.

Again, the restoration of the hardness levels to the LANL effluent is recommended as a protective measure against potential contaminant toxicity to downstream aquatic organisms and to the *Daphnia pulex* organisms used in the acute toxicity tests of the Outfall 051 effluent.

2. SUMMARY AND CONCLUSIONS

The water used at LANL is a groundwater and has a hardness that is typically ~40-50 mg/L. However, after application of the various wastewater treatment processes at the RLWTF, the hardness of the Outfall 051 effluent has been reduced to levels as low as ~1 mg/L (the annual mean concentrations were approximately 1-3 mg/L, and ranged from 0.2-12 mg/L in 2008-09). This extreme low hardness is of potential concern as the hardness ions Ca^{2+} and Mg^{2+} are essential to maintain the health of aquatic organisms.

The reduction of the concentrations of these essential ions may be reflected in the observation of sporadic acute toxicity of the Outfall 051 effluent, particularly when the hardness is reduced to extremely low levels (e.g., to non-measurable concentrations). In addition, it can be expected that if present, the toxicity of contaminants, and in particular metals such as copper and zinc, will be increased at the extremely low hardness levels.

On that basis, it is highly recommended that LANL consider implementation of measures to restore the hardness of the effluent to the original source water levels. This restoration of hardness is also supported by the fact that regulatory agency guidelines similarly call for the restoration of water hardness levels to those concentrations existing prior to the application of treatment processes that remove Ca^{2+} and Mg^{2+} . In the interim, it is recommended that the effluent samples used for acute toxicity testing with *D. pulex* be amended with the hardness ions Ca^{2+} and Mg^{2+} to restore the hardness to the original "RAW" influent conditions.

3. REFERENCES

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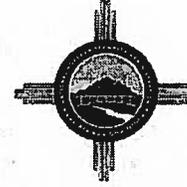
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*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
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National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: September 28, 2011
Refer To: ENV-RCRA-11-0204
LAUR: 11-11554

Ms. Hannah Branning
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Branning:

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO.
NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 051**

National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) at Los Alamos National Laboratory (the Laboratory) requires the permittees to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*).

The purpose of this letter is to notify the EPA of two process changes at the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF). The changes include the use of perchlorate ion exchange and the use of seawater reverse osmosis. In addition, this letter provides updated information about the installation of zero liquid discharge (ZLD) tanks. This notification is being provided even though neither of these process changes will change the nature of or increase the quantity of pollutants discharged at NPDES Outfall 051.

Perchlorate Ion Exchange

In 2002, the RLWTF installed the capability to remove perchlorate via ion exchange. The capability was installed in anticipation of EPA regulations that would limit perchlorate in discharges. To date, the NPDES permit for Outfall 051 has not established a discharge limit for perchlorate, nor has the EPA enacted regulations concerning perchlorate. The Laboratory's NPDES permit does require

annual monitoring for perchlorate. Currently, treated water is being discharged to the environment via evaporation or through Outfall 051.

NNSA/LANS will be modifying its treatment process to bypass the perchlorate ion exchange treatment process whenever treated water will be evaporated. Treatment will include ion exchange for perchlorate removal, when water is to be discharged through Outfall 051.

Sea Water Reverse Osmosis

The RLWTF generates secondary waste streams that cannot be processed with existing treatment equipment. These secondary wastes are currently being concentrated in a mechanical waste evaporator at the RLWTF, then shipped for offsite treatment and disposal as low-level radioactive solid waste. NNSA/LANS is currently designing a seawater reverse osmosis (SWRO) treatment unit to replace the existing waste evaporator. Replacement would occur during calendar year 2012.

As with the waste evaporator, SWRO treatment will split the secondary waste into two streams. Concentrate from the SWRO unit will be the equivalent of evaporator bottoms, and will be shipped for offsite treatment and disposal as low-level radioactive solid waste. The second output stream, permeate from the SWRO unit, will be the equivalent of evaporator overheads. This stream will be re-treated through the low-level treatment plant.

ZLD Tanks

NNSA/LANS are currently designing concrete tanks, to be located at TA52, for solar evaporation of water treated at the RLWTF. As shown in the enclosed process schematic (Enclosure 1), these tanks would provide another path for the discharge of treated water to the environment, so that treated waters can be discharged either through Outfall 051, by mechanical evaporation, or by solar evaporation in two locations.

The Zero-Liquid-Discharge (ZLD) Project consists of two portions: two concrete evaporation tanks, and a length of buried transfer piping that will connect the RLWTF to the ZLD tanks. Project completion is scheduled for 2012.

The tank portion of the ZLD Project will be located on a site of approximately one acre, located about two-thirds of a mile from the RLWTF within Technical Area 52 of the Laboratory. The site is located along the north side of Puye Road, bounded on the south by the road, and on the north by a steep drop-off in grade. The ZLD tanks will be constructed with concrete walls approximately four feet high, and will have a double liner with leak detection. Project design provides the capability of returning the contents of the tanks to the RLWTF for storage and retreatment, if necessary. Transfer piping, made of high-density polyethylene (HDPE), will be routed west from the proposed tanks, along Puye road toward the RLWTF. The length of transfer pipe will be approximately 3500 feet.

Enclosure 1 provides a revised schematic for the treatment of wastewater received at RLWTF for your review. The schematic includes the above-described changes to the treatment process.

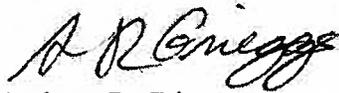
Ms. Hannah Branning
ENV-RCRA-11-0204

- 3 -

September 28, 2011

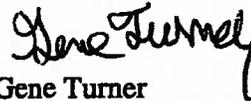
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GET:MS/lm

Cy: Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
James Bearzi, NMED/SWQB, Santa Fe, NM, w/enc.
Jerry Schoeppner, NMED/GWQB, Santa Fe, NM, w/enc.
Jim Davis, NMED/RPD, Santa Fe, NM, w/enc.
George Rael, LASO-EO, w/enc., A316
Steve Yanicak, LASO-GOV, w/enc., M894
Carl A. Beard, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Mike Saladen, ENV-RCRA, w/o enc., K490, (E-File)
Marc Bailey, ENV-RCRA, w/enc., K490, (E-File)
Bob Beers, ENV-RCRA, w/enc., K490, (E-File)
ENV-RCRA File, w/enc., M704
IRM-RMMSO, w/enc., A150



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National Nuclear Security Administration
Los Alamos Site Office, A316
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Date: June 2, 2010
Refer To: ENV-RCRA-10-110
LAUR: 10-03721

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

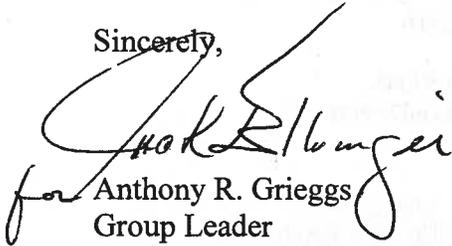
SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALLS 03A022 AND 03A160

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Reporting Requirements). On August 1, 2010 the new more stringent copper effluent limits (19 ug/l) will become effective at cooling tower outfalls 03A022 and 03A160. NNSA/LANS are taking the following interim measures to ensure the Laboratory remains in compliance with its NPDES Permit:

1. TA-3 Sigma Cooling Tower/NPDES Outfall 03A022: Four 2,500-gallon underground storage tanks and a full-scaled ion exchange system will be installed to store and treat effluent waters for removal of copper (See Enclosure 1).
2. TA-35 Cooling Tower/NPDES Outfall 03A160: Two 5,000 gallon above ground storage tanks and a full-scaled ion exchange system will be installed to store and treat effluent waters for removal of copper (See Enclosure 2).

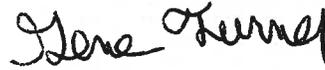
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality & RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



for Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



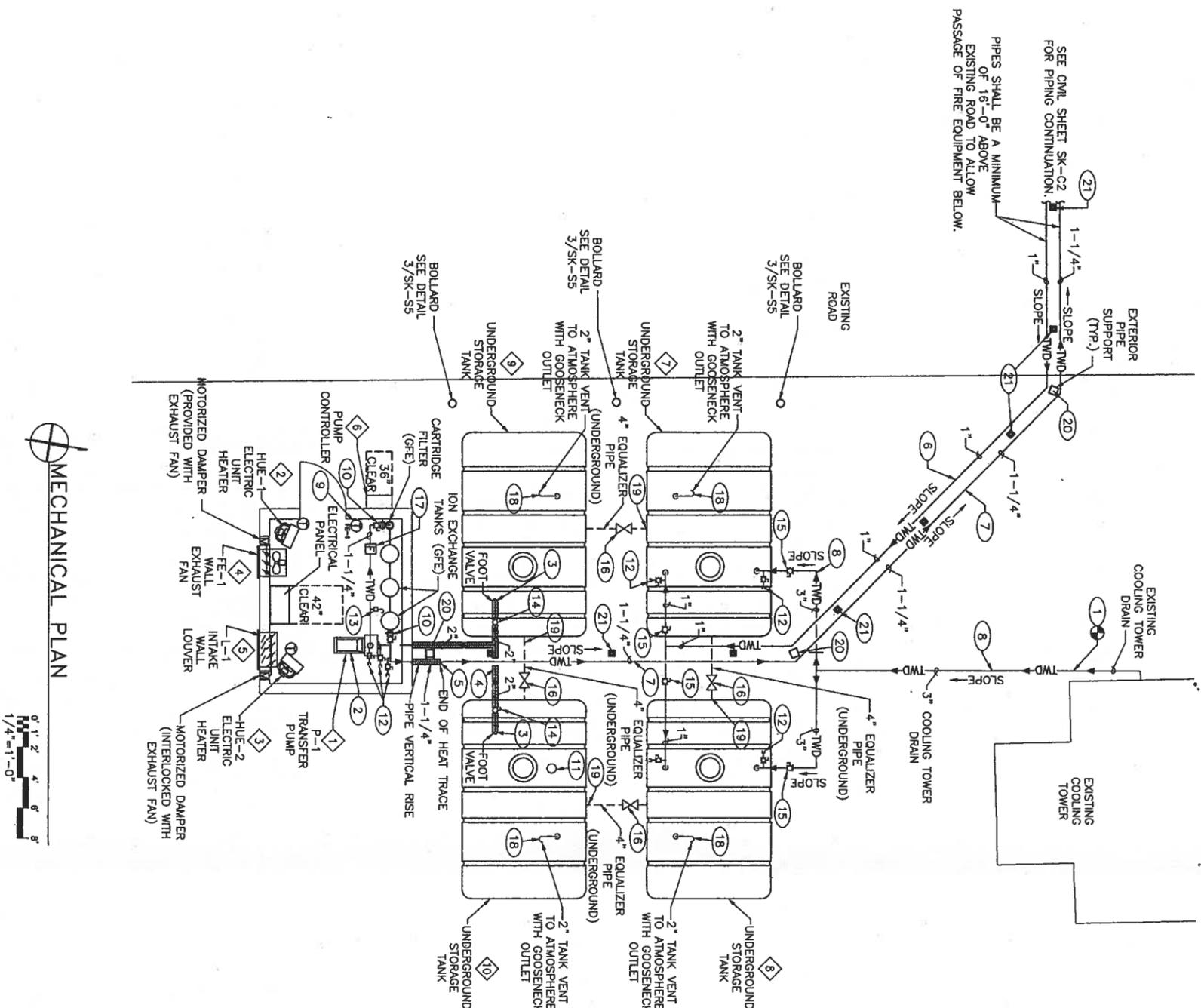
Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosures: a/s

Cy: Willie Lane, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EPO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert McQuinn, ADNHHO, w/o enc., E522
Patricia Johnson, STO-DO, w/o enc., E522
Rick Alexander, STO-DO, w/o enc., E522
Terry Morrison, STO-DO, w/o enc., G770
Bobby Romero, STO-DO, w/o enc., E522
Ed Pitchkolan, ES-NNF, w/o enc., E522
Marc Gallegos, ENV-ES, w/o enc., E509
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1



MECHANICAL PLAN



GENERAL NOTES

1. IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
2. ALL NEW NON-HEAT TRACED PIPING SHALL NOT BE INSULATED OR METAL JACKETED UNLESS NOTED. NEW HEAT TRACED PIPING SHALL BE INSULATED AND METAL JACKETED PER REQUIREMENTS OF SPECIFICATION 22 0713.
3. REFER TO DETAIL 4/SK-M4, DETAIL 5/SK-M4, AND SPECIFICATION 26 0529 FOR PIPE SUPPORT REQUIREMENTS INSIDE THE NEW PUMP BUILDING.

KEYED NOTES

1. CONNECT NEW COOLING TOWER DRAIN TO EXISTING DRAIN LINE.
2. SELF PRIMING PUMP. SEE DETAIL 1/SK-M4 FOR PIPING DETAILS.
3. ROUTE 2" PIPE DOWN TO WITHIN 6 INCHES OF BOTTOM OF STORAGE TANK AND TERMINATE WITH FOOT VALVE.
4. HEAT TRACE 2" PIPE FROM TANK OUTLET TO BUILDING INLET. SEE DETAIL 2/SK-M4 FOR HEAT TRACE DETAILS.
5. HEAT TRACE 1-1/4" PIPE FROM OUTLET OF BUILDING AND UP VERTICAL PIPE RISE UNTIL PIPE BEGINS TO SLOPE (GRAVITY DRAIN) TOWARDS EXISTING BUILDING DETAIL 2/SK-M4 FOR HEAT TRACE DETAILS.
6. SLOPE 1" DRAIN PIPING FROM BUILDING DOWN TOWARDS 2500 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
7. SLOPE 1-1/4" PUMPED DISCHARGE PIPING FROM TEMPORARY EQUIPMENT BUILDING DOWN TOWARDS EXISTING BUILDING (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
8. SLOPE 3" DRAIN PIPING FROM EXISTING COOLING TOWER DOWN TOWARDS 2500 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
9. LINE VOLTAGE THERMOSTAT FOR CONTROL OF WALL EXHAUST FAN FE-1 AND MOTORIZED DAMPER ON INTAKE LOUVER L-1.
10. THREADED CONNECTION WITH ISOLATION VALVE FOR CONNECTION OF CARTRIDGE FILTER (GFE) AND ION EXCHANGE TANKS (GFE).
11. PIPE STAND INSIDE TANK WITH PUMP "ON" FLOAT SWITCH, PUMP "OFF" FLOAT SWITCH, AND HIGH LEVEL ALARM FLOAT. REFER TO CONTROLS DRAWING FOR MOUNTING HEIGHT AND DETAILS.
12. 3/4" DRAIN LINE AND SAMPLING PORT AT LOW POINT WITH ISOLATION VALVE AND THREADED OUTLET FOR HOSE CONNECTION.
13. AUTOMATIC AIR VENT.
14. MANUAL ISOLATION VALVE (HEAT TRACED).
15. MANUAL ISOLATION VALVE.
16. BELOW GRADE 4" GATE VALVE WITH VALVE BOX EXTENSION. SEE DETAIL 3/SK-M4. GATE VALVE - MANUFACTURER: MULLER OR EQUAL. MODEL: A-2360-20 OR EQUAL. VALVE BOX - MANUFACTURER: TYLER OR EQUAL. MODEL: 6860 OR EQUAL.
17. WATER METER AND FLOW TOTALIZER. WATER METER - MANUFACTURER: BADGER OR EQUAL. MODEL: 55 1" SIZE. FLOW TOTALIZER - MANUFACTURER: BADGER OR EQUAL. MODEL: READ-O-MATIC.
18. PROVIDE INSECT SCREEN (18 X 16 ALUMINUM MESH) ON OUTLET OF 2" TANK VENTS.
19. HORIZONTAL EQUALIZER LINE BELOW GRADE. INSTALL EQUALIZER AS LOW AS POSSIBLE TO BOTTOM OF UNDERGROUND STORAGE TANK. CENTERLINE OF EQUALIZER LINE SHALL BE A MAXIMUM OF 1'-0" ABOVE BOTTOM OF UNDERGROUND STORAGE TANK.
20. PIPING/CONDUIT SUPPORT COLUMN AND FOUNDATION. SEE 1/SK-S5 FOR DETAILS.
21. PIPING UNISTRUT SUPPORT POST ON PIPING SUPPORT BEAM. SEE 2/SK-S5 FOR DETAILS.

SDV ***

CONSTRUCTION
WGL ENTERPRISES, INC. / BRIDGERS & PAXTON
 ENGINEERS

TA-03 SIGMA COOLING TOWER
 EFFLUENT DISCHARGE TREATMENT
 PROJECT

SK-M2

BLDG. 66

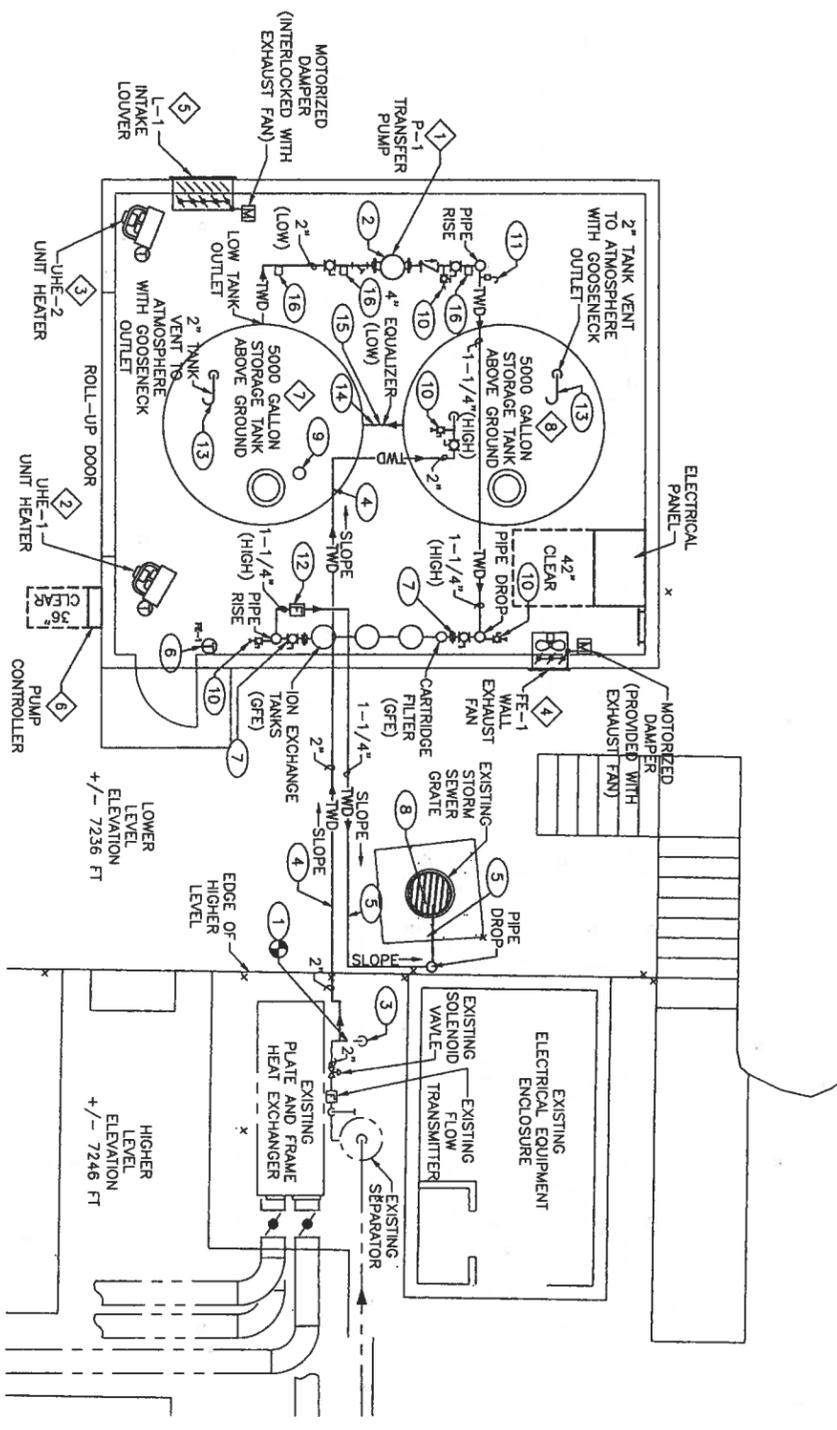
TA-03



Los Alamos
 NATIONAL LABORATORY
 P.O. Box 1663
 Los Alamos, New Mexico 87545
 Michael Harker 5-5-10
 04/21/10 3 OF 15
 APPROVED BY: *Harker K. Ross*
 PRINTED VALUE: *Michael Harker*

ENCLOSURE 2

MECHANICAL PLAN



- GENERAL NOTES**
1. IF THIS SHEET IS NOT 24"x36", IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
 2. ALL NEW PIPING SHALL NOT BE INSULATED OR METAL JACKETED UNLESS NOTED.
 3. REFER TO DETAIL 3/SK-M3, DETAIL 4/SK-M3, AND SPECIFICATION 26 0529 FOR PIPE SUPPORT REQUIREMENTS INSIDE THE NEW PUMP BUILDING.

- KEYED NOTES**
1. CONNECT NEW 2" DRAIN LINE TO EXISTING 2" DRAIN AFTER EXISTING SOLENOID VALVE AND EXISTING FLOW TRANSMITTER. ROUTE NEW 2" PIPING ABOVE GROUND OVER TO 5000 GALLON STORAGE TANK. SLOPE PIPING FOR GRAVITY DRAINAGE TO STORAGE TANKS.
 2. INLINE PUMP. SEE DETAIL 1/SK-M3 FOR PIPING DETAILS.
 3. EXISTING 2" DRAIN LINE DOWN THROUGH SLAB TO BE ABANDONED IN PLACE. CAP END OF EXISTING 2" DRAIN LINE.
 4. SLOPE 2" DRAIN PIPING FROM DRAIN CONNECTION DOWN TOWARDS 5000 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
 5. SLOPE 1-1/4" PUMPED DISCHARGE PIPING FROM TEMPORARY EQUIPMENT BUILDING DOWN TOWARDS EXISTING STORM GRATE DISCHARGE POINT (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
 6. LINE VOLTAGE THERMOSTAT FOR CONTROL OF WALL EXHAUST FAN FE-1 AND MOTORIZED DAMPER ON INTAKE LOUVER L-1.
 7. THREADED CONNECTION WITH ISOLATION VALVE FOR CONNECTION OF CARTRIDGE FILTER (GFE) AND ION EXCHANGE TANKS (GFE).
 8. ROUTE 1-1/4" DRAIN LINE THROUGH EXISTING STORM SEWER GRATE AND DISCHARGE INTO EXISTING STORM SEWER PIPE.
 9. PIPE STAND INSIDE TANK WITH PUMP "ON" FLOAT SWITCH, PUMP "OFF" FLOAT SWITCH, AND HIGH LEVEL ALARM FLOAT. REFER TO CONTROLS DRAWING FOR MOUNTING HEIGHT AND DETAILS.
 10. 3/4" DRAIN LINE AND SAMPLING PORT WITH ISOLATION VALVE AND THREADED OUTLET FOR HOSE CONNECTION.
 11. AUTOMATIC AIR VENT.
 12. WATER METER AND FLOW TOTALIZER. WATER METER - MANUFACTURER: BADGER OR EQUAL. MODEL: 35 T. SIZE: 1". FLOW TOTALIZER - MANUFACTURER: BADGER OR EQUAL. MODEL: READ-O-MATIC.
 13. PROVIDE INSECT SCREEN (18 X 16 ALUMINUM MESH) ON OUTLET OF 2" TANK VENTS.
 14. HORIZONTAL EQUALIZER ABOVE GRADE. INSTALL EQUALIZER AS LOW AS POSSIBLE TO BOTTOM OF STORAGE TANK. CENTERLINE OF EQUALIZER LINE SHALL BE A MAXIMUM OF 1'-6" ABOVE BOTTOM OF STORAGE TANK.
 15. WRAP FLUORESCENT WARNING TAPE AROUND EQUALIZER FOR TRIP HAZARD PREVENTION.
 16. PROVIDE FLOOR PIPE SUPPORT PER DETAIL 2/SK-M3.

ECN-10-TA-0035-0000-0000-0108

SDV ***

CONSTRUCTION
VIGIL ENGINEERING, INC. / BRIDGERS & PATTON
 CONSULTING ENGINEERS

TA-35 COOLING TOWER EFFLUENT
 DISCHARGE TREATMENT PROJECT

MECHANICAL PLAN

BLDG. 424

SK-M2

TA-35



Los Alamos
 NATIONAL LABORATORY
 P.O. Box 1663
 Los Alamos, New Mexico 87545

APPROVED BY: *Karen R. Rose*
 PRINTED NAME: Karen R. Rose

DATE: 04/21/10

3 OF 14



*Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)*
P.O. Box 1663, M704
Los Alamos, New Mexico 87545
(505) 667-0666/FAX (505) 667-5224

*National Nuclear Security Administration
Los Alamos Site Office, A316*
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: December 6, 2011
Refer To: ENV-RCRA-11-0268
LAUR: 11-12204

Ms. Hannah Branning
U.S. Environmental Protection Agency, Region 6
Water Quality Protection Division
Planning and Analysis Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Branning:

SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALL 03A022

National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration (NNSA) and Los Alamos National Security, LLC (LANS) at Los Alamos National Laboratory requires the permittees to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. *Reporting Requirements*). This letter notifies EPA that the cooling tower blow-down from NPDES Outfall 03A022 was connected to the Laboratory's Sanitary Wastewater System (SWWS) Plant on November 16, 2011.

An ion exchange (IX) treatment system has been treating blow-down from the TA-3 Sigma/Beryllium Test Facility's cooling tower since July 2010. This interim measure was implemented to address the new copper effluent limit at NPDES Outfall 03A022 which became effective on August 1, 2010. As documented in the Permittee's October 2011 NPDES quarterly report, the long term solution was to connect the cooling tower blow-down to the SWWS Plant. The IX treatment system will be removed but the holding tanks will remain in place at this time. Future discharges at Outfall 03A022 will be limited to once through cooling that may be needed to address off-normal conditions at the facility requiring emergency cooling. Enclosed for your review is the revised treatment schematic documenting the aforementioned changes (See Enclosure 1).

Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality and RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,

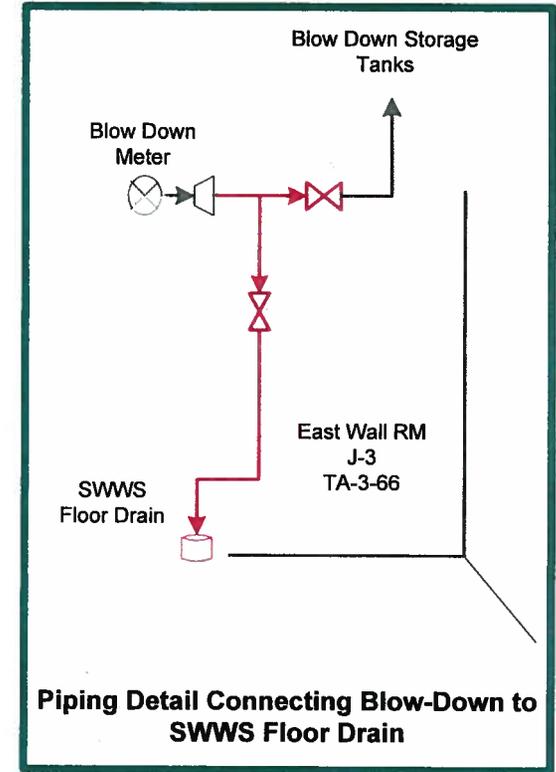
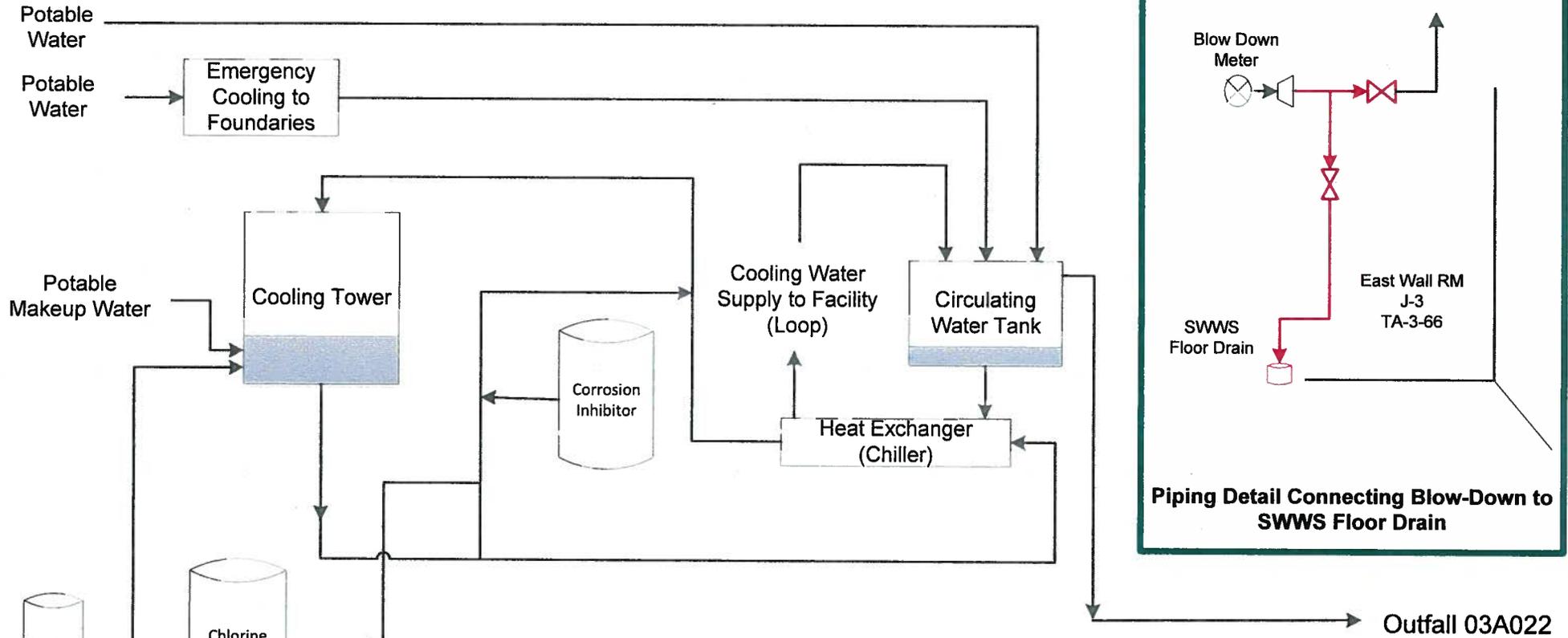


Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GET:MS/lm

Cy: Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
James Bearzi, NMED/SWQB, Santa Fe, NM, w/enc.
Jerry Schloepner, NMED/GWQB, Santa Fe, NM, w/enc.
Jim Davis, NMED/RPD, Santa Fe, NM, w/enc.
George Rael, LASO-EO, w/enc., A316
Steve Yanicak, LASO-GOV, w/enc., M894
Carl A. Beard, PADOPS, w/o enc., AI02
Michael T. Brandt, ADESH, w/o enc., K491
Rick Alexander, STO-DO, w/enc., E522
Mike Saladen, ENV-RCRA, w/enc., K490, (E-File)
Marc Bailey, ENV-RCRA, w/enc., K490, (E-File)
ENV-RCRA File, w/enc., M704
IRM-RMMSO, w/enc., A150

Notice of Changed Condition Outfall 03A022 - Cooling Tower Blow-Down to SWWS



See Detail

— Discharge Treated Blow Down to SWWS

Floor Drain
Room J-3 East Wall
Discharges to SWWS

PROCESS SCHEMATIC
Notice of Changed Condition
Cooling Tower Blow-Down to SWWS
December 6, 2011

LANL NPDES Permit No. NM0028355
OUTFALL 03A022



Environment, Safety, Health & Quality
P.O. Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

National Nuclear Security Administration
Los Alamos Site Office, A316
3747 West Jemez Road
Los Alamos, New Mexico 87545
(505) 667-5794/FAX (505) 667-5948

Date: June 2, 2010
Refer To: ENV-RCRA-10-110
LAUR: 10-03721

Ms. Sonia Hall
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Hall:

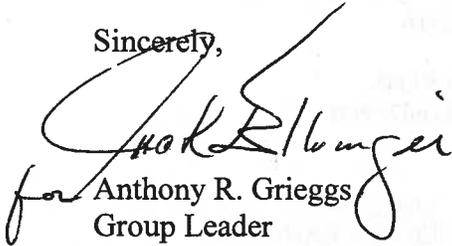
SUBJECT: LOS ALAMOS NATIONAL LABORATORY, NPDES PERMIT NO. NM0028355, NOTICE OF PLANNED CHANGE AT NPDES OUTFALLS 03A022 AND 03A160

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) regarding any physical alterations or additions to the permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Reporting Requirements). On August 1, 2010 the new more stringent copper effluent limits (19 ug/l) will become effective at cooling tower outfalls 03A022 and 03A160. NNSA/LANS are taking the following interim measures to ensure the Laboratory remains in compliance with its NPDES Permit:

1. TA-3 Sigma Cooling Tower/NPDES Outfall 03A022: Four 2,500-gallon underground storage tanks and a full-scaled ion exchange system will be installed to store and treat effluent waters for removal of copper (See Enclosure 1).
2. TA-35 Cooling Tower/NPDES Outfall 03A160: Two 5,000 gallon above ground storage tanks and a full-scaled ion exchange system will be installed to store and treat effluent waters for removal of copper (See Enclosure 2).

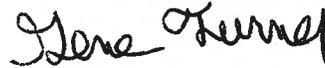
Please contact Marc Bailey at (505) 665-8135 or Mike Saladen at (505) 665-6085 of the Water Quality & RCRA Group (ENV-RCRA) if you have questions.

Sincerely,



for Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group (ENV-RCRA)
Los Alamos National Security, LLC

Sincerely,



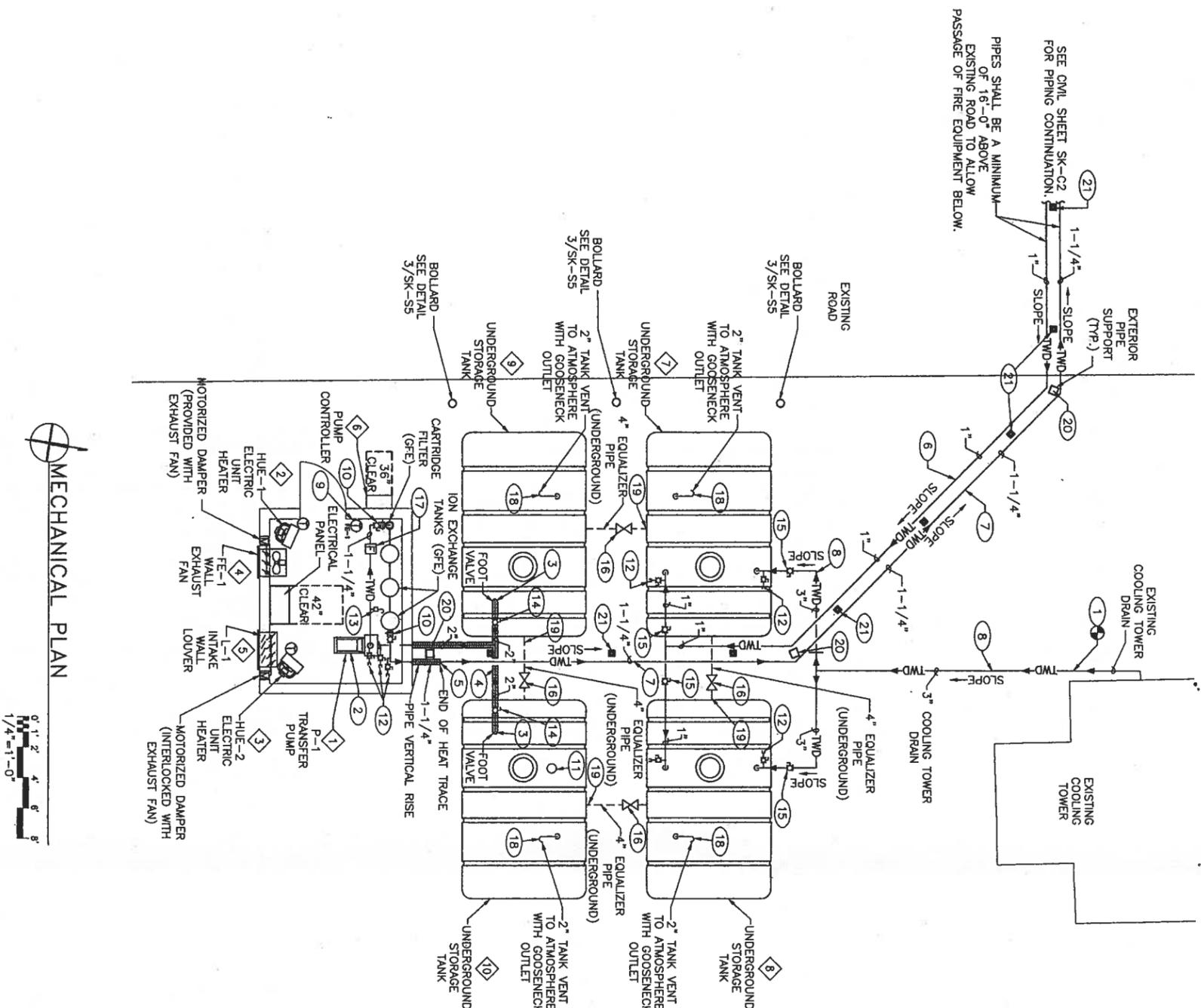
Gene Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

ARG:GT:MS/lm

Enclosures: a/s

Cy: Willie Lane, USEPA/Region 6, Dallas, TX, w/enc.
Isaac Chen, USEPA/Region 6, Dallas, TX, w/enc.
Glenn Saums, NMED/SWQB, Santa Fe, NM, w/enc.
William Olson, NMED/GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., M894
George Rael, LASO-EPO, w/enc., A316
Michael B. Mallory, PADOPS, w/o enc., AI02
J. Chris Cantwell, ADESHQ, w/o enc., K491
Robert McQuinn, ADNHHO, w/o enc., E522
Patricia Johnson, STO-DO, w/o enc., E522
Rick Alexander, STO-DO, w/o enc., E522
Terry Morrison, STO-DO, w/o enc., G770
Bobby Romero, STO-DO, w/o enc., E522
Ed Pitchkolan, ES-NNF, w/o enc., E522
Marc Gallegos, ENV-ES, w/o enc., E509
Mike Saladen, ENV-RCRA, w/o enc., K490
Marc Bailey, ENV-RCRA, w/enc., K490
ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

ENCLOSURE 1



MECHANICAL PLAN



GENERAL NOTES

1. IF THIS SHEET IS NOT 24"x36" IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
2. ALL NEW NON-HEAT TRACED PIPING SHALL NOT BE INSULATED OR METAL JACKETED UNLESS NOTED. NEW HEAT TRACED PIPING SHALL BE INSULATED AND METAL JACKETED PER REQUIREMENTS OF SPECIFICATION 22 0713.
3. REFER TO DETAIL 4/SK-M4, DETAIL 5/SK-M4, AND SPECIFICATION 26 0529 FOR PIPE SUPPORT REQUIREMENTS INSIDE THE NEW PUMP BUILDING.

KEYED NOTES

- ① CONNECT NEW COOLING TOWER DRAIN TO EXISTING DRAIN LINE.
- ② SELF PRIMING PUMP. SEE DETAIL 1/SK-M4 FOR PIPING DETAILS.
- ③ ROUTE 2" PIPE DOWN TO WITHIN 6 INCHES OF BOTTOM OF STORAGE TANK AND TERMINATE WITH FOOT VALVE.
- ④ HEAT TRACE 2" PIPE FROM TANK OUTLET TO BUILDING INLET. SEE DETAIL 2/SK-M4 FOR HEAT TRACE DETAILS.
- ⑤ HEAT TRACE 1-1/4" PIPE FROM OUTLET OF BUILDING AND UP VERTICAL PIPE RISE UNTIL PIPE BEGINS TO SLOPE (GRAVITY DRAIN) TOWARDS EXISTING BUILDING DETAIL 2/SK-M4 FOR HEAT TRACE DETAILS.
- ⑥ SLOPE 1" DRAIN PIPING FROM BUILDING DOWN TOWARDS 2500 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
- ⑦ SLOPE 1-1/4" PUMPED DISCHARGE PIPING FROM TEMPORARY EQUIPMENT BUILDING DOWN TOWARDS EXISTING BUILDING (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
- ⑧ SLOPE 3" DRAIN PIPING FROM EXISTING COOLING TOWER DOWN TOWARDS 2500 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
- ⑨ LINE VOLTAGE THERMOSTAT FOR CONTROL OF WALL EXHAUST FAN FE-1 AND MOTORIZED DAMPER ON INTAKE LOUVER L-1.
- ⑩ THREADED CONNECTION WITH ISOLATION VALVE FOR CONNECTION OF CARTRIDGE FILTER (GFE) AND ION EXCHANGE TANKS (GFE).
- ⑪ PIPE STAND INSIDE TANK WITH PUMP "ON" FLOAT SWITCH, PUMP "OFF" FLOAT SWITCH, AND HIGH LEVEL ALARM FLOAT. REFER TO CONTROLS DRAWING FOR MOUNTING HEIGHT AND DETAILS.
- ⑫ 3/4" DRAIN LINE AND SAMPLING PORT AT LOW POINT WITH ISOLATION VALVE AND THREADED OUTLET FOR HOSE CONNECTION.
- ⑬ AUTOMATIC AIR VENT.
- ⑭ MANUAL ISOLATION VALVE (HEAT TRACED).
- ⑮ MANUAL ISOLATION VALVE.
- ⑯ BELOW GRADE 4" GATE VALVE WITH VALVE BOX EXTENSION. SEE DETAIL 3/SK-M4. GATE VALVE - MANUFACTURER: MULLER OR EQUAL. MODEL: A-2360-20 OR EQUAL. VALVE BOX - MANUFACTURER: TYLER OR EQUAL. MODEL: 6860 OR EQUAL.
- ⑰ WATER METER AND FLOW TOTALIZER. WATER METER - MANUFACTURER: BADGER OR EQUAL. MODEL: 55 1" SIZE. FLOW TOTALIZER - MANUFACTURER: BADGER OR EQUAL. MODEL: READ-O-MATIC.
- ⑱ HORIZONTAL EQUALIZER LINE BELOW GRADE. INSTALL EQUALIZER AS LOW AS POSSIBLE TO BOTTOM OF UNDERGROUND STORAGE TANK. CENTERLINE OF EQUALIZER LINE SHALL BE A MAXIMUM OF 1'-0" ABOVE BOTTOM OF UNDERGROUND STORAGE TANK.
- ⑳ PIPING/CONDUIT SUPPORT COLUMN AND FOUNDATION. SEE 1/SK-S5 FOR DETAILS.
- ㉑ PIPING UNISTRUT SUPPORT POST ON PIPING SUPPORT BEAM. SEE 2/SK-S5 FOR DETAILS.

SDV ***

CONSTRUCTION
WIGL ENTERPRISES, INC. / BRIDGERS & PAXTON
TA-03 SIGMA COOLING TOWER
EFFLUENT DISCHARGE TREATMENT
PROJECT

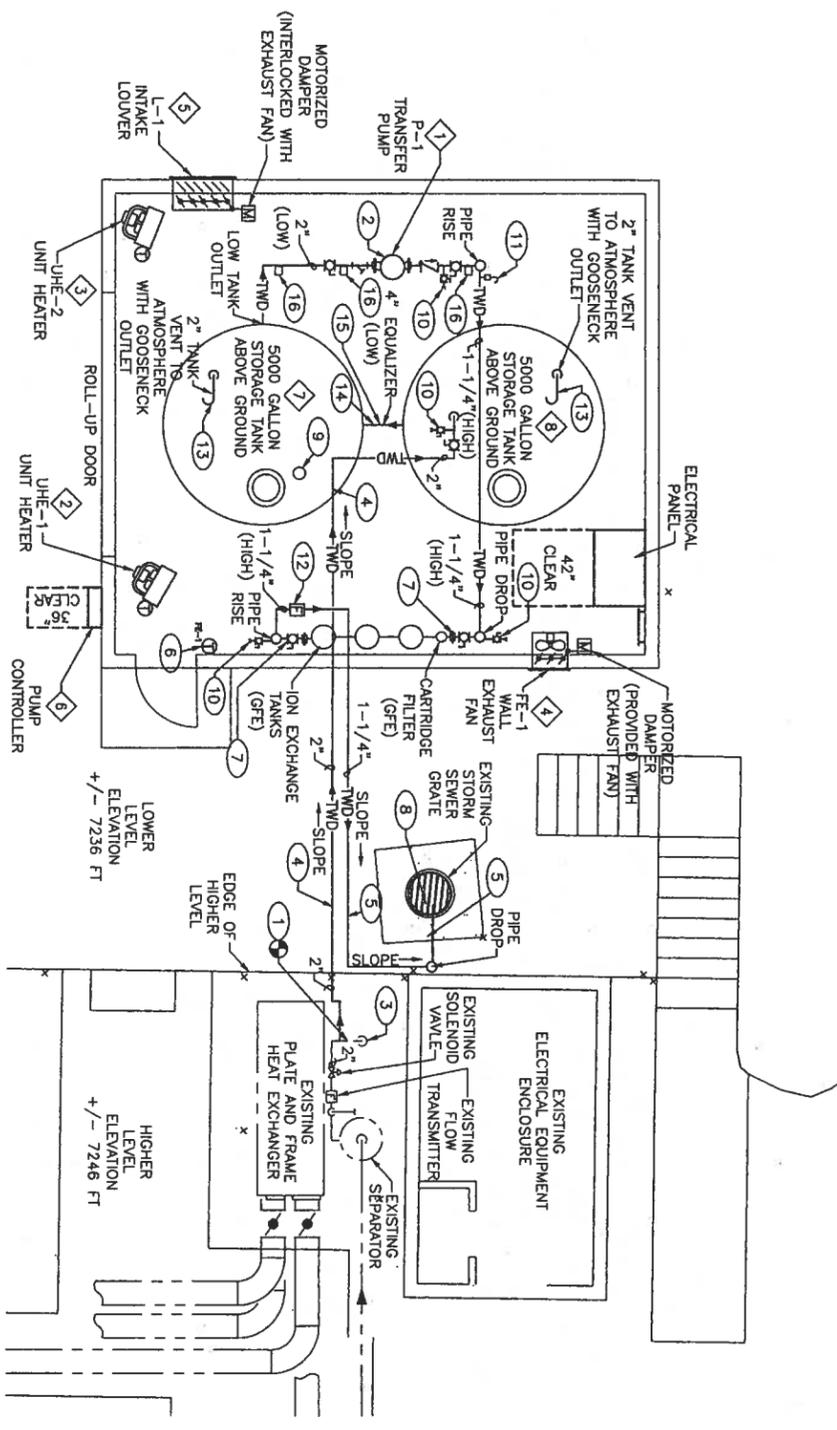
MECHANICAL PLAN
SK-M2
BLDG. 66
TA-03



Los Alamos
NATIONAL LABORATORY
P.O. Box 1663
Los Alamos, New Mexico 87545
Michael Harker 5-5-10
04/21/10
3 OF 15
APPROVED BY: *Harker K. Ross*
PRINTED VALUE: *Michael Harker*

ENCLOSURE 2

MECHANICAL PLAN



- GENERAL NOTES**
1. IF THIS SHEET IS NOT 24"x36", IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
 2. ALL NEW PIPING SHALL NOT BE INSULATED OR METAL JACKETED UNLESS NOTED.
 3. REFER TO DETAIL 3/SK-M3, DETAIL 4/SK-M3, AND SPECIFICATION 26 0529 FOR PIPE SUPPORT REQUIREMENTS INSIDE THE NEW PUMP BUILDING.

- KEYED NOTES**
1. CONNECT NEW 2" DRAIN LINE TO EXISTING 2" DRAIN AFTER EXISTING SOLENOID VALVE AND EXISTING FLOW TRANSMITTER. ROUTE NEW 2" PIPING ABOVE GROUND OVER TO 5000 GALLON STORAGE TANK. SLOPE PIPING FOR GRAVITY DRAINAGE TO STORAGE TANKS.
 2. INLINE PUMP. SEE DETAIL 1/SK-M3 FOR PIPING DETAILS.
 3. EXISTING 2" DRAIN LINE DOWN THROUGH SLAB TO BE ABANDONED IN PLACE. CAP END OF EXISTING 2" DRAIN LINE.
 4. SLOPE 2" DRAIN PIPING FROM DRAIN CONNECTION DOWN TOWARDS 5000 GAL STORAGE TANKS (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
 5. SLOPE 1-1/4" PUMPED DISCHARGE PIPING FROM TEMPORARY EQUIPMENT BUILDING DOWN TOWARDS EXISTING STORM GRATE DISCHARGE POINT (AS SHOWN) AT A MINIMUM OF 1/8" PER LINEAL FOOT OF HORIZONTAL RUN TO ALLOW GRAVITY DRAINAGE OF PIPE.
 6. LINE VOLTAGE THERMOSTAT FOR CONTROL OF WALL EXHAUST FAN FE-1 AND MOTORIZED DAMPER ON INTAKE LOUVER L-1.
 7. THREADED CONNECTION WITH ISOLATION VALVE FOR CONNECTION OF CARTRIDGE FILTER (GFE) AND ION EXCHANGE TANKS (GFE).
 8. ROUTE 1-1/4" DRAIN LINE THROUGH EXISTING STORM SEWER GRATE AND DISCHARGE INTO EXISTING STORM SEWER PIPE.
 9. PIPE STAND INSIDE TANK WITH PUMP "ON" FLOAT SWITCH, PUMP "OFF" FLOAT SWITCH, AND HIGH LEVEL ALARM FLOAT. REFER TO CONTROLS DRAWING FOR MOUNTING HEIGHT AND DETAILS.
 10. 3/4" DRAIN LINE AND SAMPLING PORT WITH ISOLATION VALVE AND THREADED OUTLET FOR HOSE CONNECTION.
 11. AUTOMATIC AIR VENT.
 12. WATER METER AND FLOW TOTALIZER. WATER METER - MANUFACTURER: BADGER OR EQUAL. MODEL: 35 T. SIZE: 1". FLOW TOTALIZER - MANUFACTURER: BADGER OR EQUAL. MODEL: READ-O-MATIC.
 13. PROVIDE INSECT SCREEN (18 X 16 ALUMINUM MESH) ON OUTLET OF 2" TANK VENTS.
 14. HORIZONTAL EQUALIZER ABOVE GRADE. INSTALL EQUALIZER AS LOW AS POSSIBLE TO BOTTOM OF STORAGE TANK. CENTERLINE OF EQUALIZER LINE SHALL BE A MAXIMUM OF 1'-6" ABOVE BOTTOM OF STORAGE TANK.
 15. WRAP FLUORESCENT WARNING TAPE AROUND EQUALIZER FOR TRIP HAZARD PREVENTION.
 16. PROVIDE FLOOR PIPE SUPPORT PER DETAIL 2/SK-M3.

ECN-10-TA-0035-0000-0000-0108

SDV ***

CONSTRUCTION
VIGIL ENGINEERS, INC. / BRIDGERS & PATTON
 CONSULTING ENGINEERS

TA-35 COOLING TOWER EFFLUENT
 DISCHARGE TREATMENT PROJECT

MECHANICAL PLAN

BLDG. 424

SK-M2

TA-35



Los Alamos
 NATIONAL LABORATORY
 P.O. Box 1663
 Los Alamos, New Mexico 87545

PI 102294
 04/21/10
 3 OF 14

APPROVED BY: *Karen K. Rose*
 DRAWN BY: *Karen K. Rose*

APPENDIX C
Other Environmental Permits at LANL

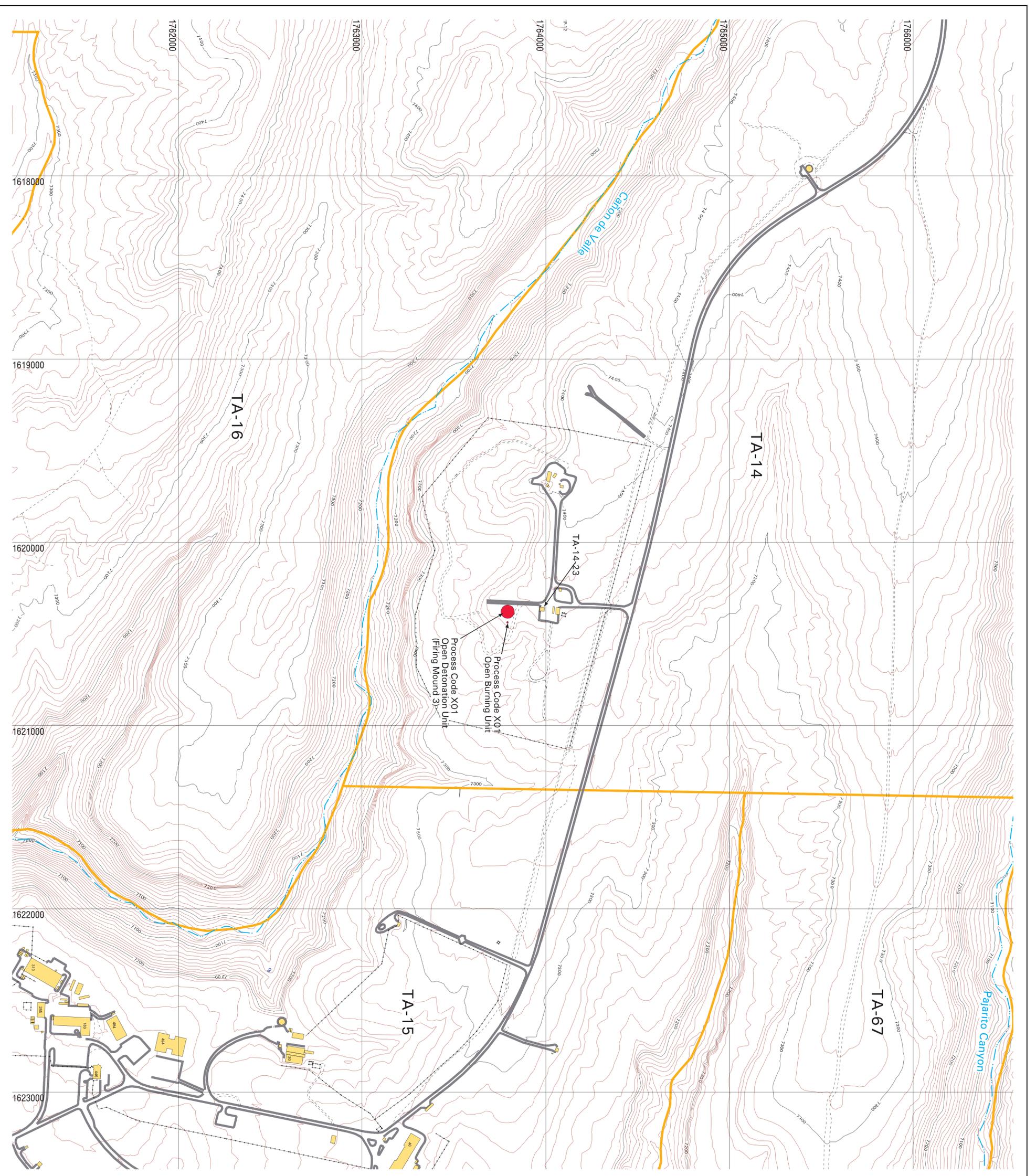
APPENDIX C
Other Environmental Permits

Permit Number	Description	
NPDES Construction General Permit		
NMR15EZ89	TA-55 Construction	
NMR15EZ83	TA-3 Construction	
NMR15FB34	TA-21 Closure Project	
NMR15FG67	Regional Wells Project	
NMR10H225	Tactical Training Facility	
NMR10H962	Diamond/Eniwetok Intersection	
NMR10HF45	TA-16 Indoor Firing Range	
NMR10HG73	TA-18 D&D Project	
NMR10HG93	TA-35 Parking Lot	
NMR10HH13	SERF Expansion Project	
NMR10HH52	Zero Liquid Discharge	
NMR10HI23	TA-40 Lift Station Project	
NMR10HI56	SM-43 Parking Lot	
NMR10HI66	Water Canyon SD Replacement	
NMR10HM30	Sigma Mesa Fill Yard	
NMR10HM39	PV Ductbank	
NPDES Industrial Point Source Permit		
NM0030759	NPDES Industrial Point Source Permit, November 1, 2010	
NPDES Storm Water Multi-Sector General Permit (MSGP) for Industrial Activities		
MSGP-2008	NPDES Storm Water Multi-Sector General Permit (MSGP), September 29, 2008	
Section 404 Dredge and Fill Permits with U.S. Army Corps of Engineers		
SPA-2011-00464	3	Canon de Valle, Emergency Culvert Replacement Project
SPA-2011-00477	13	Los Alamos Canyon, Emergency Bank Stabilization Project
SPA-2011-00512	3, 12, and 14	Water Canyon, Culvert Replacement Project
Groundwater Discharge Plans		
DP-1132	Radioactive Liquid Waste Treatment Facility	
DP-857	Sanitary Waste Water System (SWWS) Plant	
DP-1589	Septic Tank/Leach Field Systems	
Resource Conservation and Recovery Act (RCRA)		
NM0890019515-1	RCRA Hazardous Waste Facility Permit	
Air Quality Permits		
P100R1	Air Quality Operating Permit (20.2.70 NMAC) LANL Air Emissions	
2195	Air Quality (20.2.72 NMAC) Portable Rock Crusher	
2195B-M2	Air Quality (20.2.72 MAC) TA-3 Steam Plant	
2195F-R3	Air Quality (20.2.72 NMAC)TA-33 Generator	
GCP3-2195-G-R1	Air Quality (20.2.72 NMAC)TA-60 Asphalt Plant	
2195-H	Air Quality (20.2.72 NMAC) Data disintegrator	
#634-M-2 #632 #1081-M-1-R7	Air Quality (National Emission Standards for Hazardous Air Pollutants) Beryllium Machining: <ul style="list-style-type: none"> • TA-3-141 • TA-35-213 • TA-55-4 	
2195-N	Air Quality (20.2.72 NMAC) - Chemistry and Metallurgy Research Replacement Facility	
NSR 2195-P	TA-33 1-225 kW/2-20 kW Diesel Generators	

APPENDIX C (continued)
Other Environmental Permits

Permit Number	Description
<i>Septic Tank Permits</i>	
LA-21	TA-15-205, Leach Field
LA-32	TA-33-31, Seepage Pit
LA-34	TA-33-96, Leach Field
LA-38	TA-16-1194/1195, Leach Field
LA-39	TA-16-0178, Leach Field
LA-44	TA-39-0161, Evaporation Bed
LA-50	TA-49-0119, Evapotranspiration Bed
SF890024	TA-39-0132, Leach Field
SF89032R	TA-33-179, Leach Field
ES030243	TA-36-78, Leach Field
DP-1589	TA-58-0052, Leach Field
DP-1589	TA-33-0375, Leach Field

APPENDIX D
Hazardous Waste Management Facility Maps
and listing of the Hazardous Waste Treatment Process Codes



LEGEND

[Data source: Esri, DeLorme, NAVTEQ, United States Geological Survey, AeroGRID, IGN, Esri, Swisstopo]

-  Boundary, TA (020815-0001)
-  Contour, 10 foot (020781-0001)
-  Contour, 100 foot (020800-0001)
-  Fence, Industrial (020810-0001)
-  Fence, Security (020810-0002)
-  Road, Paved (020870-0001)
-  Road, Dirt (020860-0001)
-  Road/Trail (020860-0002)
-  Stream, Intermittent (020810-0003)
-  Stream, Perennial (020810-0004)
-  Structure (020815-0003)
-  RCRA-Regulated Waste Management Unit (020815-0004)
- PERCHED ALLUVIAL MONITORING WELLS**
(Old wells are pre-1990, new wells installed since 1990 according to EPA guidelines)
-  New Dry Well
-  Old Dry Well
-  New Saturated Well
-  Old Saturated Well
- MAIN AQUIFER WELLS**
-  Water Supply Well
-  Test Well
- OTHER**
-  Abandoned/Plugged Well
-  LAOR Well
-  Other Monitoring Well
-  Surface Water Sampling Station (020815-0001)
-  Spring (020815-0001)

Contour Map Showing the Locations of the RCRA-Regulated Units at Technical Area (TA) 14

N

State Plane Coordinate System, New Mexico Central Zone,
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid Interval, in feet: 1000
Feet per inch on map = 250

SCALE: 1:3000

0 250 500 750 1000

FEET

0 250 500 750 1000

METERS

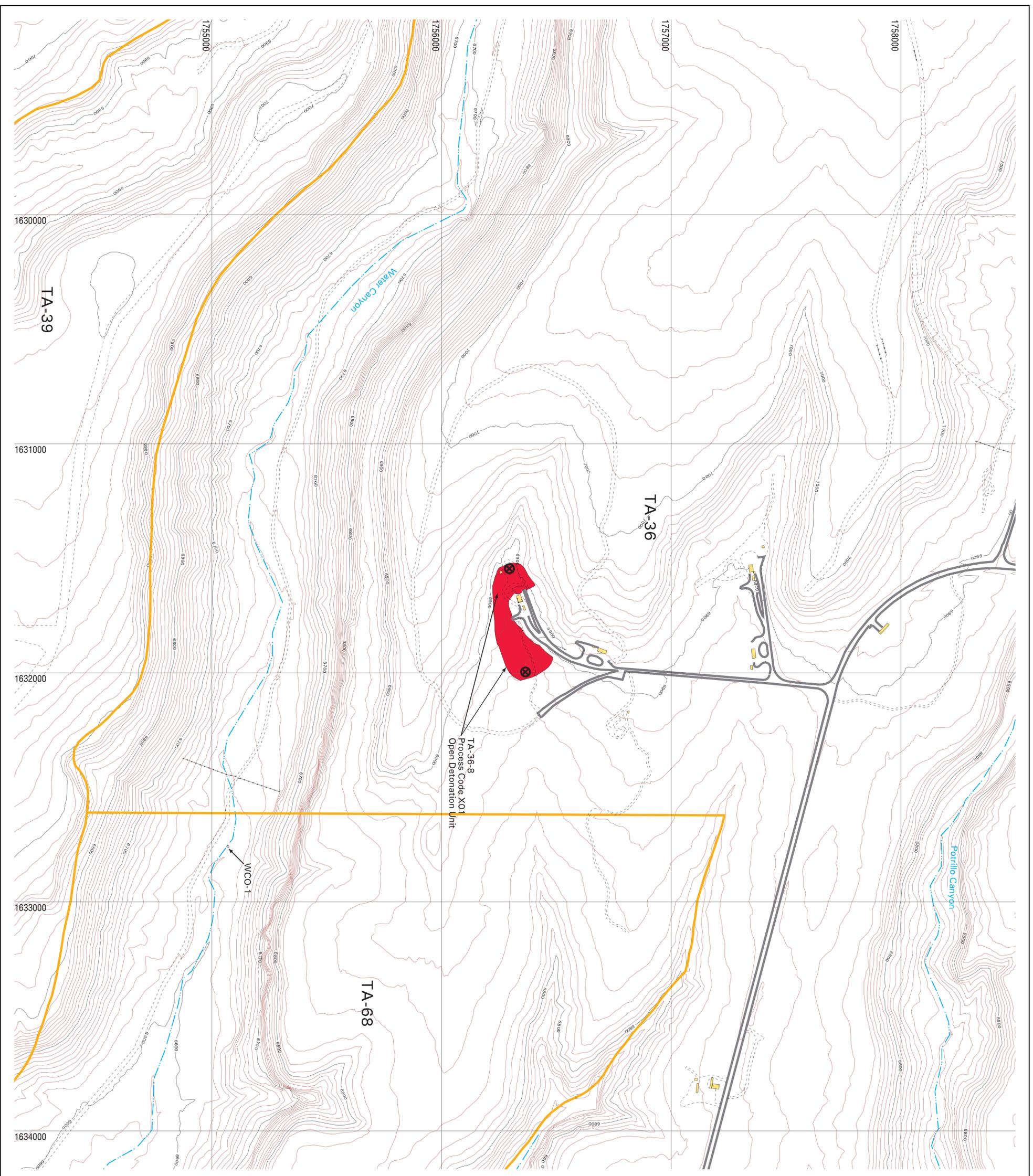
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University of California
Los Alamos National Laboratory
Earth and Environmental Sciences Division

Cartography by: Marcia Jones
Date: August 10, 2002
GISLabs Plot ID: G200212



Los Alamos National Laboratory



LEGEND

[Data source: State Plane North American Datum 1983]

-  Boundary, TA (020838-0001)
-  Contour, 10 foot (020788-0001)
-  Contour, 100 foot (020800-0001)
-  Fence, Industrial (020800-0002)
-  Fence, Security (020800-0002)
-  Road, Paved (020807-0002)
-  Road, Dirt (020808-0002)
-  Road, Trail (020808-0002)
-  Stream, Intermittent (020808-0002)
-  Stream, Perennial (020808-0002)
-  Structure (020813-0002)
-  RCRA-Regulated Waste Management Unit (020813-0002)
-  Indicates Detonation Site

PERCHED ALLUVIAL MONITORING WELLS
(Old wells are pre-1990, new wells installed since 1990 according to EPA guidelines)

-  New Dry Well
-  Old Dry Well
-  New Saturated Well
-  Old Saturated Well

MAIN AQUIFER WELLS

-  Water Supply Well
-  Test Well

OTHER

-  Abandoned/Plugged Well
-  LAOR Well
-  Other Monitoring Well
-  Surface Water Sampling Station (020838-0001)
-  Spring (020838-0001)

Contour Map Showing the Location of the RCRA-Regulated Waste Management Unit at Technical Area (TA) 36

N

State Plane Coordinate System, New Mexico Central Zone,
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid Interval, in feet: 1000
Feet per inch on map = 200

SCALE: 1:2400

0 200 400 600 800

FEET

0 100 200 300 400

METERS

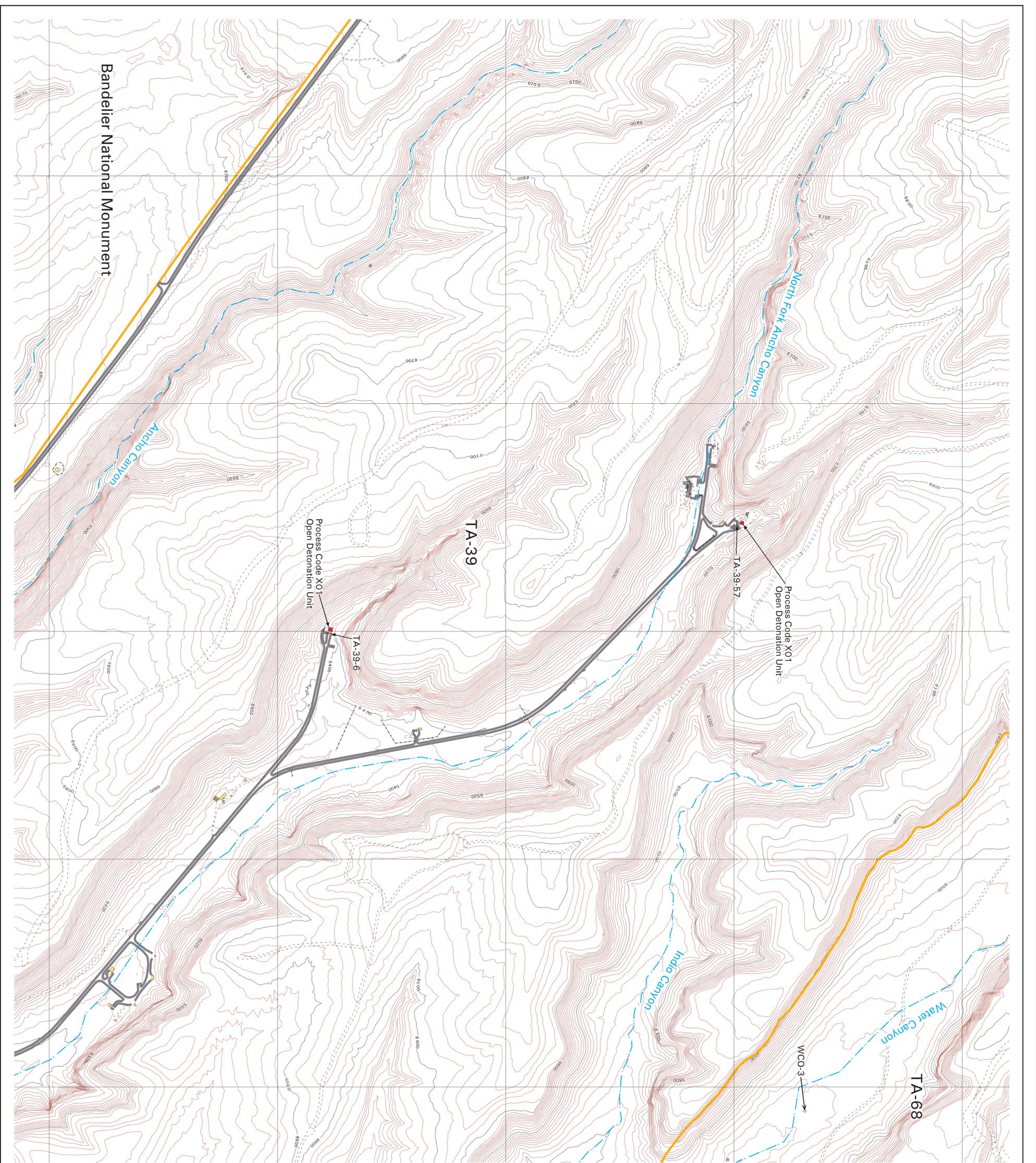
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University of California
Los Alamos National Laboratory
Earth and Environmental Sciences Division

Cartography by: Marcia Jones
Date: August 14, 2002
GISLab Plot ID: G200217



Los Alamos National Laboratory



LEGEND

(Data source: North American Datum 1983)

-  **Boundary, TA** (020385-02011)
-  **Contour, 10 foot** (020385-02011)
-  **Contour, 100 foot** (020385-02011)
-  **Fence, Industrial** (020385-02023)
-  **Fence, Security** (020385-02023)
-  **Road, Paved** (020397-02023)
-  **Road, Dirt** (020385-02023)
-  **Road/Trail** (020385-02023)
-  **Stream, Intermittent** (020385-02023)
-  **Stream, Perennial** (020385-02023)
-  **Structure** (020315-02023)
-  **Underground Structure** (020315-02023)
-  **RCRA-Regulated Waste Management Units** (020385-02023)
- PERCHED ALLUVIAL MONITORING WELLS**
(Old wells are pre-1990, new wells installed since 1990 according to EPA guidelines)
-  **New Dry Well**
-  **Old Dry Well**
-  **New Saturated Well**
-  **Old Saturated Well**
- MAIN AQUIFER WELLS**
-  **Water Supply Well**
-  **Test Well**
- OTHER**
-  **Abandoned/Plugged Well**
-  **LAOR Well**
-  **Other Monitoring Well**
-  **Surface Water Sampling Station** (020385-02011)
-  **Spring** (020385-02011)

Contour Map Showing the Locations of the RCRA-Regulated Waste Management Units at Technical Area (TA) 39

N

State Plane Coordinate System, New Mexico Central Zone,
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid Interval, in feet: 2000
Feet per inch on map = 400

SCALE: 1:4800

0 200 400 600 800 1000

FEET

0 125 250 375 500 625 750 875 1000

METERS

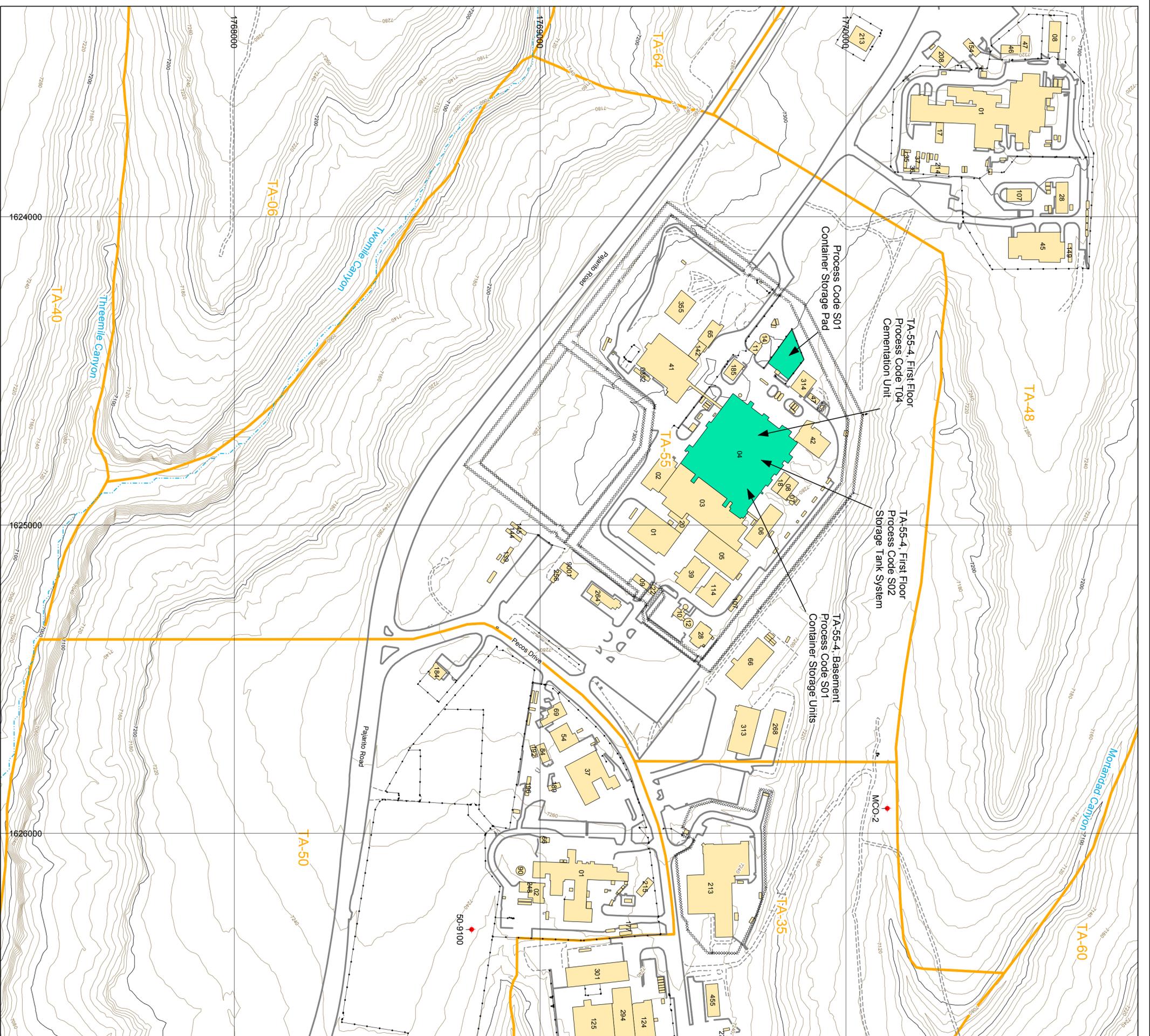
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University of California
Los Alamos National Laboratory
Earth and Environmental Sciences Division

Cartography by: Marci Jones
Date: August 10, 2002
GISLabs Plot ID: G200216



Los Alamos National Laboratory



Legend

-  Boundary, TA
-  Contour, 10 foot
-  Contour, 100 foot
-  Drainage
-  Fence, Industrial
-  Fence, Security
-  Road, Dirt
-  Road, Paved
-  Structure
-  Treatment and/or Storage Locations for RCRA-Regulated Waste Management Unit
-  Monitoring Well

DATA SOURCES

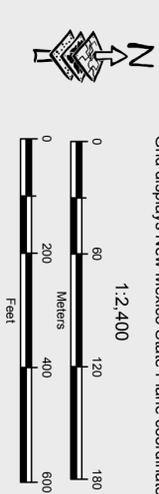
1991 Contour Data: Revised State Publication Data.
 1991 Hydrography: Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, (Nk, Unknown, 1991)
 Boundary, Technical Assets: Los Alamos National Laboratory, SSMO Site Planning and Project Initiation Group, (Unknown, 02 January 2003)
 Drainage: Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, ER20022091, 1, 24, 000, (Unknown)
 Fence: Los Alamos National Laboratory, KSL Site Support Services, Planning, Loading, and Mapping Section, (Nk, Unknown, January 6, 2004)
 Road: Los Alamos National Laboratory, Earth and Environmental Sciences GISLab, (Nk, Unknown, Unknown, Provided by the GISLab legacy database)
 Road, Surfaced: Los Alamos National Laboratory, KSL Site Support Services, Planning, Loading and Mapping Section, (Nk, Unknown, January 9, 2004)
 Road, Unsurfaced: Los Alamos National Laboratory, KSL Site Support Services, Planning, Loading, and Mapping Section, (Nk, Unknown, January 9, 2004)
 Structure: Los Alamos National Laboratory, KSL Site Support Services, Planning, Loading, and Mapping Section, (Nk, Unknown, January 9, 2004)
 Well: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, (Nk, Unknown, November 9, 2005)

Contour Map Showing the Locations of the RCRA-Regulated Waste Management Units at Technical Area (TA) 55

Cartography by: Doug Walther
 Date: March 31, 2006
 GISLab Map # 201694
 Request#: 13977



State Plane Coordinate System, New Mexico Central Zone,
 1983 North American Datum, Units Feet.
 Grid displays New Mexico State Plane coordinates in feet.



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 GISLab, Earth and Environmental Sciences, Los Alamos National Laboratory, Los Alamos, New Mexico, 87545

APPENDIX E
Signatory Authority Letters



Associate Directorate for ESH&Q
P.O. Box 1663, Mail Stop K491
Los Alamos, New Mexico 87545
(505) 667-4218/Fax: (505) 665-3811

Date: March 2, 2009
Refer To: ESH&Q-09-009

Mr. Lawrence E. Starfield, Regional Administrator
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Mr. Starfield:

SUBJECT: DELEGATION OF "AUTHORIZED REPRESENTATIVE" FOR THE CLEAN WATER ACT (CWA) AND NPDES STORM WATER PERMITS AND INDUSTRIAL OUTFALL PERMIT BY LOS ALAMOS NATIONAL SECURITY, LLC (LANS)

The purpose of this letter is to inform the Environmental Protection Agency (EPA) Region 6 of a change in signatory authority for operator of Los Alamos National Laboratory (LANL). Los Alamos National Security, LLC (LANS) has been the Laboratory's management and operation contractor since June 1, 2006. This letter delegates authority as the LANS "authorized representative" for certifying and signing permits and documents required under the Clean Water Act and associated National Pollutant Discharge Elimination System (NPDES) storm water permits (Construction General Permit, Multi-Sector General Permit, LANL Individual Permit), and the NPDES Industrial Outfall Permit. This letter replaces the two LANS' delegation of "authorized representative" letters dated June 1, 2006 (ESH&Q: 06-001) and June 19, 2006 (ESH&Q: 06-002).

As the designated LANS signatory official for Clean Water Act and associated NPDES Permit Programs (please see Enclosure 1), I wish to further identify the position of Division Leader of the Laboratory's Environmental Protection Division (ENV-DO) as certifying official for NPDES standard permit requirements with the authority to certify, review, approve and/or sign as certifying official of all permit applications (e.g. Notice of Intent (NOIs) and Notice of Termination (NOTs)), permit modifications, registrations, certifications, reports and other information as required by EPA. The following is a detailed breakdown of this delegation of signatory authorities.

The following positions are hereby designated as authorized representatives to sign reports, plans, certifications, notices of changed conditions, discharge monitoring reports, and other information as required by the EPA:

NPDES Storm Water Construction General Permit

- Group Leader or Deputy Group Leader of the Laboratory's Water Quality & RCRA Group.
- Cognizant Project Manager, Project Leader, or Subcontractor Technical Representative for the regulated construction activity.
- Responsible Facility Operations Director (FOD), Deputy FOD, or Operations Manager responsible for the overall operation of the regulated facility or activity.

Multi-Sector General Permit & LANL Individual Permit

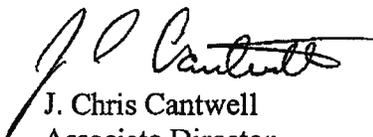
- Group Leader or Deputy Group Leader of the Laboratory's Water Quality & RCRA Group.
- Director, Deputy Director, or Group Leader of the Laboratory Division responsible for the overall operation of the regulated facility or activity.
- Responsible FOD, Deputy FOD or Operations Manager responsible for the overall operation of the regulated facility or activity.
- Program Director, Program Manager or Project Leader responsible for the overall operation of the regulated facility or activity.

NPDES Outfall Permit No. NM0028355

- Group Leader or Deputy Group Leader of the Laboratory's Water Quality & RCRA Group.
- Director or Deputy Director of the Laboratory Division responsible for the overall operation of the regulated facility or activity.

Please contact Tori George, Division Leader for Environmental Protection, at (505) 667-2211, if you have questions.

Sincerely,



J. Chris Cantwell
Associate Director
Environment, Safety, Health and Quality

Enclosures: a/s

Cy: M. Flores, U.S. EPA, Region 6, Dallas, TX, w/enc.
C. Hosch, U.S. EPA, Region 6, Dallas, TX, w/enc.
W. Lane, U.S. EPA, Region 6, Dallas, TX, w/enc.
I. Chen, U.S. EPA, Region 6, Dallas, TX, w/enc.
B. Larsen, U.S. EPA, Region 6, Dallas, TX, w/enc.
G. Saums, NMED/SWQB, Santa Fe, NM, w/enc.
R. Powell, NMED/SWQB, Santa Fe, NM, w/enc.
D. Winchell, NNSA-LASO, w/enc., MS A316
G. Rael, NNSA-LASO, w/enc., MS A906
G. Turner, NNSA-LASO, w/enc., MS A316
D. Sosinski, LC-DO, MS A183
D. Woitte, LC-LESH, MS A187
P. Wardwell, LC-LESH, w/enc., MS A187
T. George, ENV-DO, w/enc., MS J978
T. Grieggs, ENV-RCRA, w/enc., MS K490
M. Saladen, ENV-RCRA, w/enc., MS K490
T. Lemke, ENV-RCRA, w/enc., MS K490
ESH&Q File, w/enc., MS K491
ENV-DO, File, w/enc., MS J978
ENV-RCRA, File, (09-024), w/enc., MS K490
IRM-RMMSO, w/enc., MS A150

(ENCLOSURE 1)



Office of the Director

March 4, 2009

J. Chris Cantwell
Associate Director
Environment, Safety, Health and Quality
Los Alamos National Security

Dear Mr. Cantwell:

A handwritten signature in blue ink that reads "Chris".

SUBJECT: CONTRACT NUMBER: DE-AC52-06NA25396, DELEGATION OF AUTHORITY FOR PERMITS, AUTHORIZATIONS AND OTHER DOCUMENTS AS AN OPERATOR OR CO-OPERATOR UNDER ENVIRONMENTAL PERMITS FOR THE LOS ALAMOS NATIONAL LABORATORY

I, Michael R. Anastasio, Director of Los Alamos National Laboratory and President of Los Alamos National Security, LLC (LANS), the "Company," hereby delegate authority to you, J. Chris Cantwell, Associate Director, Environmental, Safety and Health and Quality (ADESH&Q), to execute on behalf of the Company permits, authorizations, or other documents necessary for the Company to become an operator or co-operator under the environmental permits for the Los Alamos National Laboratory, which permits are currently in the name of the Los Alamos National Security.

This delegation shall remain in effect while you are in the position of Associate Director, ADESH&Q or until revoked by me.

Sincerely,

A handwritten signature in blue ink that reads "Mike".

Michael R. Anastasio
Director

Cy: I. E. Richardson III, DIR, A100
M. Mallory, PADOPS, A102
M. Graham, ADEP, M991
T. George, ENV-DO, J978
D. Sosinski, LC-DO, A183

D. Woitte, LC-LESH, A187
R. Madison, LANS, T009
M. Rafferty, PCM-DO, M722
IRM-RMMSO, A150
DIR-09-085

PO Box 1663, MS A100, Los Alamos, NM 87545
505-667-5101 / FAX 505-665-2679

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DEPARTMENT OF ENERGY
National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544



JUN 16 2011

Dr. Alfredo Armendariz
Regional Administrator
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733

Dear Dr. Armendariz:

Subject: Delegation of "Duly Authorized Representatives"

As a result of a staffing addition in my organization, as Manager of the Los Alamos Site Office, I am reconfirming the delegations of our duly authorized representatives; previous delegation was transmitted to your office in correspondence dated October 6, 2010.

I will remain the signatory for permit and compliance programs regulated under the Clean Water Act, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, and the Superfund Amendments and Reauthorization Act. I am delegating authority to sign the reports associated with permits, notices of changed conditions, and other compliance documents and information as required by the Environmental Protection Agency to the newly hired Deputy for Environmental Projects, Mr. Pete Maggiore.

Consistent with my previous delegation, the Assistant Manager for Environmental Projects (currently held by George Rael), the Supervisory Federal Project Director for Environmental Remediation Projects (currently held by Mr. David Rhodes), and the Environmental Permitting Manager (currently held by Mr. Gene Turner), will also continue to act as my "Duly Authorized Representatives". These renewed delegations are established internally to maintain efficient operations with the Environmental Protection Agency.

If you have any questions or concerns, you may contact Gene Turner at (505) 667-5794.

Respectfully,

Kevin W. Smith
Manager

cc:

Isaac Chen, EPA-VI, 6WQ-PP
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733

Miguel Flores, EPA-VI, 6WQ
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave., Suite 1200
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Sonia Hall, EPA-VI, 6EN-W
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Jana Harvill, EPA-VI, 6EN-WM
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Hannah Branning, EPA-VI, 6EN
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave., Suite 1200
Dallas, TX 75202-2733

cc: Continued on Page 3

cc:

Mr. James Bearzi
Surface Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2050
1190 St. Francis Drive
P.O. Box 5469
Santa Fe, NM 87502

George Rael, EPO, LASO
Pete Maggiore, EPO, LASO
David Rhodes, EPO, LASO
Gene Turner, EPO, LASO
Lisa Cummings, SCS, LASO
Anthony Grieggs, ENV-RCRA, LANS, MS-K490
Records Center, LASO
Official Contract File, LASO

EPO-18GT-219-353384

APPENDIX F
**LA-14420-PR, Surface Water Data at Los Alamos National
Laboratory – 2009 Water Year**

Document Discussion



Return To Library > Records 2 > ERID-109500 through ERID-109999 > ERID-109826 1) SURFACE WATER DATA AT LOS ALAMOS NATIONAL LABORATORY 2009 WATER YEAR 06/24/2010

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File name: Master-Media Target.pdf
Version: 1.0
Document Type: RPF Record
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Document Details:

Title: ERID-109826 1) SURFACE WATER DATA AT LOS ALAMOS NATIONAL LABORATORY 2009 WATER YEAR 06/24/2010
Log ID: 717
ERID Number.StartPage: 109826
Transmitted By: VANESSA TRONCOSO
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Date Received: 07/01/2010
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Page Count: 128
Record Type: Letter
Document Date: 06/24/2010
To:(Addressees - Organization) N/A
From:(Senders - Organization) STEVE VEENIS, EP-CAP
Other Document Number(s): EP2010-0297, LA-14420-PR
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October 22nd, 2009

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 Phone/Fax: 7-0013/Fax 5-9344
 Symbol: EP2010-0297
 Date: JUN 24 2010

memorandum

*Environmental Programs
 Corrective Action Program
 Dave McInroy, Program Director*

Subject: Surface Water Data at Los Alamos National Laboratory 2009 Water Year

Attached is a copy of the "Surface Water Data at Los Alamos National Laboratory 2009 Water Year." This publication presents flow data at gaging stations on all major canyons at the Los Alamos National Laboratory and on some "spring stations." Additional electronic copies are available by calling Steve Veenis at (505) 667-0013 or (veenis@lanl.gov).

SV:sm

Attachment: Hard copy with an electronic file – Surface Water Data at Los Alamos National Laboratory 2009 Water Year (LA-14420-PR)

Cy: (w/att.)

Gregory Kuyumjian, 215 Melody Lane, Wenatchee, WA 98801
 Joel Lusk, U.S. Fish and Wildlife Service, Albuquerque, NM
 Anne Tillery, USGS, Albuquerque, NM
 Ray Trujillo, Cochiti Pueblo, Cochiti, NM
 Ralph Ford-Schmid, NMED-DOE-OB, Santa Fe, NM
 John D'Antonio, State Engineers Office, Santa Fe, NM
 Claudia Borchert, City of Santa Fe, Santa Fe, NM
 Rick Carpenter, City of Santa Fe, Santa Fe, NM
 Erika Nevins, Santa Fe National Forest, Santa Fe, NM
 Dr. Stephen Wust, Santa Fe County Water Resources Division, Santa Fe, NM
 Neil Weber, San Ildefonso Pueblo, San Ildefonso, NM
 Michael Chavarria, Santa Clara Pueblo, Espanola, NM
 Sandy Hurlocher, Espanola Forest Service, Espanola, NM
 Tim Glasco, Los Alamos County, Los Alamos, NM
 Pete Padilla, Los Alamos County, Los Alamos, NM
 Craig Martin, Los Alamos County, Los Alamos, NM
 Brian Jacobs, Bandelier National Monument, Los Alamos, NM
 Raymond Gachupin, Jemez Pueblo, Jemez, NM
 Steve Yanicak, NMED-DOE-OB, MS M894
 Gene Turner, NNSA-LASO, MS A316
 Steve Veenis, EP-CAP, MS K490
 Mike Alexander, EP-CAP, MS K497
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Cathy Wilson, EES-14, MS D446
Brent Newman, EES-14, MS J495
Don Hickmott, EES-14, MS D462
Patrick Longmire, EES-14, MS D469
Naomi Becker, EES-16, MS T003
Tony Grieggs, ENV-RCRA, MS K490
Mike Saladen, ENV-RCRA, MS K490
Marc Bailey, ENV-RCRA, MS K490
Ann Sherrard, ENV-RCRA, MS K490
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Manny L'Esperance, EO-EM, MS C938
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David McInroy, EP-CAP, MS M992
John McCann, EP-CAP, MS M992
Becky Coel-Roback, EP-CAP, MS M992
Steve Paris, EP-CAP, MS M992
Kent Rich, EP-CAP, MS M992
Stephanie Fuller, EP-CAP, MS M992
Craig Douglass, EP-CAP, MS M992
David Rogers, EP-ET-DO, MS M992
Ardyth Simmons, EP-ET-DO, MS M992
Tim Goering, EP-ET-DO, MS M992
Paul Huber, EP-TA-21, MS C349
Bill Criswell, EP-TA-21, MS C349
Andy Baumer, EP-TA-54 Closure Project, MS M991
Tori George, EP-REG-DO, MS M991
Kathryn Lynnes, EP-REG-DO, MS M991
Roy Bohn, EP-BPS-DO, MS C349
Eric Riebsomer EP-BPS-DO, MS M317
Kristine Smeltz, EP-BPS-DO, MS M992
Charles Trujillo, ES-VI, MS K718
Deborah Woitte, LC-LESH, MS A187
Dennis Hamerdinger, N-2, MS B228
David Hayes, N-2, MS B228
Dennis McLain, OS-BSI, MS A194
Jim Jones, SP-DO, MS J590
Sara Scott, SPO-CNP, MS A127
Everett Springer, STBPO-PRM, MS M701
Andrew Erickson, UI-DO, MS K760
Franco Sisneros, WFO-OS, MS C925
RPF, MS M707
Public Reading Room, MS M992
IRM-RMMSO, MS A150

LA-14420-PR
Progress Report
Approved for public release;
distribution is unlimited.

Surface Water Data at Los Alamos National Laboratory

2009 Water Year

Edited by Hector Hinojosa, Group IRM-CAS.

The three most recent reports in this unclassified series are LA-14328-PR, LA-14376-PR, and LA-14405-PR.

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LA-14420-PR
Progress Report
Issued: May 2010

Surface Water Data at Los Alamos National Laboratory

2009 Water Year

David Ortiz

Betsy McCullough

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Abbreviations, Acronyms, and Glossary

Acre-foot (Ac-Ft, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233.49 cubic meters.

CFS-day is the volume of water represented by the flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.98347 acre-feet, 646,317 gallons, or 2,445 cubic meters.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal used to regulate the flow or stage of the stream or to prevent the intrusion of saltwater.

Cubic feet per second per square mile [(ft³/s)/mi²] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (ft³/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second; it is equivalent to 7.48 gallons per second, 448.8 gallons per minute, or 0.02832 cubic meters per second.

Discharge is the volume of water (or more broadly, the volume of fluid, including suspended sediment) that passes a given point within a given period of time.

Drainage area (DA) of a stream at a specified location is that area measured in a horizontal plane and enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of DA given herein include all closed basins, or noncontributing areas, within the area, unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (GH) is the water-surface elevation referred to in some arbitrary gage data. GH is often used interchangeably with the more general term “stage,” although GH is more appropriate when used with a reading on a gage.

Gage station is a particular site on a stream, canal, lake, or reservoir in which systematic observations of hydrologic data are obtained.

Abbreviations, Acronyms, and Glossary (continued)

GPS is an abbreviation for global positioning system.

HWM is an abbreviation for high-water mark.

Instantaneous discharge is the discharge at a particular instant of time.

LANL is the acronym for Los Alamos National Laboratory.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada. It was formerly called Sea Level Datum of 1929, or “mean sea level,” in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific coasts, it does not necessarily represent the local mean sea level at any particular place.

NPDES is the abbreviation for National Pollution Discharge Elimination System.

Point of Zero Flow (PZF) is the gage height at which no flow occurs.

SR means “State Road.”

Stage see **Gage Height**.

Stage-discharge relation is the relation between the water-surface elevation, termed “gage height,” and the volume of water flowing in a channel per unit of time.

Stream flow is the discharge that occurs in a natural channel.

SWSC is an abbreviation for sanitary wastewater systems consolidation.

USGS is the abbreviation for U.S. Geological Survey.

Water year in reports dealing with surface water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1980, is called the “1980 water year.”

WDR is an abbreviation for “Water-Data Report” in the “Revised Records” paragraph to refer to annual hydrologic-data reports.

WSP is an abbreviation for “Water-Supply Paper” in references to previously published reports.

Surface Water Data at Los Alamos National Laboratory: 2009 Water Year

by

David Ortiz and Betsy McCullough

ABSTRACT

The principal investigators collected and computed surface water discharge data from 73 stream-gage stations that cover most of Los Alamos National Laboratory and one at Bandelier National Monument. Also included are discharge data from three springs—two that flow into Cañon de Valle and one that flows into Water Canyon.

Introduction

This annual water data report from Los Alamos National Laboratory (LANL) contains flow data from 73 stream-gage stations that cover most of the Laboratory's property. Data are collected on the Laboratory's downstream boundary, which approximates New Mexico State Road (SR) 4; the upstream boundary is approximated by New Mexico SR 501. Some gage stations are within Laboratory boundaries and were originally installed to assist groups other than the Water Stewardship Programs, which also conducts site-specific earth science research.

Rainfall/precipitation data collection began at selected stations starting March 2007–July 2007 and continued to the end of the water year. Tipping-bucket rain gages measured precipitation with data recorded every five minutes.

Water chemistry data from selected storm events occurring at some stations will be published in the “Los Alamos National Laboratory Environmental Surveillance Report.”

Station Identification Numbers

The U.S. Geological Survey (USGS), Water Resources Division, assigns a unique identification number to each stream-gage station it establishes. All sites numbered since 1950 are part of the downstream-order system. The downstream-order system increases station numbers in the downstream direction along main streams, and in the case of this report, their respective mouths to the Rio Grande.

This report adheres to the USGS convention of downstream order. Because of the proximity of stations in this network, the first five digits of all station numbers are 08313. We have replaced this number string with the letter E in the station number partly to abbreviate and also to accommodate instrumentation.

Data Collection and Computation

A complete record at a gage station gathers records of stage and discharge measurements from

streams or canals. In addition to gathering these stage and discharge measurements, we directly observe factors affecting the stage/discharge relation, consult weather records, and use other information that supplements base data in determining daily flow. Direct readings on a non-recording gage or from the data logger provide integrated (five-minute) records of stage. We measure discharge with current meters, using methods the USGS adapted as a result of experience accumulated since 1880. Standard textbooks describe these methods, as do Water-Supply Paper 2175 and the U.S. Geological Survey Technique of Water Resources Investigations, Book 3, Chapter A6.

We use stage/discharge relation curves to prepare rating tables that give the discharge for any stage measured at a stream-gage station. When it is necessary to define discharge extremes outside the range of current meter measurements, we extend the curves using logarithmic plotting; velocity area studies; results of indirect measurements of peak discharge, such as slope area or contracted opening measurements, and computations of flow over dams or weirs; or step backwater techniques.

Daily mean discharges are computed by applying daily mean gage height (stage) to the stage discharge curves or tables. If the stage/discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is computed by the shifting-control method. In the shifting-control method, correction factors based on individual discharge measurements and notes by personnel taking the measurements are applied to the gage heights before discharges are determined from the curves or tables.

The shifting-control method is also used if the stage/discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control. At some northern stream-gage stations, the stage/discharge relation is affected by ice in the winter, and it becomes impossible to compute discharge in the usual manner. Discharge for the period of ice effect is computed on the basis of gage height record and occasional winter discharge measurements. Consideration is given to the available information about temperature and precipitation, notes of observations, and comparable discharge records for other stations in the same or nearby basins for comparable periods of time.

For some gage stations, periods occur when no gage height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, etc. For such periods, the daily discharges are estimated on the basis of recorded range-in-stage, prior and subsequent records, discharge measurements, weather records, and record comparisons made against other stations in the same or nearby basins. Likewise, daily contents may be estimated from operator logs, prior and subsequent records, inflow-outflow studies, and other information.

Accuracy of Records

The following two factors determine the accuracy of stream flow records:

- stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements and

- accuracy of measurements or stage, accuracy of discharge measurements, and interpretations of records.

Accuracy attributed to records is noted under “Remarks.”

- Excellent—95% of daily discharges are within 5% of the true value.
- Good—95% of daily discharges are within 10% of the true value.
- Fair—95% of daily discharges are within 15% of the true value.
- Poor—records do not meet the criteria mentioned.

Accuracy determination is only based on days with flow.

The number of significant figures used to report daily mean discharges is based solely on the magnitude of the discharge value:

If —the value (ft ³ /s) is	Then —it is reported as
less than 1 ft ³ /s	nearest hundredth
1–10 ft ³ /s	nearest tenth
10–1,000 ft ³ /s	whole number
above 1,000 ft ³ /s	three significant figures

Data Presentation

The records published in this report are for each gage station and consist of three parts:

- station analysis summary,
- station manuscript description with photo, and
- data table for the water year (October 1, 2008, to September 30, 2009).

The station analysis supplements each daily values table and includes a description of monitoring equipment, problems associated with data collection during the water year, and other information used to compute stream flow discharge.

The station manuscript provides data under various headings: station location, period of record, average discharge, historical extremes, record accuracy, and other points pertinent to station operation and regulation. Each continuous record of discharge includes the following categories of descriptions:

Location. The most accurate and available maps, coupled with global positioning system (GPS) technology, provide location information. The location of the gage with respect to the vicinity’s cultural and physical features is given, as well as a name that refers to place. For a few stations, the U.S. Army Corps of Engineers or the Water Resources Council (River Mileage Measurement, Bulletin 14, rev. October 1968) provided river mileage. We define left and right banks from the perspective of facing downstream.

Drainage Area. The most accurate and available maps provide drainage area measurements. The

accuracy of drainage area measurements varies, depending on the type of map available for this purpose.

Revised Records. Because of new information, published records occasionally are found to be incorrect and revisions are printed in later reports. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year as follows: (M) means that only instantaneous maximum discharge was revised; (m) means that only the instantaneous minimum was revised; and (P) means that only the peak discharge was revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

Period of Record. The period of record is the time during which published records exist for a station or its equivalent station. An equivalent station is one that was in operation when the present station was not in operation and was located so that records from it can be reasonably considered equivalent to records from the present station.

Gage. This section describes the type of gage in current use. The datum of the current gage referred to in the National Geodetic Vertical Datum (NGVD) of 1929 (see Abbreviations, Acronyms, and Glossary) given under this heading are a condensed history of the types, locations, and data of previous gages.

Remarks. The text presents information relative to the accuracy of the records, special methods of computation, conditions that affect natural flow at the station, and other pertinent information.

Average Discharge. The average discharge is the average of the annual mean discharge published after five years of record. Once published, it continues as a moving average.

Extremes for Period of Record. Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest stage gage, or by direct observation of a non-recording gage.

If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

Extremes Outside Period of Record. This section contains information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may have been obtained from other agencies, old data files, newspapers, or local citizens.

Extremes for Current Year. Extremes given here are similar to those for the period of record. The time for occurrence of peaks is expressed in 24-h local standard time. For example, 12:30 A.M. is 0030 and 1:30 P.M. is 1330. The minimum for the current water year appears in this section.

Data Table of Daily Mean Values. The daily table of discharge records for stream-gage stations gives the mean discharge for each day of the water year. In the monthly summary for

the table, the line headed “Total” gives the sum of the daily figures for each month; the line headed “Mean” gives the average flow in cubic feet per second for the month; and the lines headed “Max” and “Min” give the maximum and minimum daily mean discharges for each month and in acre-feet, respectively, in the line headed “Acre-Ft.”

Acknowledgments

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References

Water-Supply Paper 2175 and the U.S. Geological Survey Technique of Water Resources Investigations, Book 3, Chapter A6.
U.S. Army Corps of Engineers, River Mileage Measurement, Bulletin 14, rev. October 1968.

National Geodetic Vertical Datum of 1929.

<http://www.esg.montana.edu/gl/glcus.html> Used to obtain legal locations.

Previous Los Alamos National Laboratory reports in this series—“Surface Water Data at Los Alamos National Laboratory” for Water Years 1995–2008:

1995: LA-13177-PR (August 1996)

1996: LA-13234-PR (November 1996)

1997: LA-13403-PR (January 1996)

1998: LA-13551-PR (February 1999)

1999: LA-13706-PR (April 2000)

2000: LA-13814-PR (July 2001)

2001: LA-13905-PR (April 2002)

2002: LA-14019-PR (March 2003)

2003: LA-14131-PR (March 2004)

2004: LA-14211-PR (April 2005)

2005: LA-14239-PR (May 2006)

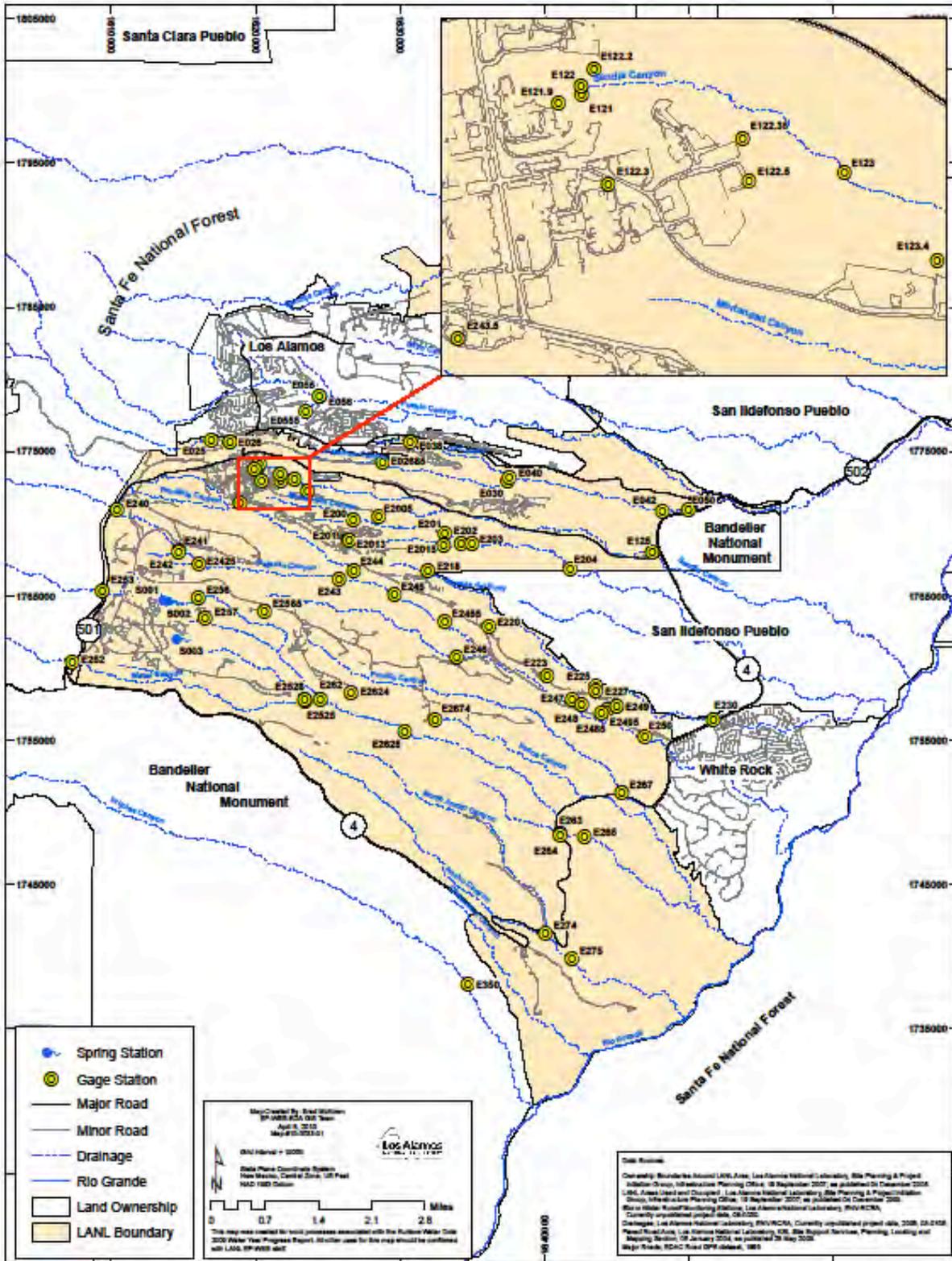
2006: LA-14328-PR (August 2007)

2007: LA-14376 (October 2008)

2008: LA-14405-PR (September 2009)

Gage Stations

Gage Stations at Los Alamos National Laboratory



**Summary of Discharges from Stream Monitoring Stations at
Los Alamos National Laboratory**

Water Year 2009

October 1, 2008, to September 30, 2009

Canyon Sites	Days with Mean Discharge	Volume in Acre-Ft	Instantaneous Max in ft³/s
E025 Los Alamos Canyon at Los Alamos	154	70	1.86
E026 Los Alamos Canyon below Ice Rink	123	65	2.80
E02685 Los Alamos Canyon at TA-2	96	76	34
E030 Los Alamos Canyon above DP Canyon	26	7.50	11
E038 DP Canyon above TA-21	71	107	202
E039 DP Canyon below Meadow near TA-21	124	67	123
E040 DP Canyon above Los Alamos Canyon	36	57	153
E042 Los Alamos Canyon above SR 4	7	16	53
E050 Los Alamos Canyon below Los Alamos Weir	5	5.30	34
E055 Pueblo Canyon above Acid Canyon	118	58	34
E0555 South Fork of Acid Canyon	36	3.80	31
E056 Acid Canyon above Pueblo Canyon	153	21	263
E060 Pueblo Canyon above SR 502	155	37	4.20
E121 Sandia Canyon Right Fork at Power Plant	365	411	42
E1219 Sandia Canyon East of Power Plant	36	1.30	2.52
E122 Sandia Canyon near Roads and Grounds at TA-3	361	54	15
E1222 Sandia Canyon Tributary from Roads and Grounds	21	0.91	1.19
E1223 Sandia Canyon Tributary from Sigma Building	5	0.10	1.90
E12235 Sandia Canyon Tributary from MRF	8	0.22	1.59
E1225 Sandia Canyon Tributary at Heavy Equipment	37	2.80	6.00
E123 Sandia Canyon below Wetlands	365	357	54
E1234 Sandia Canyon Roads and Grounds at Sigma	41	4.10	2.20
E125 Sandia Canyon above SR 4	0	0	0
E196 TA-55 above Effluent Canyon	6	0.24	0.77
E200 Mortandad Canyon below Effluent Canyon	145	41	14
E2005 Mortandad Canyon Tributary Batch Plant at Sigma	3	0.24	1.10
E201 Mortandad Canyon above Ten Site Canyon	0	0	0
E2011 TA-50 Area 006 (C)	45	2.60	5.00
E2013 TA-50 Area C	37	1.60	7.56
E2015 Ten Site Canyon above Mortandad Canyon	2	0.14	2.45
E202 Mortandad Canyon above Sediment Traps	0	0	0
E203 Mortandad Canyon below Sediment Traps	0	0	0
E204 Mortandad Canyon at LANL Boundry	0	0	0
E218 Cañada del Buey near TA-46	0	0	0
E220 TA-54 RANT	9	0.20	1.67
E223 MDA Area L	3	0.06	1.28
E225 Cañada del Buey near MDA G	0	0	0

**Summary of Discharges from Stream Monitoring Stations at
Los Alamos National Laboratory (continued)**

Water Year 2009

October 1, 2008, to September 30, 2009

Canyon Sites	Days with Mean Discharge	Volume in Acre-Ft	Instantaneous Max in ft³/s
E227 MDA G-13	0	0	0
E230 Cañada del Buey above SR 4	4	1.60	12
E240 Pajarito Canyon below SR 501	1	0.10	8.60
E241 Pajarito Canyon above Starmer's Gulch	362	9.2	2.20
E242 Starmer's Gulch above Pajarito Canyon	365	107	10
E2425 Arroyo de la Delfe above Pajarito Canyon	365	15	0.10
E243 Pajarito Canyon above Two Mile Canyon	190	35	0.62
E2435 Two Mile Canyon Tributary at TA-3	38	3.90	7.70
E244 Two Mile Canyon above Pajarito Canyon	70	4.70	4.00
E245 Pajarito Canyon above TA-18	6	1.30	2.10
E2455 Pajarito Canyon above Three Mile Canyon	0	0	0
E246 Three Mile Canyon above Pajarito Canyon	2	0.04	0.04
E247 MDA G-1	1	0.02	0.51
E248 MDA G-2	1	0.02	1.40
E2485 MDA G-6U	4	0.22	1.40
E249 MDA G-4	0	0	0
E2495 MDA G-7	0	0	0
E250 Pajarito Canyon above SR 4	0	0	0
E252 Water Canyon above SR 501	362	50	0.21
E2525 Water Canyon above S Site Canyon	219	44	0.27
E2528 S Site Canyon above Water Canyon	0	0	0
E253 Cañon del Valle above SR 501	0	0	0
E256 Cañon del Valle below MDA P	340	21	0.19
E2565 Cañon del Valle at Q Site	25	0.67	0.87
E257 Cañon del Valle Tributary at TA-16 Burn Grounds	10	0.30	0.71
E262 Cañon del Valle above Water Canyon	0	0	0
E2624 Phermex	33	1.6	0.71
E2625 Water Canyon below MDA AB	1	0.08	2.70
E263 Water Canyon at SR 4	0	0	0
E264 Indio Canyon at SR 4	4	0.08	0.01
E265 Water Canyon below SR 4	0	0	0.16
E267 Potrillo Canyon above SR 4	0	0	0.03
E2674 TA-36 Minie Site	3	0.06	0.53
E274 North Fork Ancho Canyon below SR 4	3	0.06	0.30
E275 Ancho Canyon below SR 4	5	17	414
E350 Rito de los Frijoles at Bandelier	365	576	5.0

E025 Los Alamos Canyon at Los Alamos

Location. Lat 35° 52' 50", long 106° 19' 45", NW ¼, Sec. 17, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 6.92 mi².

Period of Record. October 1, 1993, to September 30, 2001; October 2001 to September 2006 (fragmentary). October 1, 2006, to September 30, 2009.

Revised Record. Drainage Area (2007).

Gage. Data logger and 24" Parshall flume. Elevation of gage is 7,237 ft above NGVD.

Remarks. Records are good. Flow is partially regulated by Los Alamos Reservoir about 1.52 mi upstream.

Extremes for Period of Record. Maximum discharge, 185 ft³/s, August 9, 2001, gage height not determined. No flow at times.

Extremes for Current Water Year. Maximum discharge 1.86 ft³/s at 1015h, June 11, gage height 0.39 ft. No peak above base of 5.0 ft³/s. No flow at times.



E025 Los Alamos Canyon at Los Alamos

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8200 data logger (5-min. interval) with a shaft encoder float system. The system is powered by a solar panel battery system housed in a National Electric Manufacturing Association (NEMA) shelter on top of a 18" Corrugated Metal Pipe (CMP) well attached to a 24" Parshall flume on right bank. No provision for measurement above wading stage.

Field Work. The station was visited 18 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None from levels.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the period from April 1–23 when float was raised during the winter months.

Rating. The low-flow control is a 24" Parshall flume. The medium- to high-flow control becomes the channel. Channel is straight for 100' above and below gage and is subject to overflow at very high stages. The streambed is gravel and cobbles with grass covering over banks.

One discharge measurement (No. 16) and 18 inspections were made during the year.

Rating No. 1 was developed based on the computation of 24" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Estimated discharges were based on precipitation and referenced to E026.

Flow is somewhat controlled by Los Alamos Reservoir about 1 River mi upstream of gage.

Remarks. Records are good.

Peak flow since the Cerro Grande fire has been too high to record at gage. Station E026 has been established 0.1 mi downstream for high flow. E025 will functionally be operated as a low- to medium-flow partial record station.

E025 Los Alamos Canyon at Los Alamos

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0*	.84	.32	.18	.07	.08
2	0	0	0	0	0	0	0*	.86	.27	.18	.05	.07
3	0	0	0	0	0	0	0*	.82	.31	.18	.03	.05
4	0	0	0	0	0	0	0*	.75	.27	.17	.01	.03
5	0	0	0	0	0	0	0*	.68	.26	.21	0	.02
6	0	0	0	0	0	0	0*	.64	.25	.23	0	0
7	0	0	0	0	0	0	0*	.61	.22	.17	0	0
8	0	0	0	0	0	0	0*	.54	.23	.14	0	0
9	0	0	0	0	0	0	0*	.53	.22	.12	0	0
10	0	0	0	0	0	0	0*	.49	.29	.10	0	0
11	.04	0	0	0	0	0	0*	.45	.77	.09	0	0
12	.06	0	0	0	0	0	0*	.38	.36	.07	.02	0
13	.04	0	0	0	0	0	0*	.32	.23	.05	.09	0
14	.02	0	0	0	0	0	0*	.28	.26	.03	.09	0
15	.01	0	0	0	0	0	0*	.26	.24	0	.09	0
16	0	0	0	0	0	0	0*	.24	.22	0	.07	.09
17	0	0	0	0	0	0	.10*	.19	.19	0	.05	.09
18	0	0	0	0	0	0	.15*	.19	.19	0	.02	.07
19	0	0	0	0	0	0	.40*	.19	.18	0	0	.05
20	0	0	0	0	0	0	.83	.16	.26	.04	0	.05
21	0	0	0	0	0	0	.89	.16	.20	.09	0	.03
22	0	0	0	0	0	0	.94	.18	.18	.09	0	.01
23	0	0	0	0	0	0	.97	.28	.18	.07	0	0
24	0	0	0	0	0	0	1.0	.26	.18	.05	0	0
25	0	0	0	0	0	0	1.1	.20	.18	.04	0	0
26	0	0	0	0	0	0	1.1	.18	.19	.06	0	0
27	0	0	0	0	0	0	1.1	.21	.18	.09	0	0
28	0	0	0	0	0	0	1.1	.27	.18	.08	0	0
29	0	0	0	0	----	0	.97	.28	.18	.10	0	0
30	0	0	0	0	----	0	.85	.32	.18	.11	.04	0
31	0	----	0	0	----	0*	----	.33	----	.09	.09	----
Total	0.17	0	0	0	0	0	11.50	12.09	7.37	2.83	0.72	0.64
Mean	.006	0	0	0	0	0	.38	.39	.25	.091	.023	.021
Max	.06	0	0	0	0	0	1.1	.86	.77	.23	.09	.09
Min	0	0	0	0	0	0	0	.16	.18	0	0	0
Acre-Ft	.34	0	0	0	0	0	23	24	15	5.6	1.4	1.3
Wtr Year	2009	Total	35.32	Mean	.097	Max	1.1	Min	0	Acre-Ft	70	
Cal Year	2008	Total	130.84	Mean	.36	Max	2.8	Min	0	Acre-Ft	260	

*Estimate

E026 Los Alamos Canyon below Ice Rink

Location. Lat 35° 52' 49" long 106° 19' 30", NE ¼, Sec. 17, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 7.07 mi².

Period of Record. February 26, 2001, to September 30, 2009.

Revised Record. Drainage Area (2006); Section (2007).

Average Discharge. 8 yr, 0.35 ft³/s, 250 acre-ft/yr.

Gage. Data logger with cellular telemetry. Elevation of gage is 7,183 ft above NGVD.

Remarks. Records are good, except estimated daily discharges, which are fair. Flow partially regulated by Los Alamos Reservoir about 1.55 mi upstream.

Extremes for Period of Record. Maximum discharge, 185 ft³/s, August 9, 2001, gage height 1.52 ft. No flow at times.

Extremes for Current Water Year. Maximum discharge, 2.8 ft³/s at 1030 h, June 11, gage height 0.48 ft. No peak above base of 15 ft³/s. No flow at times.



E026 Los Alamos Canyon below Ice Rink

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and shaft encoder float system with cellular phone. The system is powered by a solar panel battery system housed in a NEMA shelter on top of a 24" CMP well. Station is equipped with ISCO samplers for water quality sample collection. ISCO samplers are housed in a separate 3' × 4' metal box. Samplers are triggered by stage through the data logger. An outside staff is available for reference. No provision for measurement above wading stage. All high-flow measurement will be by slope-area or critical depth computation methods.

Field Work. The station was visited 38 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run November 21, 2001, found gage to be within limits.

Gage-Height Record. The data logger referenced to the inside staff gave a complete and satisfactory record, except for the period from July 6 to September 21 due to data logger malfunction.

Rating. The channel at the gage is about 20' wide and straight for 20' upstream where it bends to the left and then straight for about 150' downstream. The streambed through this reach is primary gravel with cobbles. Low-flow control is rock and gravel riffle 15' downstream from gage. Channel is control for medium and high stages. The build-up and scour of this control leads to changes of shifts during the water year.

Six discharge measurements (Nos. 69–74) and 38 inspections were made during the year.

Rating No. 3 was developed based on measurements made during the period of record.

Flow is partially regulated by Los Alamos Reservoir about 1.5 mi upstream of gage and draining of this reservoir. Gage of reference at this station is the inside reference point (RP measure). Fall exists at all low- to medium-flow regimes between staff and well.

Discharge. Discharges were computed from Rating No. 3 using variable shifts. Estimated discharges were based on precipitation and referenced to E025.

Remarks. Records are good, except for estimated daily discharges, which are fair.

E026 Los Alamos Canyon below Ice Rink

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	.80	.39	.06	.06*	.08*
2	0	0	0	0	0	0	0	.88	.46	.04	.04*	.06*
3	0	0	0	0	0	0	0	.88	.68	.05	.02*	.03*
4	0	0	0	0	0	0	0	.84	.59	.03	0*	.01*
5	0	0	0	0	0	0	0	.77	.52	.12	0*	0*
6	0	0	0	0	0	0	0	.74	.44	.09*	0*	0*
7	0	0	0	0	0	0	0	.72	.36	.07*	0*	0*
8	0	0	0	0	0	0	0	.64	.38	.05*	0*	0*
9	0	0	0	0	0	0	0	.62	.32	.04*	0*	0*
10	0	0	0	0	0	0	0	.63	.57	.02*	0*	0*
11	0	0	0	0	0	0	0	.48	1.3	.01*	.01*	0*
12	0	0	0	0	0	0	0	.36	.73	0*	.07*	0*
13	0	0	0	0	0	0	0	.22	.32	0*	.05*	0*
14	0	0	0	0	0	0	0	.15	.32	0*	.06*	0*
15	0	0	0	0	0	0	0	.14	.28	0*	.05*	0*
16	0	0	0	0	0	0	0	.09	.20	0*	.04*	.08*
17	0	0	0	0	0	0	.01	.07	.12	0*	.01*	.07*
18	0	0	0	0	0	0	.07	.06	.10	0*	0*	.06*
19	0	0	0	0	0	0	.30	.05	.08	0*	0*	.04*
20	0	0	0	0	0	0	.72	.02	.47	.03*	0*	.03*
21	0	0	0	0	0	0	.64	.03	.21	.05*	0*	.02*
22	0	0	0	0	0	0	.66	.05	.09	.06*	0*	.01*
23	0	0	0	0	0	0	.78	.29	.09	.05*	0*	0
24	0	0	0	0	0	0	.92	.21	.08	.04*	0*	.04
25	0	0	0	0	0	0	.99	.09	.09	.03*	0*	.01
26	0	0	0	0	0	0	.99	.05	.14	.05*	0*	0
27	0	0	0	0	0	0	.96	.10	.12	.08*	0*	0
28	0	0	0	0	0	0	.91	.20	.13	.07*	0*	0
29	0	0	0	0	----	0	.86	.18	.11	.09*	0*	0
30	0	0	0	0	----	0	.77	.31	.09	.10*	.03*	0
31	0	----	0	0	----	0	----	.33	----	.08*	.08*	----
Total	0	0	0	0	0	0	9.58	11.00	9.78	1.31	0.52	0.54
Mean	0	0	0	0	0	0	.32	.35	.33	.042	.017	.018
Max	0	0	0	0	0	0	.99	.88	1.3	.12	.08	.08
Min	0	0	0	0	0	0	0	.02	.08	0	0	0
Acre-Ft	0	0	0	0	0	0	19	22	19	2.6	1.0	1.1
Wtr Year	2009	Total	32.73	Mean	.090	Max	1.3	Min	0	Acre-Ft	65	
Cal Year	2008	Total	126.17	Mean	.34	Max	2.6	Min	0	Acre-Ft	250	

*Estimate

E02685 Los Alamos Canyon at TA-2

Location. Lat 35° 52' 34", long 106° 17' 21", SE ¼, Sec. 15, T. 19 N., R. 6 E., Los Alamos County

Drainage Area. 7.97 mi².

Period of Record. March 8, 2006, to September 30, 2009.

Gage. Data logger. Elevation of gage is 6,853 ft above NGVD.

Remarks. Water discharge records are good. Flow partially regulated by Los Alamos Reservoir about 3.0 mi upstream.

Extremes for Period of Record. Maximum discharge 52 ft³/s, September 6, 2007, gage height 1.94 ft. No flow most of the time.

Extremes for Current Water Year. Peak discharges above base of 15 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1255	24	1.53
July 6	1300	34*	1.75*

No flow at times.



E02685 Los Alamos Canyon at TA-2

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor. System is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct measurement above wading stage.

Field Work. The station was visited 21 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels of March 30, 2006, found gage within limits, no correction needed.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the period from February 5–8 and February 21, 22 when gage height was affected by ice.

Rating. The channel is straight for 100' upstream and downstream. Bed is large gravel and well armored and should not be subject to much movement. Channel is trapezoidal with some vegetation. Flow is regulated somewhat by Los Alamos Reservoir about 3.0 mi upstream.

Eleven discharge measurements (Nos. 34–44) and 21 inspections were made during the year.

Rating No. 2 was used for part of the year. Rating No. 4 was developed based on measurements made during the year. Shifts are small and variable. Flows are very flashy, less than an hour, so mean daily discharges are very small in relation to the instantaneous peak.

Discharge. Discharge was computed from Ratings No. 4 with shifts applied by stage V diagram.

Remarks. Records are good.

E02685 Los Alamos Canyon at TA-2

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	.95	.21	.01	0	0
2	0	0	0	0	0	0	0	.95	.23	0	0	0
3	0	0	0	0	0	0	0	.96	.68	.03	0	0
4	0	0	0	0	0	0	0	.89	.39	0	0	0
5	0	0	0	0	0*	0	0	.74	.31	1.2	0	0
6	0	0	0	0	0*	0	0	.64	.24	1.7	0	0
7	0	0	0	0	0*	0	0	.61	.19	.25	0	0
8	0	0	0	0	0*	0	0	.56	.20	.05	0	0
9	0	0	0	0	0	0	0	.53	.17	0	0	0
10	0	0	0	0	0	0	0	.53	.91	0	0	0
11	.52	0	0	0	0	0	.44	.46	.70	0	0	0
12	0	0	0	0	0	0	.31	.39	.49	0	0	0
13	0	0	0	0	0	0	.33	.32	.26	0	0	0
14	0	0	0	0	0	0	.19	.22	.35	0	.02	0
15	0	0	0	0	0	0	.14	.18	.25	0	0	0
16	0	0	0	0	0	0	.11	.16	.16	0	0	0
17	0	0	0	0	0	0	.21	.14	.10	0	0	0
18	0	0	0	0	0	0	.23	.09	.06	0	0	0
19	0	0	0	0	0	0	.23	.08	.03	0	0	0
20	0	0	0	0	0	0	.45	.03	.80	0	0	0
21	0	0	0	0	0*	0	.66	.04	.35	.02	0	0
22	0	0	0	0	0*	0	.89	.12	.17	0	0	0
23	0	0	0	0	0	0	1.2	.79	.09	.06	0	0
24	0	0	0	0	0	0	1.2	.55	.05	0	0	0
25	0	0	0	0	0	0	1.2	.38	.06	0	0	0
26	0	0	0	0	0	0	1.2	.20	.12	.03	0	0
27	0	0	0	0	0	0	1.1	.38	.07	0	0	0
28	0	0	0	0	0	0	1.1	.30	.09	.03	0	0
29	0	0	0	0	----	0	1.0	.21	.06	.06	0	0
30	0	0	0	0	----	0	.94	.22	.03	.60	.04	0
31	0	----	0	0	----	0	----	.22	----	0	0	----
Total	0.52	0	0	0	0	0	13.13	12.84	7.82	4.04	0.06	0
Mean	.017	0	0	0	0	0	.44	.41	.26	.13	.002	0
Max	.52	0	0	0	0	0	1.2	.96	.91	1.7	.04	0
Min	0	0	0	0	0	0	0	.03	.03	0	0	0
Acre-Ft	1.0	0	0	0	0	0	26	25	16	8.0	.12	0
Wtr Year	2009	Total	38.41	Mean	.11	Max	1.7	Min	0	Acre-Ft	76	
Cal Year	2008	Total	148.19	Mean	.40	Max	3.1	Min	0	Acre-Ft	294	

*Estimate

E030 Los Alamos Canyon above DP Canyon

Location. Lat 35° 52' 21", long 106° 15' 36", SW ¼, sec. 13, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 8.57 mi².

Period of Record. July 1994 to September 30, 2009.

Revised Record. Drainage Area (2006); Township (2007).

Gage. Data logger with concrete control. Elevation of gage is 6,621 ft above NGVD from GPS survey.

Remarks. Records are good. Flow partially regulated by Los Alamos Reservoir about 2.5 mi upstream.

Average Discharge. 15 yr, 0.28 ft³/s, 202 acre-ft/yr.

Extremes Outside Period of Record. Flood of July 31, 1968, was 329 ft³/s from slope area determination. Gage height was established later at 3.71 ft present datum.

Extremes for Period of Record. Maximum discharge, 125 ft³/s, June 22, 2002, gage height 2.88 ft from peak flow computation. No flow most of the time.

Extremes for Current Water Year. Peak discharges above base of 10 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 6	1340	11*	1.57

No flow at times.



E030 Los Alamos Canyon above DP Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval). The system is powered by a solar panel battery system housed in NEMA shelter on 18" CMP well on left bank. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Field Work. The station was visited 25 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except during the periods from March 2–5 when gage height was affected by ice and July 7 to August 6 when gage height was affected by silting of stilling well.

Rating. Streambed is sand and gravel and subject to slight movement during flow events. The channel is straight for 300' above gage and 50' below. Vegetation on bank is sparse grass.

Two discharge measurement (Nos. 55–56) and 25 inspections were made during the year.

Rating No. 2 was used for the entire water year.

Discharge. Discharge was computed using Rating No. 2.

Remarks. Records are good.

E030 Los Alamos above DP Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	.04*	0
2	0	0	0	0	0	0*	0	0	0	0	.03*	0
3	0	0	0	0	0	0*	0	.09	.20	0	0*	0
4	0	0	0	0	0	0*	0	.11	0	0	0*	0
5	0	0	0	0	0	0*	0	.05	0	.53	0*	0
6	0	0	0	0	0	0	0	.06	0	.92	0*	0
7	0	0	0	0	0	0	0	.05	0	.04*	0	0
8	0	0	0	0	0	0	0	.05	0	0*	0	0
9	0	0	0	0	0	0	0	.02	0	0*	0	0
10	0	0	0	0	0	0	0	.02	.35	0*	0	0
11	.14	0	0	0	0	0	0	0	.18	0*	0	0
12	0	0	0	0	0	0	0	0	.13	0*	0	0
13	0	0	0	0	0	0	0	0	0	0*	0	0
14	0	0	0	0	0	0	0	0	.01	0*	0	0
15	0	0	0	0	0	0	0	0	0	0*	0	0
16	0	0	0	0	0	0	0	0	0	0*	0	0
17	0	0	0	0	0	0	0	0	0	0*	0	0
18	0	0	0	0	0	0	0	0	0	0*	0	0
19	0	0	0	0	0	0	0	0	0	0*	0	0
20	0	0	0	0	0	0	0	0	.17	0*	0	0
21	0	0	0	0	0	0	0	0	0	0*	0	0
22	0	0	0	0	0	0	0	0	0	0*	0	0
23	0	0	0	0	0	0	0	.16	0	0*	0	0
24	0	0	0	0	0	0	0	.03	0	0*	0	0
25	0	0	0	0	0	0	0	.02	0	0*	0	0
26	0	0	0	0	0	0	0	0	0	0*	0	0
27	0	0	0	0	0	0	0	.04	0	0*	0	0
28	0	0	0	0	0	0	0	0	0	0*	0	0
29	0	0	0	0	----	0	0	0	0	0*	0	0
30	0	0	0	0	----	0	0	0	0	.30*	0	0
31	0	----	0	0	----	0	----	0	----	.05*	0	----
Total	0.14	0	0	0	0	0	0	0.70	1.04	1.84	0.07	0
Mean	.005	0	0	0	0	0	0	.023	.035	.059	.002	0
Max	.14	0	0	0	0	0	0	.16	.35	.92	.04	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.28	0	0	0	0	0	0	1.4	2.1	3.6	.14	0
Wtr Year	2009	Total	3.79	Mean	.010	Max	.92	Min	0	Acre-Ft	7.5	
Cal Year	2008	Total	88.21	Mean	.24	Max	2.6	Min	0	Acre-Ft	175	

*Estimate

E038 DP Canyon above TA-21

Location. Lat 35° 52' 49", long 106° 16' 58", SW ¼, sec. 14, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.22 mi².

Period of Record. April 26, 2000, to September 30, 2009.

Revised Record. Drainage Area (2006); Section (2007).

Average Discharge. 9 yr, 0.14 ft³/s, 98 acre-ft/yr.

Gage. Data logger with cellular telemetry. Elevation of gage is 7,087 ft above NGVD.

Remarks. Records are good.

Extremes for Period of Record. Maximum discharge, 295 ft³/s, July 24, 2004, gage height 4.36 ft from rating curve extended above 10 ft³/s on basis of peak flow computations. No flow most of the time.

Extremes for Current Water Year. Peak discharges above base of 100 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 30	1350	202*	3.56*

No flow at times.



E038 DP Canyon above TA-21

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron accububble self contained bubbler system and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff gage is available for reference. No provision for discharge measurements above wading stage. All high-flow measurement will be by slope-area or peak flow computation methods.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 26 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run July 2005 show gage to be within limits.

Gage-Height Record. The data logger referenced to the outside gage gave a complete and satisfactory record for the year, except for the periods from November 6–8, 11, 12, December 28 to January 24, and February 24 to March 5 when gage height was affected by ice.

Rating. The channel is about 10' wide and straight for about 30' upstream and downstream. The streambed through this reach is primarily sand, gravel, and larger boulders. Low-flow control is a rock outcrop downstream from gage about 5'. Channel is control for medium and high stages.

Two discharge measurement (Nos. 10–11) and 26 inspections were made this year. All inspections of no flow used to develop a V diagram shift needed to adjust PZF.

Rating No. 2 was developed using past discharge measurements and verified with current measurements.

Discharge. Rating No. 2 was used with V diagrams to compute this record.

Remarks. Records are good.

E038 DP Canyon above TA-21

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0*	0	.02	.02	0	0	0
2	0	0	0	0*	0	0*	0	0	0	0	0	0
3	0	0	0	0*	0	0*	0	0	1.7	0	0	.14
4	.39	0	0	0*	0	0*	0	0	.02	0	0	.02
5	.09	0	0	0*	0	0*	0	0	0	1.9	0	0
6	0	0*	0	0*	0	0	0	0	0	.05	0	.25
7	0	0*	0	0*	0	0	0	0	0	0	0	.28
8	0	0*	0	0*	0	0	0	0	0	0	0	.24
9	0	0	0	0*	0	.09	0	0	0	0	0	0
10	0	0	.02	0*	0	0	0	0	3.6	.04	0	.03
11	4.1	0*	.22	0*	0	0	.50	0	0	0	0	.14
12	0	0*	.20	0*	0	0	.29	0	0	0	.32	0
13	0*	0	.01	0*	0	2.1	0	0	0	0	.21	0
14	0*	0	0	0*	0	.14	0	0	2.0	0	2.2	.13
15	0	0	0	0*	0	.01	0	0	.05	0	0	.05
16	0	0	0	0*	0	0	0	0	0	0	0	3.0
17	0	0	0	0*	0	0	.09	0	0	0	0	1.9
18	0	0	0	0*	0	0	.02	0	0	0	0	.31
19	0	0	0	0*	0	0	0	0	0	0	0	0
20	0	0	.03	0*	0	0	0	0	4.2	0	0	0
21	0	0	.05	0*	0	0	0	.01	0	1.5	0	0
22	0*	0	0	0*	0	0	0	.01	0	0	0	0
23	0*	0	0	0*	0	0	0	2.3	0	1.0	0	1.3
24	0	0	.07	0*	0*	0	0	1.9	0	0	.17	1.6
25	0	0	0	0	0*	0	0	.12	.56	.03	0	.04
26	0	0	0	0	0*	1.5	0	.21	.01	.50	0	0
27	0	0	0	0	0*	2.2	0	1.4	0	0	0	0
28	0	0	0*	0	0*	.01	0	.19	.13	.44	0	0
29	0	0	0*	0	----	0	0	0	0	.51	0	0
30	0	0	0*	0	----	0	0	0	0	2.9	1.4	0
31	0	----	0*	0	----	0	----	.79	----	.03	.05	----
Total	4.58	0	0.60	0	0	6.05	0.90	6.95	12.29	8.90	4.35	9.43
Mean	.15	0	.019	0	0	.20	.030	.22	.41	.29	.14	.31
Max	4.1	0	.22	0	0	2.2	.50	2.3	4.2	2.9	2.2	3.0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	9.1	0	1.2	0	0	12	1.8	14	24	18	8.6	19
Wtr Year	2009	Total	54.05	Mean	.15	Max	4.2	Min	0	Acre-Ft	107	
Cal Year	2008	Total	27.84	Mean	.076	Max	4.1	Min	0	Acre-Ft	55	

*Estimate

E039 DP Canyon below Meadow near TA-21

Location. Lat 35° 52' 41", long 106° 15' 28", SE ¼, sec. 14, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.315 mi².

Period of Record. October 1, 1999, to September 30, 2009.

Revised Record. Section, Township, Range (2007).

Average Discharge. 8 yr, 0.12 ft³/s, 85 acre-ft/yr.

Gage. Data logger with cellular telemetry. Elevation of gage is 7,010 ft above NGVD from topographic map.

Remarks. Records are good except estimated daily discharges, which are fair.

Extremes for Period of Record. Maximum discharge, 200 ft³/s, July 24, 2004 gage height 2.58 ft. No flow most of the time.

Extremes for Current Water Year. Peak discharges above base of 50 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 6	1245	101	1.87
July 30	1410	123*	2.03*

No flow at times.



E039 DP Canyon below Meadow near TA-21

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Sutron Accubar bubble sensor with cellular phone speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. Low to medium flow can be waded. High flow will be measured by indirect methods.

Field Work. The station was visited 20 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run July 14, 2005, found gage within acceptable limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory for the water year, except during the periods October 12–27 due to data logger malfunction and February 9, 15, 19, 20 when gage height was affected by ice.

Rating. The channel has rock outcrop in bed with pockets of sand mostly from deposition below riffles. Channel is straight for 50' above and below gage. A slight left bend 50' below gage also has a 2' drop and could act as a broad-crested weir at high flow. Banks and canyon bottom are thickly vegetated with grass.

One discharge measurements (No. 17) and 20 inspections were made during the year.

Rating No. 2 was developed from three critical depth computations and a PZF.

Discharge. Discharge was computed by applying gage height directly to Rating No. 2. The channel in winter is heavily glaciated and choked with ice and snow with flow frozen dry. The winter record is published as zero based on comparison with E038 and E040. Variable shift diagrams were used at lower flows defined by discharge measurements.

Remarks. Records are good, except for estimated daily discharges, which are fair.

E039 DP Canyon below Meadow near TA-21

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	.02	0	0	0	0	.03	0	0	.08	0	0
2	.02	.02	0	0	0	0	.01	0	0	.09	0	0
3	.03	.02	0	0	0	0	0	0	.68	.11	0	0
4	.06	.02	0	0	0	0	0	0	0	.12	0	0
5	.06	.02	0	0	0	0	0	0	0	2.6	0	0
6	0	.02	0	0	0	0	0	0	0	3.4	0	0
7	0	.02	0	0	0	0	0	0	.02	0	0	0
8	.01	.02	0	0	0	0	0	0	.06	0	0	0
9	.01	.03	0	0	0*	0	0	0	.05	0	0	0
10	.01	.03	0	0	0	0	0	0	1.7	0	0	0
11	.03	.04	0	0	0	0	2.0	0	0	0	0	0
12	.02*	.04	0	0	0	0	1.3	0	0	0	0	0
13	.01*	.04	0	0	0	.02	1.2	0	0	0	0	0
14	.01*	.04	0	0	0	0	.58	0	.98	0	.82	0
15	.01*	.03	0	0	0*	0	.49	0	0	0	0	0
16	.02*	.03	0	0	0	0	.42	0	0	0	0	.80
17	.01*	.03	.01	0	0	0	.91	0	0	0	0	.32
18	.01*	.03	.23	0	0	0	.69	0	0	0	0	.05
19	.01*	.03	.01	0	0*	0	.07	0	0	0	0	0
20	.01*	.03	0	0	0*	0	.03	0	2.2	0	0	0
21	.02*	.03	0	0	0	0	0	0	.20	.86	0	0
22	.01*	.02	0	0	0	0	0	0	.17	.03	0	0
23	.01*	.02	0	0	0	0	0	.98	.15	.80	0	.21
24	.01*	.02	0	0	0	0	0	.36	.15	0	0	.66
25	.01*	.02	0	0	0	0	0	0	.29	0	0	0
26	.01*	.02	0	0	0	.01	0	0	.07	.34	0	0
27	.01*	.49	0	0	0	.48	0	.20	.06	0	0	0
28	.01	0	0	0	0	.17	0	0	.07	.27	0	0
29	.02	0	0	0	----	.19	0	0	.07	.29	0	0
30	.02	0	0	0	----	.04	0	0	.08	2.3	.37	0
31	.02	----	0	0	----	.03	----	.17	----	.01	0	----
Total	0.51	1.18	0.25	0	0	0.94	7.73	1.71	7.00	11.30	1.19	2.04
Mean	.016	.039	.008	0	0	.030	.26	.055	.23	.36	.038	.068
Max	.06	.49	.23	0	0	.48	2.0	.98	2.2	3.4	.82	.80
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	1.0	2.3	.50	0	0	1.9	15	3.4	14	22	2.4	4.0
Wtr Year	2009	Total	33.85	Mean	.093	Max	3.4	Min	0	Acre-Ft	67	
Cal Year	2008	Total	43.22	Mean	.12	Max	3.0	Min	0	Acre-Ft	86	

*Estimate

E040 DP Canyon above Los Alamos Canyon

Location. Lat 35° 52' 24", long 106° 15' 34", SW ¼, sec. 13, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.60 mi².

Period of Record. May 1999 to September 30, 2009.

Revised Record. Drainage Area (2006); Section (2007).

Gage. Data logger and concrete control. Elevation of gage is 6,620 ft above NGVD from GPS survey.

Remarks. Records are good, except estimated daily discharges, which are fair.

Average Discharge. 10 yr, 0.035 ft³/s, 25 acre-ft/yr.

Extremes for Period of Record. Maximum discharge 452 ft³/s, August 8, 2006, gage height 5.65 ft. (from slope area measurement). No flow most of the time.

Extremes for Current Water Year. Peak discharge above base of 30 ft³/s and maximum (*).

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1600	134	3.98
June 10	0640	30	3.13
July 5	1310	78	3.62
July 6	1310	153*	4.10*
July 30	1440	140	4.02

No flow most of the time.



E040 DP Canyon above Los Alamos Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Milltronics sonic probe. The system is powered by a solar panel battery system. All equipment is housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality collection in a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. High flow measurements can be made from bridge upstream of gage.

Field Work. The station was visited 29 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Corrections. None from levels.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from November 19–23 and December 9 to January 7 when gage height was affected by ice. Several days throughout the summer were estimated due to silting at control.

Rating. The channel is about 15' wide and bends to the right above gage and straight for about 100' downstream. The streambed through this reach is primarily sand with large boulders. The control at this site is a concrete control with a V notch in the middle for low flow. Channel becomes the control for medium to high flows.

Twenty-nine inspections of no flow were made during the year.

Rating No. 3 is good up to 30 ft³/s and fair above that.

Discharge. Discharge was computed using Rating No. 3. Those days estimated at zero flow were based on comparison with nearby gage stations and precipitation records. No flow most of the time.

Remarks. Records are good except for estimated daily discharges, which are fair.

E040 DP Canyon above Los Alamos Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	.05	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0*	.68	0	0	0
4	0	0	0	0*	0	0	0	0*	.03	0	0	0
5	0	0	0	0*	0	0	0	0*	0	3.2	0	0
6	0	0	0	0*	0	0	0	0*	0	5.2	0	0
7	0	0	0	0*	0	0	0	0*	0	.06	0	0
8	0	0	0	0	0	0	0	0*	0	0	0	0
9	0	0	0*	0	0	0	0	0*	0	0	0	0
10	0	0	0*	0	0	0	0	0*	2.3	0	0	0
11	7.1	0	0*	0	0	0	.13	0*	0	0	0	0
12	0	0	0*	0	0	0	.05	0*	0	0	0	0
13	0	0	0*	0	0	0	.15	0*	0	0	0	0
14	0	0	0*	0	0	0	0	0*	.94	0	.13	0
15	0	0	0*	0	0	0	0	0*	0*	0	0	0
16	0	0	0*	0	0	0	0	0*	0*	0	0	0
17	0	0	0*	0	0	0	0	0*	0	0	0	.02
18	0	0	0*	0	0	0	0	0*	0	0	0	0
19	0	0*	0*	0	0	0	0	0*	0	0	0	0
20	0	0*	0*	0	0	0	.01	0*	1.5	0	0	0
21	0	0*	0*	0	0	0	.03	0	0*	.18	0	0
22	0	0*	0*	0	0	0	.03	.01	0*	.14	0	0
23	0	0*	0*	0	0	0	0	.69	0	.52	0	0
24	0	0	0*	0	0	0	0	.87	0	.02	0	.15
25	0	0	0*	0	0	0	0	.18	0	0*	0	.01*
26	0	0	0*	0	0	.01	0	0	0	0*	0	0*
27	0	0	0*	0	0	.14	0	.12	0	0*	0	0*
28	0	0	0*	0	0	.01	0	.05	0	0*	0	0*
29	0	0	0*	0	----	0	0	0	0	.03	0	0*
30	0	0	0*	0	----	0	0	0	0	3.6	0	0
31	0	----	0*	0	----	0	----	0	----	.31	0	----
Total	7.1	0	0	0	0	0.16	0.40	1.92	5.45	13.26	0.18	0.18
Mean	.23	0	0	0	0	.005	.013	.062	.18	.43	.006	.006
Max	7.1	0	0	0	0	.14	.15	.87	2.3	5.2	.13	.15
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	14	0	0	0	0	.32	.79	3.8	11	26	.36	.36
Wtr Year	2009	Total	28.65	Mean	.078	Max	7.1	Min	0	Acre-Ft	57	
Cal Year	2008	Total	11.52	Mean	.031	Max	7.1	Min	0	Acre-Ft	23	

*Estimate

E042 Los Alamos Canyon above SR 4

Location. Lat 35° 52' 01", long 106° 13' 25", NW ¼, sec. 20, T. 19 N., R. 7 E., Santa Fe County.

Drainage Area. 10.11 mi².

Period of Record. November 1970 to June 1971, October 1991 to September 30, 2009.

Revised Record. Drainage Area (2006); Quarter (2007); Peak discharges for 2006 (2007).

Gage. Data logger with cellular telemetry and concrete control. Elevation of gage is 6,300 ft above NGVD from GPS survey.

Remarks. Records are good. Flow partially regulated by Los Alamos Reservoir about 7.8 mi upstream.

Average Discharge. 15 yr, 0.25 ft³/s, 181 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 240 ft³/s, August 08, 2006, gage height 3.76 ft (from flood marks). No flow at times.

Extremes for Current Water Year. Peak discharges above base of 40 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 6	1410	53*	2.36*

No flow at times.



E042 Los Alamos Canyon above SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with quadrature encoder driven by float tape in stilling well and cellular telemetry with speech modem. System is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. Outside staff available for reference. Control is broad-crested weir that has deteriorated somewhat over the years, but is still fairly stable. Footbridge is available for high-flow discharge measurements.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 32 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except during the periods from May 17–21 when the data logger malfunctioned and July 30, 31 when stilling well became silted.

Rating. Streambed is sand and gravel and channel is straight for over 150' above and below broad-crested weir. Fill and scour, mostly fill, results in pooling at the gage on most flow events.

Thirty-two inspections of no flow were made.

Rating No. 4 was developed from measurements made in previous years.

Discharge. Discharge computed from Rating No. 4 using V diagrams with no shifts on high flows. Those days estimated were based on precipitation and nearby gage stations for verification.

Remarks. Records are good. Flow partially regulated by Los Alamos Reservoir about 7.8 mi upstream.

E042 Los Alamos Canyon above SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	1.3	0	0
6	0	0	0	0	0	0	0	0	0	3.1	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	.54	0	0	0
11	1.1	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	.05	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0*	0	0	0	0
18	0	0	0	0	0	0	0	0*	0	0	0	0
19	0	0	0	0	0	0	0	0*	0	0	0	0
20	0	0	0	0	0	0	0	0*	.31	0	0	0
21	0	0	0	0	0	0	0	0*	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	1.5*	0	0
31	0	----	0	0	----	0	----	0	----	0*	0	----
Total	1.1	0	0	0	0	0	0	0	0.90	5.9	0	0
Mean	.035	0	0	0	0	0	0	0	.030	.19	0	0
Max	1.1	0	0	0	0	0	0	0	.54	3.1	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	2.2	0	0	0	0	0	0	0	1.8	12	0	0
Wtr Year	2009	Total	7.90	Mean	.022	Max	3.1	Min	0	Acre-Ft	16	
Cal Year	2008	Total	47.48	Mean	.13	Max	2.4	Min	0	Acre-Ft	94	

*Estimate

E050 Los Alamos Canyon below Los Alamos Weir

Location. Lat 35° 52' 71", long 106° 13' 0.03", NE ¼, sec. 20, T. 19N., R. 7E., Los Alamos County.

Drainage Area. 10.42 mi².

Period of Record. May 2001 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger. Elevation of gage is 6,345 ft above NGVD from GPS survey.

Remarks. Records are good. Flows partially regulated by broad-crested weir 200 ft upstream.

Average Discharge. 8 yr, 0.19 ft³/s, 138 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 252 ft³/s August 08, 2006, gage height 3.20 ft (from slope area measurement). No flow most of the time.

Extremes for Current Year. Peak discharge above base of 30 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 6	1445	34*	1.49*

No flow most of the time.



E050 Los Alamos Canyon below Los Alamos Weir

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Sutron Accubar bubble sensor. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. No provision for discharge measurements above wading stage.

Field Work. The station was visited 23 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels of May 31, 2001, found gage within limits; no correction needed.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record.

Rating. The channel is straight for 100' upstream and downstream. Bed is large gravel and well armored and should not be subject to much movement. Channel is trapezoidal with little or no vegetation. Flow is regulated somewhat by detention weir just upstream.

Twenty-six inspections of no flow were made.

Rating No. 2 was developed based on all measurements made during the period of record. Shifts are small and variable. Flows are very flashy, less than an hour, daily mean discharges are very small in relation to the instantaneous peak.

Discharge. Discharge was computed from Rating No. 2 with shifts applied by stage diagram.

Remarks. Records are good.

E050 Los Alamos Canyon below Los Alamos Weir

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	2.3	0	0
7	0	0	0	0	0	0	0	0	0	.02	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	.27	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	.08	0	0
31	0	----	0	0	----	0	----	0	----	.01	0	----
Total	0.27	0	0	0	0	0	0	0	0	2.41	0	0
Mean	.009	0	0	0	0	0	0	0	0	.078	0	0
Max	.27	0	0	0	0	0	0	0	0	2.3	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.54	0	0	0	0	0	0	0	0	4.8	0	0
Wtr Year	2009	Total	2.68	Mean	.007	Max	2.3	Min	0	Acre-Ft	5.3	
Cal Year	2008	Total	10.41	Mean	.028	Max	1.8	Min	0	Acre-Ft	21	

E055 Pueblo Canyon above Acid Canyon

Location. Lat 35° 53' 20", long 106° 18' 14", SE ¼, Sec. 9, T 19 N., R 6 E., Los Alamos County.

Drainage Area. 3.42 mi².

Period of Record. October 1, 2002, to September 30, 2009.

Revised Record. Average discharge (2007, 2008).

Gage. Data logger. Elevation of gage is 6,945 ft above NGVD from topographic map.

Remarks. Records are good to fair.

Average Discharge. 7 yr, 0.23 ft³/s, 167 acre-ft/yr.

Extremes for Period Outside of Record. Maximum discharge, 1,600 ft³/s (from slope-area computation), July 2, 2001, gage height 7.3 ft (from flood mark). No flow most of the time.

Extremes for Period of Record. Maximum discharge, 1,780 ft³/s, August 8, 2006, gage height 7.50 ft (from critical depth computation). No flow most of the time.

Extremes for Current Year. Peak discharge above base of 20 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1225	34*	3.02*

No flow most of the time.



E055 Pueblo Canyon above Acid Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Sutron Accubar bubble sensor. System is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with ISCO pump sampler for water quality sample collection. ISCO is housed in separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stage.

Field Work. The station was visited 31 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the period of November 30 to March 19 when ice affected gage height.

Rating. Channel comes into gage from a left to right bend and bends hard left about 100' below gage. Bed consists of unstable sand and gravel with some boulders. The left bank downstream from gage is heavily wooded and that tends to hold the flow to the right, away from the reach of the gage. Lower end of any stage-discharge relation here will be unstable. The upper end could be stable, but floods and construction have enabled the flow to jump channel at the bend above the gage and allow significant flow to go down the road not in accordance with recorded gage heights. This jump out occurs at approximately 500 ft³/s. This channel problem was corrected in March 2007.

Five discharge measurements (Nos. 46–50) and 16 inspections of no flow were made during the year.

Rating No. 2 was developed using the current-year measurements and one critical depth measurement of 850 ft³/s, and various low-flow measurements from previous years. Low water definition is poor, and high end needs to be confirmed. Low end of rating was verified by dye study and used to enhance rating. Rating No. 2 is good.

Discharge. Discharge was computed using Rating No. 2 and a series of V diagrams.

Remarks. Records are good.

E055 Pueblo Canyon above Acid Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	.10	0	.09	.01	.08	0
2	0	0	0	0	0	0	.07	0	.08	0	.03	0*
3	0	0	0	0	0	0	.06	0	.90	.18	.01	0*
4	0	.42	0	0	0	0	.02	0	.32	.04	0	0*
5	0	.07	0	0	0	0	0	0	.15	2.8	0	0*
6	0	.06	0	0	0	0	0	0	.12	3.0	0	0*
7	0	.04	0	0	0	0	0	0	.09	.97	0	0*
8	0	0	0	0	0	0	0	0	.07	.56	0	0*
9	0	0	0	0	0	0	0	0	.04	.40	0	0*
10	0	0	0	0	0	0	0	0	.97	.40	0	0*
11	.80	0	0	0	0	0	.40	0	.24	.31	0	0*
12	.16	0	0	0	0	0	.41	0	.13	.22	0	0*
13	.10	0	0	0	0	0	.45	0	.09	.18	0	0*
14	.17	0	0	0	0	0	.17	0	.09	.14	.63	0*
15	.15	0	0	0	0*	0	.14	0	.10	.07	.10	0*
16	.10	0	0	0	0*	0	.12	0	.07	.03	.01	.05*
17	.08	0	0	0	0*	0	.32	0	.05	0	0	.24*
18	.07	0	0*	0	0*	0	.30	0	.02	0	0	.12
19	.07	0	0*	0	0*	0	.20	0	0	0	0	.01
20	.06	0	0*	0	0*	0	.15	0	1.4	0	0	0
21	.05	0	0*	0	0*	0	.13	0	.33	.11	0	0
22	0	0	0*	0	0*	0	.13	0	.14	.17	0	0
23	0	0	0*	0	0*	0	.12	.47	.08	.06	0	0
24	0	0	0*	0	0*	0	.12	.22	.06	.02	0	.34
25	0	0	0*	0	0	0	.12	.20	.06	0	0	.02
26	0	0	0*	0	0	0	.12	.12	.14	.62	0	0
27	0	0	0*	0	0	0	.11	.46	.07	.27	0	0
28	0	0	0*	0	0	.05	.10	.29	.06	.23	0	0
29	0	0	0	0	----	.07	.05	.15	.05	.25	0	0
30	0	0	0	0	----	.10	0	.11	.02	1.4	.04	0
31	0	----	0	0	----	.10	----	.10	----	.26	0	----
Total	1.81	0.59	0	0	0	0.32	3.91	2.12	6.03	12.70	0.90	0.78
Mean	.058	.020	0	0	0	.010	.13	.068	.20	.41	.029	.026
Max	.80	.42	0	0	0	.10	.45	.47	1.4	3.0	.63	.34
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	3.6	1.2	0	0	0	.63	7.8	4.2	12	25	1.8	1.5
Wtr Year	2009	Total	29.16	Mean	.080	Max	3.0	Min	0	Acre-Ft	58	
Cal Year	2008	Total	9.47	Mean	.026	Max	.99	Min	0	Acre-Ft	19	

*Estimate

E0555 South Fork of Acid Canyon

Location. Lat 35° 53' 10", long 106° 18' 26", SE ¼, Sec. 9, T 19 N., R 6 E., Los Alamos County.

Drainage Area. 0.08 mi².

Period of Record. August 18, 2004, to September 30, 2009.

Revised Record. Period of Record (this report).

Gage. Data logger with cellular telemetry. Elevation of gage is 7,100 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 5 yr, 0.03 ft³/s, 23 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 108 ft³/s, August 08, 2006, gage height 6.22 ft (from critical depth computation). No flow most of the time.

Extremes for Current Year. Peak discharges above base of 20 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1205	31*	5.58*

No flow most of the time.



E0555 South Fork of Acid Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor and cellular telemetry with speech modem housed in a NEMA shelter on left bank. The system is powered by a solar panel battery system. The station is equipped with ISCO pump samplers for water quality sample collection. Samples are triggered by stage through the data logger. Samplers are housed in a separate shelter, a 3' × 4' metal box. An outside staff gage is available for reference. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 19 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels from November 8, 2005, found gage within limits. No corrections needed.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from October 24 to November 18 and July 6 to August 6 when the data logger malfunctioned and December 18 and April 13–15 when gage height was affected by ice.

Rating. The channel is straight for about 75' upstream and 100' downstream. The channel is trapezoidal with little vegetation. Bed is rock with gravel and should not be subject to very much movement.

Twelve inspections of no flow and seven inspections of observed flow were made this year.

Rating No. 1 was developed by one discharge measurement of low flow and one slope area measurement of peak flow. Rating curve was extended to 6.22, based on a critical depth computation.

Discharge. Discharge was computed by applying Rating No. 1. Shift was applied with a V diagram for the entire year.

Remarks. Records are good except for estimated daily discharges, which are fair.

E0555 South Fork of Acid Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0*	0	0	0	0	0	0	0	0	0*	0
2	0	0*	0	0	0	0	0	0	0	0	0*	0
3	0	0*	0	0	0	0	0	0	.02	0	0*	0
4	0	0*	0	0	0	0	0	0	0	0	0*	0
5	.01	0*	0	0	0	0	0	0	0	.59	0*	0
6	.01	0*	0	0	0	0	0	0	0	.35*	0*	0
7	0	0*	0	0	0	0	0	0	0	.20*	0	0
8	0	0*	0	0	0	0	0	0	0	.10*	0	0
9	0	0*	0	0	0	0	0	0	0	.05*	0	0
10	0	0*	0	0	0	0	0	0	.02	.01*	0	0
11	0	.10*	0	0	0	0	.03	0	0	0*	0	0
12	.02	.02*	0	0	0	0	.01	0	0	0*	0	0
13	.01	.01*	0	0	0	0	0*	0	0	0*	0	0
14	.01	.01*	0	0	0	0	0*	0	.01	0*	.02	0
15	.01	0*	0	0	0	0	0*	0	0	0*	0	0
16	0	0*	0	0	0	0	0	0	0	0*	0	.01
17	0	0*	0	0	0	0	0	0	0	0*	0	0
18	0	0*	0*	0	0	0	0	0	0	0*	0	0
19	0	0	0	0	0	0	0	0	0	0*	0	0
20	0	0	0	0	0	0	0	0	.03	.01*	0	0
21	0	0	0	0	0	0	0	0	0	0*	0	0
22	0	0	0	0	0	0	0	0	0	0*	0	0
23	0	0	0	0	0	0	0	.03	0	0*	0	.01
24	0*	0	0	0	0	0	0	.01	0	0*	0	0
25	0*	0	0	0	0	0	0	0	.01	0*	0	0
26	0*	0	0	0	0	0	0	0	0	.04*	0	0
27	0*	.02	0	0	0	0*	0	0	0	.03*	0	0
28	0*	0	0	0	0	0	0	0	0	.03*	0	0
29	0*	0	0	0	----	0	0	0	0	.05*	0	0
30	0*	0	0	0	----	0	0	0	0	.01*	.03	0
31	0*	----	0	0	----	0	----	0	----	0*	0	----
Total	0.07	0.16	0	0	0	0	0.04	0.04	0.09	1.47	0.05	0.02
Mean	.002	.005	0	0	0	0	.001	.001	.003	.047	.002	.001
Max	.02	.10	0	0	0	0	.03	.03	.03	.59	.03	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.14	.32	0	0	0	0	.08	.08	.18	2.9	.10	.04
Wtr Year	2009	Total	1.94	Mean	.005	Max	.59	Min	0	Acre-Ft	3.8	
Cal Year	2008	Total	0.23	Mean	.003	Max	.10	Min	0	Acre-Ft	.46	

*Estimate

E056 Acid Canyon above Pueblo Canyon

Location. Lat 35° 53' 19", long 106° 18' 14" SE ¼, Sec. 9, T 19 N., R 6 E., Los Alamos County.

Drainage Area. 0.452 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Revised Record. Period of Record (2008).

Gage. Data logger. Elevation of gage is 6,944 above NGVD.

Remarks. Records are fair to poor. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 263 ft³/s, July 5, 2009, gage height 3.63 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 50 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1225	263*	3.63*

No flow most of the time.



E056 Acid Canyon above Pueblo Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor mounted on a 6" channel cantilevered over streambed. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. Outside staff is available for reference. No provisions for measurements above wading stage.

Field Work. The station was visited 32 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels from June 6, 2006. Gage is within acceptable limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the period from November 28 to December 2 when gage height was affected by ice.

Rating. The channel is about 20' wide and straight for about 15' upstream and about 40' downstream and 20' above the confluence of Pueblo Canyon. The streambed through this reach is primarily sand and cobbles. The low-water control is a 90° sharp-crested weir. At high flow, the channel becomes the control.

Ten discharge measurements (Nos. 19–25) and seven visits of no flow. All inspections of no flow were used to develop a V diagram shift needed to adjust for PZF.

Rating No. 2 is based on four discharge measurements and six indirect measurements made by concurrent dye study at site. Shifts were applied to low flow using V diagrams.

Discharge. Discharge was computed by applying gage height to Rating No. 2 through shift adjustment based on V diagrams. Estimated daily discharges were based on precipitation record, field notes, and some comparison with E0555.

Remarks. Records are fair.

E056 Acid Canyon above Pueblo Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0	0	0	0	.05	.06	0	.02	.04
2	0	0	0*	0	0	0	0	.04	.06	0	.03	.04
3	.01	0	0	0	0	0	0	.04	.10	0	.04	.04
4	.01	0	0	0	0	0	0	.03	.04	0	.04	.03
5	.01	0	0	0	0	0	0	.03	.04	5.1	0	.03
6	.01	0	0	0	0	0	0	.01	.04	.18	0	.03
7	.01	0	0	0	0	0	0	0	.03	.03	0	.03
8	.02	0	0	0	0	0	0	0	.03	.06	0	.03
9	.02	0	0	0	0	0	0	0	.02	.07	0	.03
10	.02	0	0	0	0	0	0	0	.11	.07	.03	.03
11	.07	0	0	0	0	0	0	0	.03	.07	.08	.03
12	.02	0	0	0	0	0	0	0	.03	.07	.08	.03
13	.03	0	0	0	0	0	0	0	.03	.07	.07	.03
14	.02	0	0	0	0	0	0	0	.02	.08	.10	.03
15	.02	0	0	0	0	0	0	0	.02	.07	.06	.02
16	.03	0	0	0	0	0	0	0	.02	.06	.06	.01
17	.03	0	0	0	0	0	0	0	.02	.05	.05	0
18	.03	0	0	0	0	0	0	0	.02	.04	.05	.01
19	.03	0	0	0	0	0	0	0	.02	.03	.04	.01
20	.02	0	0	0	0	0	0	0	.11	.02	.04	.02
21	.02	0	0	0	0	0	0	0	.02	.01	.04	.03
22	.02	0	0	0	0	0	0	0	.02	0	.04	.03
23	.01	0	0	0	0	0	0	.05	.03	0	.04	.03
24	.01	0	0	0	0	0	0	.03	.03	0	.04	.05
25	.01	0	0	0	0	0	.01	.03	.03	0	.04	.03
26	.01	0	0	0	0	0	.01	.03	.03	.04	.04	.04
27	0	0	0	0	0	0	.01	.05	.03	.03	.04	.04
28	0	0*	0	0	0	0	.03	.04	.03	.03	.04	.04
29	0	0*	0	0	----	0	.05	.06	.03	.01	.04	.04
30	0	0*	0	0	----	0	.05	.06	.02	.08	.05	.04
31	0	----	0	0	----	0	----	.06	----	.01	.04	----
Total	0.49	0	0	0	0	0	0.16	0.61	1.12	6.28	1.24	0.89
Mean	.016	0	0	0	0	0	.005	.020	.037	.20	.040	.030
Max	.07	0	0	0	0	0	.05	.06	.11	5.1	.10	.05
Min	0	0	0	0	0	0	0	0	.02	0	0	0
Acre-Ft	.97	0	0	0	0	0	.32	1.2	2.2	12	2.5	1.8
Wtr Year	2009	Total	10.79	Mean	.030	Max	5.1	Min	0	Acre-Ft	21	
Cal Year	2008	Total	3.42	Mean	.009	Max	1.9	Min	0	Acre-Ft	6.8	

*Estimate

E060 Pueblo Canyon above SR 502

Location. Lat 35° 52' 15", long 106° 13' 1", NE ¼, Sec. 20, T. 19 N., R. 7 E., Santa Fe County.

Drainage Area. 8.21 mi².

Period of Record. January 1992 to September 30, 2009.

Revised Record. Drainage area (2006).

Gage. Data logger with cellular telemetry. Elevation of gage is 6,341 ft above NGVD from GPS survey.

Remarks. Records are fair. No diversion above station. Perennial flow is primarily from effluent.

Average Discharge. 15 yr, 0.051 ft³/s, 591 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 1,930 ft³/s, August 24, 2006, gage height 11.75 ft (from slope area measurement). Rating curve extended above 130 ft³/s on basis of slope area measurement. No flow at times.

Extremes for Current Water Year. Maximum discharge 4.2 ft³/s at 2050 h, July 6, gage height 7.89 ft. No peak above base of 75 ft³/s. No flow at times.



E060 Pueblo Canyon above SR 502

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor housed in a NEMA shelter on right bank. The station is also equipped with a pair of ISCO samplers for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference gage. No provision for discharge measurements above wading stage.

An auxiliary 6" Parshall flume is located downstream from E060 used to verify the low-flow record.

Field Work. This station was visited 28 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels of May 7, 2007, found gage to be correct.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for several periods throughout the winter and spring when gage height was affected by ice or silting.

Rating. Channel consists of sand gravel with hard pan bed. Sand degrades easily and will change with flow events. Channel is straight at high flow but incised in sand and meandering at low flow. Channel bottom elevation or PZF may change many times throughout the year and is critical in determining shift values. Grasses become 4–5' tall and cause considerable backwater at most stages. These grasses are usually flattened at high flow.

Three discharge measurements (Nos. 126–128) and eight inspections of no flow were made this year.

Rating No. 8 was developed based on measurements from previous years. The upper end of the rating is based on slope area measurement from the previous year.

Measuring conditions at this site are poor. Generally, low flows are shallow and characterized by high velocities and uneven measuring sections. Peak flows are flashy and change quickly; mean gage heights for measurements are difficult to determine.

Discharge. Discharge was computed by applying gage height to Rating No. 8 using V diagram.

Remarks. Records are fair except for estimated daily discharges, which are poor.

E060 Pueblo above SR-502

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	.07	.49	.11*	.01*	0	0	0	0
2	0	0	0	0*	0	.45*	.05*	.01*	0	0	0	0
3	0	0	0	0*	.05*	.42	.02*	.01*	.01*	0	0	0
4	0	0	0	0*	0	.30	0	0	.03*	0	0	0
5	0	0	0	0*	.05*	0	.04*	0	.06*	0	0	0
6	0	0	0	.29	.05*	0	.08	0	.01*	.52	0	0
7	0	.01	.03	.24	.04	.04	.08*	0	.02*	.63	0	0
8	0	.07	.12	.35	.08*	.10*	.01*	0	.02*	.51	0	0
9	0	.08	.02	.35	.08*	.20*	0	0	0	.05	0	0
10	0	.08*	0	.26	.10	.10*	.02*	0	0	0	0	0
11	.01	.08*	0	.10*	.08	.05*	.21*	0	0*	0	0	0
12	0	0*	.02	.08*	.05*	.01*	.09*	0	.01*	0	0	0
13	0	0	.17	.12	.05*	.39	.09*	0	.01*	0	0	0
14	0	0	.13	.12*	.01	.25*	.12*	0	0	0	0	0
15	0	0	.12	.12	0	.25*	.08*	0	0	0	0	0
16	0	0	.02	.10	.05	.20*	.07*	0	.03*	0	0	0
17	0	0	.07	.08*	.10*	.14	.16*	0	.01*	0	0	0
18	0	0	.02	.08*	.05*	.02	.15*	0	0	0	0	0
19	0	0	0	.08	.05*	0	.09*	0	0	0	0	0
20	0	0	.02	.15	.01*	.03*	.11*	0	0	0	0	0
21	0	0*	0	.05*	.05*	0	.05*	0	0	0	0	0
22	0	.08	.08	.08*	.08*	0	.02*	0	0	0	0	0
23	0	.13	.20	.08*	.05*	.03*	.01*	0	0	0	0	0
24	0	.05*	.07	.15*	.52	.11*	.01*	0	0	0	0	0
25	0	.05*	.07	.15*	.64	.15*	.01*	0	0	0	0	0
26	0	.05	.04	0*	.62	.19*	.01*	0	0	0	0	0
27	0	.05*	.08	0*	.60	.25*	.01*	0	0	0	0	0
28	0	0	.59*	0*	.53	.19*	.01*	.01*	0	0	0	0
29	0	0	.05*	0	----	.18*	.01*	.02*	0	0	0	0
30	0	0	.05*	.10	----	.05*	.01*	.01*	0	0	0	0
31	0	----	.05*	.08	----	.13*	----	.01*	----	0	0	----
Total	0.01	0.73	2.02	3.21	4.06	4.72	1.73	0.08	0.21	1.71	0	0
Mean	0	.024	.065	.10	.15	.15	.058	.003	.007	.055	0	0
Max	.01	.13	.59	.35	.64	.49	.21	.02	.06	.63	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	1.4	4.0	6.4	8.1	9.4	3.4	.16	.42	3.4	0	0
Wtr Year	2009	Total	18.48	Mean	.051	Max	.64	Min	0	Acre-Ft	37	
Cal Year	2008	Total	75.92	Mean	.21	Max	.92	Min	0	Acre-Ft	151	

*Estimate

E121 Sandia Canyon Right Fork at Power Plant

Location. Lat 35° 52' 31", long 106° 19' 7", SW ¼, Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.08 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Revised Record. Period of Record (2008).

Gage. Data logger. Elevation of gage is 7,283, ft above NGVD from GPS survey.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 191 ft³/s, June 21, 2002, from peak flow computation, gage height 8.13 ft. Minimum daily discharge 0.05 ft³/s, August 12, 2008.

Extremes for Current Year. Peak discharges above 35 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1220	42*	6.62*
July 6	1225	39	6.57

Minimum daily discharge, 0.18 ft³/s August 25.



E121 Sandia Canyon Right Fork at Power Plant

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor. System is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct measurements above wading stage.

Field Work. The station was visited 21 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height. The data logger reference to the outside staff gave a complete and satisfactory record for the year, except for the period from December 2 and 3 when gage height was affected by ice.

Rating. The channel is straight for about 30' with a step upstream slope and straight for 50' downstream with a sharp slope downstream. The streambed through this reach consists of primarily sand, gravel, and cobbles, more so below the gage. The low-water control is a bedrock riffle below gage.

Four discharge measurements (Nos. 82–85) were made during the year. Discharge measurements were used to define a V diagram. Range in stage is fairly limited because most flow is effluent.

Rating No. 4 was developed based on previous measurements verified with current-year measurements.

Discharge. Discharge was computed by applying Rating No. 4 with variable shifts defined by measurements and applied by V diagram. No shifts were applied to high flows.

Remarks. Records are good.

E121 Sandia Canyon Right Fork at Power Plant

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.53	.56	.48	.43	.66	.67	.57	.49	.53	.51	.49	.44
2	.47	.61	.37*	.46	.75	.79	.53	.44	.59	.58	.43	.59
3	.57	.52	.45*	.49	.60	.61	.49	.46	1.3	.61	.48	.52
4	.56	.56	.45	.44	.62	.61	.59	.47	.66	.61	.49	.52
5	.59	.54	.47	.58	.64	.66	.61	.44	.66	1.1	.47	.48
6	.48	.50	.48	.43	.61	.66	.53	.42	.71	1.1	.47	.57
7	.50	.50	.42	.42	.66	.76	.61	.51	.68	.52	.45	.64
8	.53	.53	.44	.46	.65	.81	.46	.50	.66	.49	.53	.58
9	.34	.63	.43	.44	.68	.81	.53	.59	.65	.49	.46	.58
10	.45	.58	.46	.46	.70	.84	.53	.44	1.0	.48	.48	.59
11	1.5	.48	.45	.56	.62	.84	.65	.51	.64	.53	.47	.56
12	.56	.48	.46	.46	.52	.73	.77	.54	.69	.52	.68	.53
13	.56	.41	.50	.43	.56	.79	.56	.45	.65	.49	.53	.51
14	.65	.39	.55	.52	.65	.84	.49	.41	.81	.50	.69	.53
15	.62	.49	.49	.47	.55	.97	.52	.43	.60	.45	.45	.46
16	.51	.46	.39	.47	.56	.78	.46	.43	.62	.56	.43	.66
17	.52	.47	.48	.45	.67	.90	.60	.42	.57	.52	.47	.65
18	.47	.40	.47	.48	.57	.65	.60	.45	.53	.55	.44	.50
19	.60	.45	.39	.56	.57	.85	.57	.46	.62	.52	.44	.66
20	.63	.49	.47	.63	.65	.90	.70	.49	.91	.72	.48	.49
21	.50	.51	.47	.59	.72	.87	.42	.67	.59	.93	.52	.44
22	.59	.47	.44	.55	.92	.89	.45	.56	.67	.61	.50	.50
23	.54	.47	.35	.52	.64	.66	.44	.97	.55	.61	.52	.62
24	.59	.50	.46	.54	.63	.63	.47	.68	.60	.65	.53	.52
25	.55	.37	.53	.62	.55	.61	.52	.61	.60	.62	.18	.50
26	.61	.36	.47	.57	.64	.71	.46	.58	.56	.77	.31	.48
27	.53	.70	.48	.64	.61	.72	.48	.78	.59	.66	.35	.55
28	.44	.47	.52	.62	.69	.70	.52	.58	.57	.88	.33	.49
29	.46	.43	.54	.59	-----	.72	.48	.50	.65	.83	.43	.48
30	.48	.51	.46	.60	-----	.65	.44	.59	.48	.80	.89	.45
31	.50	-----	.48	.70	-----	.61	-----	.51	-----	.54	.56	-----
Total	17.43	14.84	14.30	16.18	17.89	23.24	16.05	16.38	19.94	19.75	14.95	16.09
Mean	.56	.49	.46	.52	.64	.75	.54	.53	.66	.64	.48	.54
Max	1.5	.70	.55	.70	.92	.97	.77	.97	1.3	1.1	.89	.66
Min	.34	.36	.35	.42	.52	.61	.42	.41	.48	.45	.18	.44
Acre-Ft	35	29	28	32	35	46	32	32	40	39	30	32
Wtr Year	2009	Total	207.04	Mean	.57	Max	1.5	Min	.18	Acre-Ft	411	
Cal Year	2008	Total	186.79	Mean	.51	Max	1.7	Min	.05	Acre-Ft	370	

*Estimate

E1219 Sandia Canyon East of Power Plant

Location. Lat 35° 52' 30", long 106° 19' 10", SW ¼, Sec. 16, T 19 N., R 6 E., Los Alamos County.

Drainage Area. 0.002 mi².

Period of Record. March 3, 2006, to September 30, 2009.

Gage. Data logger, 9" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 7,337 ft above NGVD from land survey.

Remarks. Records are good.

Extremes for Period of Record. Maximum discharge, 5.2 ft³/s, August 10, 2008, gage height 1.41 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 2.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
June 3	1200	2.52*	0.88*
July 6	1220	2.30	0.83

No flow most of the time.



E1219 Sandia Canyon East of Power Plant

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume and cellular telemetry with speech modem. System is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 25 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the water year, except for the periods of October 11–14 due to data logger malfunction and December thru March when gage height was affected by ice.

Rating. The channel is straight above and below gage and is confined to the main channel by cut banks on both sides. The bottom is a 4' wide channel prone to some shifting with vegetation on each bank. Low-water control is the 9" Parshall flume.

Twenty-four inspections of no flow were made during the year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly.

Remarks. Records are good.

E1219 Sandia Canyon East of Power Plant

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	.05	0	0	0
4	.01	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	.04	0	0
6	0	0	0	0*	0	0	0	0	0	.03	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	.01	0*	0	0	0	0	0	0	0	0
10	0	0	0	0*	0	0	0	0	.04	0	0	.01
11	.01*	0	0	0*	0	0	.03	0	0	0	0	0
12	0*	0	0	0*	0	0	.01	0	0	0	.02	0
13	0*	0	0*	0*	0	0*	0	0	0	0	0	0
14	.01*	0	0*	0*	0	0	0	0	.02	0	.03	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0*	0	0	0	0	0	0	0	.02
17	0	0	0*	0*	0*	0	.01	0	0	0	0	.01
18	0	0	0*	0*	0	0	0	0	0	0	0	0
19	0	0	0	0*	0	0	0	0	0	0	0	0
20	0	0	0	0*	0	0	0	0	.04	.01	0	0
21	0	0	0	0*	0	0	0	.01	0	.02	0	0
22	0	0	0*	0*	0*	0	0	.01	0	0	0	0
23	0	0	0*	0*	0*	0	0	.04	0	0	.01	.01
24	0	0	0*	0*	0*	0	0	.01	0	0	.01	.01
25	0	0	0*	0	0*	0	0	0	.01	0	0	0
26	0	0	0*	0	0	0*	0	0	0	.01	0	0
27	0	.02	0*	0	0	0*	0	.02	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	.01	0	0
29	0	0	0*	0	----	0	0	0	0	.01	0	0
30	0	0	0*	0	----	0	0	0	0	.01	.02	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.03	0.02	0.01	0	0	0	0.05	0.09	0.16	0.14	0.09	0.06
Mean	.001	.001	0	0	0	0	.002	.003	.005	.005	.003	.002
Max	.01	.02	.01	0	0	0	.03	.04	.05	.04	.03	.02
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.06	.04	.02	0	0	0	.10	.18	.32	.28	.18	.12
Wtr Year	2009	Total	0.65	Mean	.002	Max	.05	Min	0	Acre-Ft	1.3	
Cal Year	2008	Total	0.63	Mean	.002	Max	.13	Min	0	Acre-Ft	1.2	

*Estimated

E122 Sandia Canyon near Roads and Grounds at TA-3

Location. Lat 35° 52' 31", long 106° 9' 6", SW ¼, Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.08 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger. Elevation of gage is 7,290 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 88 ft³/s August 23, 2003, gage height 4.23 ft. Minimum daily discharge 0.00 ft³/s, March 17, 2009.

Extremes for Current Year. Peak discharges above base of 15 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1215	15*	2.78*

Minimum daily discharge, 0.0 ft³/s March 17.



E122 Sandia near Roads and Grounds at TA-3

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and a Milltronics sonic probe. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is also equipped with ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 22 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None, levels of July 25, 2005, found gage to be within limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year.

Rating. The channel is straight for about 20' above with a step downstream slope and straight for 15' downstream with a sharp slope 5' downstream. The streambed through this reach is primarily bed rock with some cobbles below gage. The low-water control is bedrock riffle below gage.

Three discharge measurements (Nos. 48–50) and 22 inspections were made this year.

Rating No. 2 was developed based on the measurements made the previous year and verified with measurements made this year. Shifts are small and mostly negative, caused by small amounts of deposition near gage or some bank slough during high flows. They have been distributed using variable diagrams with no shifts applied on the peak flows.

Discharge. Discharge computed from Rating No. 2 with shifts applied by V diagrams.

Remarks. Records are good.

E122 Sandia Canyon near Roads and Grounds at TA-3

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.05	.02	.01	.03	.01	.01	.02	.03	.04	.02	.10	.13
2	.05	.02	.02	.04	.01	.02	.02	.03	.04	.04	.12	.09
3	.07	.02	.02	.04	.01	.02	.02	.03	.58	.10	.12	.09
4	.19	.02	.02	.03	.02	.02	.02	.03	.07	.06	.13	.08
5	.11	.02	.02	.03	.02	.03	.02	.03	.06	.59	.13	.08
6	.05	.02	.01	.02	.02	.02	.02	.03	.07	.68	.14	.17
7	.05	.02	.01	.02	.02	.02	.02	.04	.05	.24	.11	.11
8	.05	.02	.02	.02	.02	.02	.02	.03	.06	.22	.10	.12
9	.05	.02	.03	.03	.02	.07	.02	.03	.09	.21	.09	.09
10	.05	.02	.03	.02	.02	.02	.02	.03	.51	.22	.09	.15
11	.73	.02	.03	.02	.02	.04	.34	.03	.03	.18	.09	.05
12	0	.02	.02	.02	.03	.03	.32	.03	.02	.17	.32	.06
13	0	.02	.09	.02	.02	.13	.11	.02	.02	.22	.14	.05
14	.09	.02	.02	.02	.02	.05	.05	.02	.17	.22	.39	.07
15	.01	.01	.02	.02	.02	.01	.05	.02	.03	.21	.12	.11
16	.01	.02	.02	.02	.01	0	.04	.03	.02	.20	.10	.30
17	.01	.02	.08	.02	.02	0	.15	.02	.02	.21	.06	.25
18	.01	.01	.12	.02	.02	.02	.14	.03	.02	.13	.04	.06
19	0	.01	.05	.02	.02	.01	.05	.02	.02	.12	.03	.05
20	.01	.01	.03	.03	.02	.03	.05	.03	.46	.26	.03	.04
21	.01	.02	.03	.02	.02	.03	.05	.20	.01	.34	.06	.04
22	0	.03	.03	.03	.01	.02	.05	.12	.01	.23	.06	.03
23	.01	.02	.04	.06	.03	.02	.05	.66	.01	.26	.18	.14
24	.01	.02	.02	.09	.03	.02	.05	.34	.02	.26	.14	.16
25	.01	.02	.02	.03	.03	.02	.05	.05	.04	.25	.09	.05
26	.02	.02	.03	.03	.02	.06	.03	.08	.04	.42	.08	.04
27	.01	.26	.01	.02	.02	.10	.02	.25	.02	.24	.08	.03
28	.01	.09	.02	.01	.02	.06	.03	.04	.04	.40	.07	.04
29	.03	.02	.04	.01	----	.07	.02	.03	.02	.42	.08	.05
30	.03	.02	.04	.01	----	.02	.02	.04	.03	.38	.39	.06
31	.03	----	.02	.01	----	.02	----	.04	----	.12	.18	----
Total	1.76	0.88	0.97	0.81	0.55	1.01	1.87	2.41	262	7.62	3.86	2.79
Mean	.057	.029	.031	.026	.020	.033	.062	.078	.087	.25	.12	.093
Max	.73	.26	.12	.09	.03	.13	.34	.66	.58	.68	.39	.30
Min	0	.01	.01	.01	.01	0	.02	.02	.01	.02	.03	.03
Acre-Ft	3.5	1.7	1.9	1.6	1.1	2.0	3.7	4.8	5.2	15	7.7	5.5
Wtr Year	2009	Total	27.15	Mean	.074	Max	.73	Min	0	Acre-Ft	54	
Cal Year	2008	Total	27.89	Mean	.076	Max	.73	Min	0	Acre-Ft	55	

E1222 Sandia Canyon Tributary from Roads and Grounds

Location. Lat 35° 52' 33", long 106° 19' 5", Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.01 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 7,326 ft above NGVD.

Remarks. Records are fair. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 4.4 ft³/s September 2, 2007, gage height 1.26 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge is 1.19 ft³/s at 1230 h, July 6, gage height 0.55 ft. No peak discharges above base of 2.0 ft³/s. No flow most of the time.



E1222 Sandia Canyon Tributary from Roads and Grounds

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage. All high measurements will be by slope area or peak flow computation methods.

Field Work. This station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods December 15 to January 21 and March 26, 27 when gage height was affected by ice in flume and June 4 to July 1 and July 15 to August 3 when data logger malfunctioned.

Rating. Channel is straight above and below gage. Channel bottom is vegetation, bedrock, and gravel.

Fifteen inspections of no flow were made this water year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are fair.

E1222 Sandia Canyon Tributary from Roads and Grounds

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0*	0*	0
2	0	0	0	0*	0	0	0	0	0	0	0*	0
3	0	0	0	0*	0	0	0	0	0	0	0*	0
4	0	0	0	0*	0	0	0	0	0*	0	0	0
5	0	0	0	0*	0	0	0	0	0*	.05	0	0
6	0	0	0	0*	0	0	0	0	0*	.05	0	0
7	0	0	0	0*	0	0	0	0	0*	0	0	0
8	0	0	0	0*	0	0	0	0	0*	0	0	0
9	0	0	0	0*	0	0	0	0	0*	0	0	0
10	0	0	0	0*	0	0	0	0	.03*	0	0	0
11	.09	0	0	0*	0	0	.01	0	0*	0	0	0
12	0	0	0	0*	0	0	0	0	0*	0	0	0
13	0	0	0	0*	0	0	0	0	0*	0	0	0
14	0	0	0	0*	0	0	0	0	.01*	0	.01	0
15	0	0	0*	0*	0	0	0	0	0*	0*	0	0
16	0	0	0*	0*	0	0	0	0	0*	0*	0	.01
17	0	0	0*	0*	0	0	0	0	0*	0*	0	0
18	0	0	0*	0*	0	0	0	0	0*	0*	0	0
19	0	0	0*	0*	0	0	0	0	0*	0*	0	0
20	0	0	0*	0*	0	0	0	0	.03*	.01*	0	0
21	0	0	0*	0*	0	0	0	0	0*	.02*	0	0
22	0	0	0*	0	0	0	0	0	0*	0*	0	0
23	0	0	0*	0	0	0	0	.03	0*	0*	0	0
24	0	0	0*	0	0	0	0	.01	0*	0*	0	.01
25	0	0	0*	0	0	0	0	0	.01*	0*	0	0
26	0	0	0*	0	0	0*	0	0	0*	.01*	0	0
27	0	0	0*	0	0	0*	0	.01	0*	0*	0	0
28	0	0	0*	0	0	0	0	0	0*	.01*	0	0
29	0	0	0*	0	----	0	0	0	0*	.01*	0	0
30	0	0	0*	0	----	0	0	0	0*	.01*	.03	0
31	0	----	0*	0	----	0	----	0	----	0*	0	----
Total	0.09	0	0	0	0	0	0.01	0.05	0.08	0.17	0.04	0.02
Mean	.003	0	0	0	0	0	0	.002	.003	.006	.001	.001
Max	.09	0	0	0	0	0	.01	.03	.03	.05	.03	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.18	0	0	0	0	0	.02	.10	.16	.34	.08	.04
Wtr Year	2009	Total	0.46	Mean	.001	Max	.09	Min	0	Acre-Ft	0.91	
Cal Year	2008	Total	0.29	Mean	.001	Max	.09	Min	0	Acre-Ft	0.58	

*Estimated

E1223 Sandia Canyon Tributary from Sigma Building

Location. Lat 35° 52' 22", long 106° 19' 3", SW ¼, Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.003 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 7,368 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 1.89 ft³/s, August 16, 2009, gage height 0.73 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
August 16	1305	1.9*	0.73*

No flow most of the time.



E1223 Sandia Canyon Tributary from Sigma Building

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 28 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from December 9, December 15–17, and December 22 to January 8 when gage height was affected by snow and ice.

Rating. Above 9" Parshall flume is asphalt lot. Flume is located southwest of roadway on the shoulder of the road. Below flume is asphalt roadway.

Twenty-eight inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E1223 Sandia Canyon Tributary from Sigma Building

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	.01	0	0
6	0	0	0	0*	0	0	0	0	0	.01	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	.01	0	0	0
11	.01	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	.01	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0	0	0.01	0.02	0.01	0
Mean	0	0	0	0	0	0	0	0	0	.001	0	0
Max	.01	0	0	0	0	0	0	0	.01	.01	.01	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	0	0	.02	.04	.02	0
Wtr Year	2009	Total	0.05	Mean	0	Max	.01	Min	0	Acre-Ft	0.10	
Cal Year	2008	Total	0.05	Mean	0	Max	.01	Min	0	Acre-Ft	0.10	

*Estimated

E12235 Sandia Canyon Tributary from MRF

Location. Lat 35° 52' 26", long 106° 18' 47", SW ¼, Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.001 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 7,285 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 2.50 ft³/s August 26, 2007, gage height 1.13 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge is 1.59 ft³/s at 1340 h July 30, gage height 0.65 ft. No peak above base of 2.0 ft³/s. No flow most of the time.



E12235 Sandia Canyon Tributary from MRF

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 27 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from December 15 to January 8 when gage height was affected by ice and September 2–10 when data logger malfunctioned.

Rating. Channel is straight above and below 9" Parshall flume with large cobble.

Twenty-six inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E12235 Sandia Canyon Tributary from MRF

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0*
3	0	0	0	0*	0	0	0	0	.01	0	0	0*
4	0	0	0	0*	0	0	0	0	0	0	0	0*
5	0	0	0	0*	0	0	0	0	0	.01	0	0*
6	0	.03	0	0*	0	0	0	0	0	.01	0	0*
7	0	0	0	0*	0	0	0	0	0	0	0	0*
8	0	0	0	0*	0	0	0	0	0	0	0	0*
9	0	0	0	0	0	0	0	0	0	0	0	0*
10	0	0	0	0	0	0	0	0	0	0	0	0*
11	.01	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	.01	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0	0	0	0	0	0	0
27	0	0	0*	0	0	.02	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	.01	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.01	0.03	0	0	0	0.02	0	0.01	0.01	0.03	0	0
Mean	0	.001	0	0	0	.001	0	0	0	.001	0	0
Max	.01	.03	0	0	0	.02	0	.01	.01	.01	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	.06	0	0	0	.04	0	.02	.02	.06	0	0
Wtr Year	2009	Total	0.11	Mean	0	Max	.03	Min	0	Acre-Ft	0.22	
Cal Year	2008	Total	0.11	Mean	0	Max	.03	Min	0	Acre-Ft	0.22	

*Estimated

E1225 Sandia Canyon Tributary at Heavy Equipment

Location. Lat 35° 52' 22", long 106° 18' 46", SW ¼, Sec. 16, T.19 N., R 6 E., Los Alamos County.

Drainage Area. 0.008 mi².

Period of Record. October 1, 2002, to September 30, 2009.

Gage. Data logger, 12" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 7,322 ft above NGVD from land survey.

Remarks. Records are good.

Average Discharge. 7 yr, 0.003 ft³/s, 2.17 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 8.90 ft³/s August 10, 2008, gage height 1.69 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 5.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
April 12	0235	5.7	1.26
July 5	1215	6.0*	1.30*
July 30	1345	5.1	1.17

No flow most of the time.



E1225 Sandia Canyon Tributary at Heavy Equipment

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Milltronics sonic probe mounted on a 12" Parshall flume and cellular telemetry with speech modem. System is powered by a solar panel battery system housed in a NEMA shelter. The gage station is also equipped with an ISCO pump sampler for water quality data collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 12" Parshall flume is the reference gage. There is no provision for direct discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 31 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the periods from December 4 to January 20 and March 25 to April 6 when gage height was affected by ice in the flume.

Rating. The channel is straight above and below gage. It is confined to the main channel by cut banks on both sides. The bottom is a 10' wide channel prone to no shifting. Low-water control is the 12" Parshall flume.

Thirty-one inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 12" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Records. Records are good.

E1225 Sandia Canyon Tributary at Heavy Equipment

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0*	0	0	0	0	0
2	0	0	0	0*	0	0	0*	0	0	0	0	0
3	0	0	0	0*	0	0	0*	0	.08	0	0	0
4	.01	0	0*	0*	0	0	0*	0	0	0	0	0
5	0	0	0*	0*	0	0	0*	0	0	.11	0	0
6	0	.03	0*	0*	0	0	0*	0	0	0	0	.01
7	0	.01	0*	0*	0	0	0	0	0	0	0	0
8	0	.01	0*	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	.08	0	0	.01
11	.10	0	0*	0*	0	0	.04	0	0	0	0	0
12	0	0	0*	0*	0	0	.09	0	0	0	.02	0
13	0	0	0*	0*	0	0	0	0	0	0	.01	0
14	0	0	0*	0*	0	0	0	0	0	0	.07	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0*	0	0	0	0	0	0	0	.04
17	0	0	0*	0*	0	0	.01	0	0	0	0	.07
18	0	0	0*	0*	0	0	0	0	0	0	0	0
19	0	0	0*	0*	0	0	0	0	0	0	0	0
20	0	0	0*	0*	0	0	0	0	0	.02	0	0
21	0	0	0*	0	0	0	0	.02	0	.05	0	0
22	0	0	0*	0	0	0	0	.01	0	0	0	0
23	0	0	0*	0	0	0	0	.10	0	.02	.01	.04
24	0	0	0*	0	0	0	0	.02	0	0	.02	.03
25	0	0	0*	0	0	0*	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	.02	0	0
27	0	.03	0*	0	0	0*	0	.04	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	.04	0	0
29	0	0	0*	0	----	0*	0	0	0	.03	.01	0
30	0	0	0*	0	----	0*	0	0	0	.05	.05	0
31	0	----	0*	0	----	0*	----	0	----	0	0	----
Total	0.11	0.08	0	0	0	0	0.14	0.19	0.16	0.34	0.19	0.20
Mean	.004	.003	0	0	0	0	.005	.006	.005	.011	.006	.007
Max	.10	.03	0	0	0	0	.09	.10	.08	.11	.07	.07
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.22	.16	0	0	0	0	.28	.38	.32	.67	.38	.40
Wtr Year	2009	Total	1.41	Mean	.004	Max	.11	Min	0	Acre-Ft	2.8	
Cal Year	2008	Total	1.14	Mean	.003	Max	.13	Min	0	Acre-Ft	2.3	

*Estimate

E123 Sandia Canyon below Wetlands

Location. Lat 35° 52' 23", long 106° 18' 35", SE ¼, Sec. 16, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.29 mi².

Period of Record. August 1, 1999, to September 30, 2009.

Revised Record. Drainage Area (2006); Section (2007).

Gage. Data logger with cellular telemetry. Elevation of gage is 7,204 ft above NGVD from GPS survey.

Remarks. Records are fair to good.

Average Discharge. 9 yr, 0.61 ft³/s, 439 acre-ft/year.

Extremes for Period of Record. Maximum discharge, 88 ft³/s, August 23, 2003, gage height 4.23 ft. Minimum daily discharge, 0.08 ft³/s June 22, 2003.

Extremes for Current Year. Peak discharges above base of 40 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1305	54	3.47
July 6	1320	54	3.47
July 28	1335	43	3.27
July 30	1445	48	3.36
August 30	1755	54*	3.48*

Minimum daily discharge, 0.12 ft³/s July 10.



E123 Sandia Canyon below Wetlands

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with a Sutron Accubar bubble sensor. Data logger is equipped with cellular speech modem telemetry. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is also equipped with ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

An auxiliary 6" Parshall flume is located downstream from E123 used to verify the low-flow record.

Field Work. The station was visited 26 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None, levels run June 27, 2008, found within limits.

Gage-Height Record. The data logger referenced to the inside gage height gave a complete and satisfactory record for the year, except during the periods from November 3–10, November 27 to December 11, and December 29 to January 20 when the data logger malfunctioned.

Rating. Channel is trapezoidal with rock outcrop and small depositional bars within pools. Banks have some grass, not very tall or thick. Channel is straight for about 100' above and below gage.

Twenty-three discharge measurements (Nos. 110–132) were made this year.

Rating No. 4 was developed based on measurements made previous years. Shifts are small and mostly negative caused by small amounts of deposition near gage or some bank slough during high flows. They have been distributed using variable diagrams with no shifts applied on the peak flows.

Discharge. Discharge computed from Rating No. 4 with shifts applied by V diagrams.

Remarks. Records are good except for estimated days, which are fair.

E123 Sandia Canyon below Wetlands

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.45	.45	.97*	.35*	.40	.42	.46	.38	.30	.37	.43	.39
2	.41	.49	.97*	.46*	.59	.57	.39	.32	.35	.42	.36	.54
3	.55	.44	.97*	.51*	.39	.34	.36	.35	1.0	.65	.42	.42
4	.71	.26*	.97*	.35*	.44	.36	.49	.43	.27	.58	.43	.43
5	.70	.27*	.97*	.81*	.46	.41	.51	.50	.25	1.4	.42	.39
6	.37	.27*	.97*	.39*	.37	.40	.44	.33	.23	.93	.39	.55
7	.39	.27*	.97*	.42*	.45	.43	.52	.58	.24	.17	.36	.66
8	.49	.27*	.97*	.47*	.43	.43	.34	.35	.22	.12	.43	.52
9	.19	.27*	.97*	.34*	.46	.46	.38	.55	.20	.14	.37	.52
10	.35	.40*	.97*	.31*	.53	.43	.47	.31	.96	.12	.37	.46
11	1.2	.42	.70*	.59*	.45	.49	1.1	.49	.15	.19	.40	.51
12	.38	.47	.45	.38*	.36	.44	1.3	.56	.13	.19	.78	.41
13	.37	.36	.59	.33*	.38	.73	.73	.42	.16	.40	.53	.43
14	.69	.33	.58	.62*	.48	.55	.42	.26	.38	.47	1.3	.46
15	.51	.47	.48	.42*	.38	.57	.43	.34	.70	.38	.46	.33
16	.34	.46	.40	.39*	.39	.31	.34	.32	.33	.42	.40	.89
17	.37	.50	.57	.34*	.49	.40	.72	.34	.35	.53	.43	1.1
18	.29	.36	.58	.40*	.35	.23	.72	.42	.31	.51	.40	.55
19	.42	.40	.38	.50*	.28	.40	.54	.36	.44	.48	.36	.66
20	.41	.46	.47	.62*	.41	.46	.67	.41	1.4	.75	.45	.48
21	.31	.52	.51	.46	.47	.46	.36	.70	.38	1.0	.47	.39
22	.42	.43	.46	.55	.74	.46	.37	.57	.42	.56	.43	.43
23	.35	.43	.33	.62	.47	.34	.36	1.6	.41	.53	.63	.60
24	.45	.53	.47	.66	.42	.40	.37	.77	.59	.57	.63	.95
25	.39	.34	.49	.69	.36	.38	.42	.47	.60	.44	.16	.47
26	.48	.27	.41	.55	.39	.55	.33	.44	.52	.75	.22	.42
27	.47	.59*	.44	.52	.41	.69	.36	1.2	.50	.53	.33	.50
28	.34	.97*	.38*	.48	.47	.70	.39	1.3	.56	.83	.25	.42
29	.43	.97*	.36*	.41	-----	.75	.36	.28	.59	.72	.36	.46
30	.43	.97*	.38*	.57	-----	.56	.32	.35	.37	1.0	.95*	.39
31	.38	-----	.38*	.54	-----	.48	---	.30	-----	.50	.57	-----
Total	14.04	13.64	19.51	15.05	12.22	14.60	14.97	16.00	13.31	16.65	14.49	15.73
Mean	.45	.45	.63	.49	.44	.47	.50	.52	.44	.54	.47	.52
Max	1.2	.97	.97	.81	.74	.75	1.3	1.6	1.4	1.4	1.3	1.1
Min	.19	.26	.33	.31	.28	.23	.32	.26	.13	.12	.16	.33
Acre-Ft	28	27	39	30	24	29	30	32	26	33	29	31
Wtr Year	2009	Total	180.21	Mean	.49	Max	1.6	Min	.12	Acre-Ft	357	
Cal Year	2008	Total	217.20	Mean	.59	Max	6.7	Min	.15	Acre-Ft	431	

*Estimate

E1234 Sandia Canyon Roads and Grounds at Sigma

Location. Lat 35° 52' 14", long 106° 18' 24", Sec. 21, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.001 mi².

Period of Record. August 2, 2007, to September 30, 2009.

Gage. Data logger and 24" Parshall flume. Elevation 7,311 ft above NGVD.

Remarks. Records are good.

Extremes for Period of Record. Maximum discharge is 5.77 ft³/s, August 10, 2008, gage height 0.81 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 2.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1210	2.0	0.40
July 6	1220	2.0	0.40
July 23	1220	2.2	0.44
July 30	1340	2.2*	0.44*

No flow most of the time.



E1234 Sandia Canyon Roads and Grounds at Sigma

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 24" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 22 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the periods from November 28 to December 30 and several days in February, March, and April when gage height was affected by ice.

Rating. The control for this station is the 24" Parshall flume.

Twenty-two inspections of no flow and one day of snow melt were made this year.

Rating No. 1 was developed based on the computation of 24" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E1234 Sandia Canyon Roads and Grounds at Sigma

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0*	0	0	0	.02	0
3	0	0	0	0*	0	0	0	0	.06	0	.03	0
4	.03	0	0	0*	0	0	0	0	0	0	0	0
5	.04	0	0	0*	0	0	0	0	0	.09	0	0
6	0	0	0	0*	0	0	0*	0	0	.06	0	.01
7	0	0	0*	0	0	0	0*	0	0	0	0	0
8	0	0	0	0*	0	0*	0	0	0	0	0	0
9	0	0	0*	0*	0	0*	0	0	0	0	0	0
10	0	0	0*	0*	0*	0*	0	0	.09	.16	0	0
11	.07	0	0*	0*	0*	0*	0*	0	0	0	0	0
12	0	0	0*	0*	0	0*	0*	0	0	0	.03	0
13	0	0	0*	0*	0	0*	0*	0	0	0	.04	0
14	0	0	0*	0*	0	0*	0*	0	.05	0	.09	.03
15	0	0	0*	0*	0*	0*	0	0	0	0	0	.02
16	0	0	0*	0*	0	0*	0	0	0	0	0	.05
17	0	0	0*	0*	0	0	.08	0	0	0	0	.14
18	0	0	0*	0*	0	0	0*	0	0	0	0	0
19	0	0	0*	0*	0	0*	0*	0	0	0	0	0
20	0	0	0*	0*	0*	0	0*	0	.10	.02	0	0
21	0	0	0	0*	0	0	0*	.02	0	.03	0	0
22	0	0	0*	0*	0	0	0*	.07	0	0	0	0
23	0	0	0*	0*	0	0	0*	.12	0	.04	.02	.02
24	0	0	0*	0*	0	0	0	.04	0	0	.03	.03
25	0	0	0*	0*	0	0*	0	0	.03	0	0	0
26	0	0	0*	0*	0	0*	0	0	0	.02	0	0
27	0	.09	0*	0*	0	0*	0*	.05	0	0	0	0
28	0	0*	0*	0*	0	0*	0	0	0	.03	0	0
29	0	0*	0*	0*	----	0*	0	0	0	.02	0	0
30	0	0*	0*	0*	----	0*	0*	0	.01	.05	.02	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.14	0.09	0	0	0	0	0.08	0.30	0.34	0.52	0.28	0.30
Mean	.005	.003	0	0	0	0	.003	.010	.011	.017	.009	.010
Max	.07	.09	0	0	0	0	.08	.12	.10	.16	.09	.14
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.28	.18	0	0	0	0	.16	.60	.67	1.0	.56	.60
Wtr Year	2009	Total	2.05	Mean	.006	Max	.16	Min	0	Acre-Ft	4.1	
Cal Year	2008	Total	1.45	Mean	.004	Max	.25	Min	0	Acre-Ft	2.9	

*Estimate

E125 Sandia Canyon above SR 4

Location. Lat 35° 51' 32", long 106° 13' 34", SW ¼, Sec. 20, T. 19 N., R.7 E., Santa Fe County.

Drainage Area. 2.05 mi².

Period of Record. October 1, 1994, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and concrete control. Elevation of gage is 6,495 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 15 yr, 0.003 ft³/s, 2.17 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 59 ft³/s, August 25, 2006, gage height 3.60 ft (from slope-area measurement). No flow most of the time.

Extremes for Current Year. No flow for the year.



E125 Sandia Canyon above SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and a shaft encoder float system. The system is powered by a solar panel battery system. All equipment is housed in NEMA shelter on 18" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. Control is a concrete broad-crested weir. No provision for measurements above wading stage.

Field Work. The station was visited 14 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year.

Rating. Channel is straight for 150' above and 100' below gage. Bed material is sand with vegetation on banks, bottom is well supported.

Fourteen inspections of no flow were made this year.

Rating No. 1 is from theoretical points computed from broad-crested weir formula from USGS-TWRI. Worksheet in record folder shows computations including estimated velocity head used in computation because "p" in equation was functionally zero. Rating No. 1 is considered fair.

Discharge. Discharge computed directly from Rating No.1 without shift correction.

Remarks. Records are good.

E125 Sandia Canyon above SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	7.6	Mean	.021	Max	7.6	Min	0	Acre-Ft	15	

E196 TA-55 above Effluent Canyon

Location. Lat 35° 51' 52", long 106° 18' 13", NE ¼, Sec. 21, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.008 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 12" Parshall flume, as well as rain gage with cellular telemetry. Elevation of gage is 7,270 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 0.95 ft³/s, September 2, 2007, gage height 0.42 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.77 ft³/s at 1225 h, July 23, gage height 0.37 ft. No peak above base of 1.0 ft³/s. No flow most of the time.



E196 TA-55 above Effluent Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 12" Parshall flume and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 12" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 28 times for the purpose of making a discharge measurement and or servicing the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from December to March when gage height was affected by ice and March 4–20 and April 20–22 when data logger malfunctioned.

Rating. The control for the station is a 12" Parshall flume.

Twenty-eight inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 12" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E196 TA-55 above Effluent Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0*	0	0	0	0	0	0
5	0	0	0	0*	0	0*	0	0	0	.01	0	0
6	0	0	0	0*	0*	0*	0	0	0	.04*	0	0
7	0	0	0	0*	0*	0*	0	0	0	0*	0	0
8	0	0	0	0*	0	0*	0	0	0	0	0	0
9	0	0	0*	0*	0*	0*	0	0	0	0	0	0
10	0	0	0	0*	0	0*	0	0	.01	0	0	0
11	.02	0	0*	0*	0	0*	0	0	0	0	0	0
12	0	0	0	0*	0	0*	0	0	0	0	0	0
13	0	0	0	0	0	0*	0	0	0	0	0	0
14	0	0	0*	0*	0	0*	0	0	0	0	0	0
15	0	0	0*	0	0	0*	0	0	0	0	0	0
16	0	0	0*	0	0	0*	0	0	0	0	0	0
17	0	0	0*	0*	0	0*	0	0	0	0	0	0
18	0	0	0	0*	0	0*	0	0	0	0	0	0
19	0	0	0	0*	0	0*	0	0	0	0	0	0
20	0	0	0	0*	0	0*	0*	0	0	0	0	0
21	0	0	0*	0*	0	0	0*	0	0	0	0	0
22	0	0	0*	0*	0	0	0*	0	0	0	0	0
23	0	0	0*	0	0	0	0	.01	0	.02	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0*	0	0*	0	0	0	0	0	0
27	0	0	0*	0*	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	.01	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0*	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.02	0	0	0	0	0	0	0.01	0.01	0.08	0	0
Mean	.001	0	0	0	0	0	0	0	0	.003	0	0
Max	.02	0	0	0	0	0	0	.01	.01	.04	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.04	0	0	0	0	0	0	.02	.02	.16	0	0
Wtr Year	2009	Total	0.12	Mean	0	Max	.04	Min	0	Acre-Ft	.24	
Cal Year	2008	Total	0.51	Mean	.001	Max	.13	Min	0	Acre-Ft	1.0	

*Estimate

E200 Mortandad Canyon below Effluent Canyon

Location. Lat 35° 51' 55", long 106° 17' 46", NW ¼, Sec. 22, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.49 mi².

Period of Record. May 10, 1995, to September 30, 2009.

Gage. Data logger with cellular telemetry and steel “fabricated” nonstandard flume as low-water control. Elevation of gage is 7,062.50 ft above NGVD from survey.

Remarks. Records are good, except estimated daily discharges, which are fair. Flow is mostly effluent from LANL TA-50, liquid radiological waste plant.

Average Discharge. 15 yr, 0.053 ft³/s, 38 acre-ft/yr.

Extremes Outside Period of Record. Maximum discharge, 34 ft³/s, August 19, 1970, gage height 3.07 ft, from old data files of USGS.

Extremes for Period of Record. Maximum discharge, 448 ft³/s, August 24, 2006, gage height 5.38 ft (from critical depth computation of flood marks). No flow at times.

Extremes for Current Year. Maximum discharge 14 ft³/s at 1245 h, July 23, gage height 2.25 ft. No peak above base of 15 ft³/s. No flow at times.



E200 Mortandad Canyon below Effluent Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Sutron Accubar bubble sensor with cellular telemetry and speech modem. The system is powered by a solar panel battery system. All equipment is housed in a NEMA shelter mounted on a 2' CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" flume is the reference gage. A larger staff is also available for high flow. No provision for measurements above wading stage.

Field Work. The station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the water year except during the periods from November 20, January 20–23, 25–27, February 4–10, 25, 26, March 28–30, April 11–13, 15, and May 4–7 when gage height was affected by ice.

Rating. The channel at the gage is about 33' wide and straight for about 50' upstream and about 75' below gage. The streambed is sand and gravel and subject to fill behind flume from flow events and gage silting problem from effluent release. Flow is mostly effluent from TA-50 water treatment plant. The control is a fabricated steel flume about 5" at the throat.

Fifteen inspections were made, 11 of which observed no flow during the year.

Rating No. 1, which was developed based on measurements made during previous years, is effective and was used with a variable shift diagram from last measurement made at gage station.

Discharge. Discharge was computed by applying gage height to Rating No. 1 through shift adjustment based on variable shift diagram. Estimated days were computed based on TA-50 release and precipitation records.

Remarks. Records are good, except for estimated daily discharges, which are fair.

E200 Mortandad Canyon below Effluent Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	.02	.08	.02
2	.04	0	0	0	0	0	0	0	0	0	.04	0
3	0	0	0	0	0	.02	0	0	.12	0	.03	0
4	.02	0	0	0	.01*	.02	0	.01	.08	0	.01	0
5	.04	0	0	0	0*	0	0	0	0	.76	0	0
6	.04	.01	0	0	0*	0	.02	.01	0	.96	.04	.06
7	.04	.01	0	0	0*	0	0	0	0	.08	.01	.02
8	.02	0	0	0	0*	0	0	0	0	.01	0	0
9	0	0	0	0	0*	0	.01	0	0	.03	0	.03
10	0	.01	.07	0	.01*	.02	0	0	.44	0	0	.01
11	.49	0	0	0	0	0	.01*	.01	.03	0	.01	.01
12	.01	.01	5.2	0	0	.04	.01*	0	.01	0	0	0
13	0	0	5.2	0	0	.03	.01*	0	.01	0	.03	0
14	.03	0	.01	0	0	.01	.01	0	.07	0	.13	.03
15	.02	0	.22	0	0	.02	0	0	.03	.01	.02	.01
16	0	0	0	0	0	0	.02*	0	.02	0	0	.16
17	0	.01	.01	0	0	0	.03	0	.03	.01	0	.18
18	0	0	.01	0	0	0	.02	.01*	0	0	.02	.06
19	0	.02	.02	0	0	.02	.01	0	0	0	0	.01
20	.01	.01*	0	.01*	0	0	0	0	.16	.03	.02	0
21	0	.01	0	.01*	0	0	0	0	.01	.07	0	0
22	0	.02	.28	.01*	0	0	0	0	0	.08	0	.02
23	0	.01	0	.01	0	0	.02	.30	.02	.86	0	.08
24	0	0	0	0	0	.01	0	.09	0	.05	0	.18
25	0	.02	0	0*	.01*	0	0	.16	.02	.02	.01	.01
26	0	0	0	0*	0*	0	0	.07	.03	.03	0	.01
27	0	.15	0	.01*	.04	.04	0	.18	0	.01	.02	0
28	0	.04	0	.01	0	.02*	0	.15	0	.34	0	.02
29	0	0	0	0	----	0*	0	0	0	.17	0	0
30	0	0	0	0	----	.01*	.01	0	0	.86	.09	0
31	0	----	0	0	----	0	----	.03	----	.16	.01	----
Total	0.76	0.33	11.02	0.06	0.07	0.26	0.18	1.02	1.08	4.56	0.57	0.92
Mean	.025	.011	.36	.002	.003	.008	.006	.033	.036	.15	.018	.031
Max	.49	.15	5.2	.01	.04	.04	.03	.30	.44	.96	.13	.18
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	1.5	.65	22	.12	.14	.52	.36	2.0	2.1	9.0	1.1	1.8
Wtr Year	2009	Total	20.83	Mean	.057	Max	5.2	Min	0	Acre-Ft	41	
Cal Year	2008	Total	18.66	Mean	.051	Max	5.2	Min	0	Acre-Ft	37	

*Estimate

E2005 Mortandad Canyon Tributary Batch Plant at Sigma

Location. Lat 35° 51' 57", long 106° 17' 24", NE ¼, Sec. 22, T.19 N., R. 6 E., Los Alamos County.

Drainage Area. 7.69 mi².

Period of Record. July 24, 2007, to September 30, 2009.

Gage. Data logger and 24" Parshall flume. Elevation of gage is 7,215 ft above NGVD.

Remarks. Records are good.

Extremes for Period of Record. Maximum discharge, 3.17 ft³/s, July 26, 2008, gage height 0.55 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge 1.1 ft³/s at 1240 h July 6, gage height 0.28 ft. No peak discharge above base of 5.0 ft³/s. No flow most of the time.



E2005 Mortandad Canyon Tributary Batch Plant at Sigma

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 24" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Rain gage and cellular telemetry removed April 15.

Field Work. This station was visited 34 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 9 to January 6 and March 26–28 when gage height was affected by ice.

Rating. The site has an upstream catchment pond. The channel is straight for 25' below gage.

Thirty-four inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 24" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E2005 Mortandad Canyon Tributary Batch Plant at Sigma

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	.08	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0*	0	0	0	0	0	0	0	0	0
11	0	0	0*	0	0	0	.02	0	0	0	0	0
12	0	0	0*	0	0	0	0	0	0	0	0	0
13	0	0	0*	0	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	.02	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0.02	0	0	0.10	0	0
Mean	0	0	0	0	0	0	.001	0	0	.003	0	0
Max	0	0	0	0	0	0	.02	0	0	.08	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	.04	0	0	.20	0	0
Wtr Year	2009	Total	0.12	Mean	0	Max	.08	Min	0	Acre-Ft	.24	
Cal Year	2008	Total	0.80	Mean	.002	Max	.12	Min	0	Acre-Ft	1.6	

*Estimate

E201 Mortandad Canyon above Ten Site Canyon

Location. Lat 35° 51' 46", long 106° 16' 29", SW ¼, Sec. 22, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.25 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Revised Record. Period of Record (2008).

Gage. Data logger with steel “fabricated” nonstandard flume. Elevation of gage is 6,864 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 78 ft³/s, August 10, 2008, gage height 2.43 ft. No flow most of the time.

Extremes for Current Year. No flow for the year.



E201 Mortandad Canyon above Ten Site Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 10' flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is trigger by stage through the data logger. An outside staff is available for reference. No provision for measurements above wading stage.

Field Work. The station was visited 12 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except during the periods from December 15 to January 7 and March 27 when ice affected gage height.

Rating. Channel is straight above and below modified flume. Flow is confined to cut banks. Channel bottom is 3' ft wide with some vegetation above and below flume.

The streambed is sand and gravel and subject to fill flume from low-flow events. The control is a fabricated steel flume 10' at the throat.

Twelve inspections of no flow were made this year.

Rating No. 1 was developed based on slope area computations and discharge measurements

Discharge. Discharge was computed by applying Rating No. 1 directly.

Remarks. Records are good.

E201 Mortandad Canyon above Ten Site Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	2.75	Mean	.008	Max	2.4	Min	0	Acre-Ft	5.5	

*Estimate

E2011 TA-50 Area 006 (C)

Location. Lat 35° 51' 41", long 106° 17' 50", SW ¼, Sec. 22, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.019 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 24" Parshall flume. Elevation of gage is 7,220 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 6.0 ft³/s, August 10, 2008, gage height 0.83 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 3.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 5	1220	4.7	0.71
July 23	1220	5.0*	0.74*
July 28	1235	3.1	0.54
July 30	1350	4.0	0.64

No flow most of the time.



E2011 TA-50 Area 006 (C)

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 24" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the periods from November 28 to March 6 and March 9, 10, 13–15, and March 26 to April 4 when gage height was affected by ice.

Rating. Upstream and downstream sections are formed cement as a result of recent construction to building adjacent to the site.

Fifteen inspections of no flow were made this year

Rating No. 1 was developed based on the computation of 24" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly.

Remarks. Records are good.

E2011 TA-50 Area 006 (C)

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0*	0*	0*	0*	0	0	0	0	0
2	0	0	0*	0*	0*	0*	0*	0	0	0	0	0
3	0	0	0*	0*	0*	0*	0*	0	.03	.01	0	0
4	.01	0	0*	0*	0*	0*	0*	0	0	0	0	0
5	.01	0	0*	0*	0*	0*	0	0	0	.07	0	0
6	0	0	0*	0*	0*	0*	0	0	0	.04	0	.03
7	0	0	0*	0*	0*	0	0	0	0	0	.01	.01
8	0	0	0*	0*	0*	0	0	0	0	0	0	0
9	0	0	0*	0*	0*	0*	0	0	0	0	0	0
10	0	0	0*	0*	0*	0*	0	0	.06	0	0	0
11	.09	0	0*	0*	0*	0	.06	0	0	0	0	0
12	0	0	0*	0*	0*	0	.08	0	0	0	0	0
13	0	0	0*	0*	0*	0*	0	0	0	0	0	0
14	.02	0	0*	0*	0*	0*	0	0	.01	0	.03	.01
15	0	0	0*	0*	0*	0*	0	0	.01	0	0	.01
16	0	0	0*	0*	0*	0	0	0	0	0	0	.03
17	0	0	0*	0*	0*	0	.01	0	0	0	0	.05
18	0	0	0*	0*	0*	0	0	0	0	0	0	0
19	0	0	0*	0*	0*	0	0	0	0	0	0	0
20	0	0	0*	0*	0*	0	0	0	.04	.01	0	0
21	0	0	0*	0*	0*	0	0	.01	.01	.02	0	0
22	0	0	0*	0*	0*	0	0	.02	0	0	0	0
23	0	0	0*	0*	0*	0	0	.05	0	.13	0	.02
24	0	0	0*	0*	0*	0	0	.03	0	0	0	.01
25	0	0	0*	0*	0*	0	0	.01	.01	0	0	0
26	0	0	0*	0*	0*	0*	0	0	.01	.01	0	0
27	0	.01	0*	0*	0*	0*	0	.03	0	0	0	0
28	0	0*	0*	0*	0*	0*	0	.01	.01	.04	0	0
29	0	0*	0*	0*	----	0*	0	0	0	.01	0	0
30	0	0*	0*	0*	----	0*	0	0	0	.11	.03	0
31	0	----	0*	0*	----	0*	----	0	----	0	0	----
Total	0.13	0.01	0	0	0	0	0.15	0.16	0.19	0.45	0.07	0.17
Mean	.004	0	0	0	0	0	.005	.005	.006	.015	.002	.006
Max	.09	.01	0	0	0	0	.08	.05	.06	.13	.03	.05
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.26	.02	0	0	0	0	.30	.32	.38	.89	.14	.34
Wtr Year	2009	Total	1.33	Mean	.004	Max	.13	Min	0	Acre-Ft	2.6	
Cal Year	2008	Total	0.77	Mean	.002	Max	.14	Min	0	Acre-Ft	1.5	

*Estimate

E2013 TA-50 Area C

Location. Lat 35° 51' 41", long 106° 17' 49", SW ¼, Sec. 22, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.002 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 12" Parshall flume. Elevation of gage is 7,213 ft above NGVD.

Remarks. Records are good except for estimated daily discharges, which are fair. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 7.56 ft³/s, July 23, 2009, gage height 1.52 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 2.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 23	1220	7.56*	1.52*
September 20	0420	4.12	1.02

No flow most of the time.



E2013 TA-50 Area C

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 12" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 12" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 29 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except during the periods of December 6, 9 to January 18, March 13, 26–29, and April 18 when gage height was affected by ice and May 26 to July 10 and August 4 to September 14 when data logger malfunctioned.

Rating. Rating No. 1 was developed based on the computation of 12" Parshall flume. Point of zero flow is 0.00 gage height.

Twenty-nine inspections of no flow were made.

Discharge. Discharge was computed by applying Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good except for estimated daily discharges, which are fair.

E2013 TA-50 Area C

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0*	0*	0	0*
2	0	0	0	0*	0	0	0	0	0*	0*	0	0*
3	0	0	0	0*	0	0	0	0	.03*	.01*	0	0*
4	0	0	0	0*	0	0	0	0	0*	0*	0*	0*
5	0	0	0	0*	0	0	0	0	0*	.07*	0*	0*
6	0	0	0*	0*	0	0	0	0	0*	.04*	0*	.03*
7	0	0	0	0*	0	0	0	0	0*	0*	.01*	.01*
8	0	0	0	0*	0	0	0	0	0*	0*	0*	0*
9	0	0	0*	0*	0	0	0	0	0*	0*	0*	0*
10	0	0	0*	0*	0	0	0	0	.06*	0*	0*	0*
11	.06	0	0*	0*	0	0	.01	0	0*	0	0*	.01*
12	0	0	0*	0*	0	0	.01	0	0*	0	0*	0*
13	0	0	0*	0*	0	0*	0	0	0*	0	0*	0*
14	0	0	0*	0*	0	0	0	0	.01*	0	.03*	0*
15	0	0	0*	0*	0	0	0	0	.01*	0	0*	0
16	0	0	0*	0*	0	0	0	0	0*	0	0*	.01
17	0	0	0*	0*	0	0	.03	0	0*	0	0*	.01
18	0	0	0*	0*	0	0	0*	0	0*	0	0*	0
19	0	0	0*	0	0	0	0	0	0*	0	0*	0
20	0	0	0*	0	0	0	0	0	.04*	0	0*	.02
21	0	0	0*	0	0	0	0	0	.01*	.01	0*	0
22	0	0	0*	0	0	0	0	0	0*	0	0*	0
23	0	0	0*	0	0	0	0	.02	0*	.07	0*	.01
24	0	0	0*	0	0	0	0	.01	0*	0	0*	.01
25	0	0	0*	0	0	0	0	0	.01*	0	0*	0
26	0	0	0*	0	0	0*	0	0*	.01*	.01	0*	0
27	0	.01	0*	0	0	0*	0	.03*	0*	0	0*	0
28	0	0	0*	0	0	0*	0	.01*	.01*	.02	0*	0
29	0	0*	0*	0	----	0*	0	0*	0*	0	0*	0
30	0	0	0*	0	----	0	0	0*	0*	.02	.03*	0
31	0	----	0*	0	----	0	----	0*	----	0	0*	----
Total	0.06	0.01	0	0	0	0	0.05	0.07	0.19	0.25	0.07	0.11
Mean	.002	0	0	0	0	0	.002	.002	.006	.008	.002	.004
Max	.06	.01	0	0	0	0	.03	.03	.06	.07	.03	.03
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.12	.02	0	0	0	0	.10	.14	.38	.50	.14	.22
Wtr Year	2009	Total	0.81	Mean	.002	Max	.07	Min	0	Acre-Ft	1.6	
Cal Year	2008	Total	0.91	Mean	.003	Max	.25	Min	0	Acre-Ft	1.8	

*Estimate

E2015 Ten Site Canyon above Mortandad Canyon

Location. Lat 35° 51' 38", long 106° 16' 30", SE ¼, Sec. 23, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.32 mi².

Period of Record. October 2000 to September 30, 2009.

Revised record. Drainage Area (2006).

Gage. Data logger with 90° sharp-crested weir. Elevation of gage is 6,858 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 9 yr, 0.005 ft³/s, 3.62 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 303 ft³/s, August 25, 2006, gage height 4.60 ft (from slope-area measurement of peak flow). No flow most of the time.

Extremes for Current Year. Maximum discharge 2.45 ft³/s at 1405 h, July 30, gage height 2.25. No peak discharge above base of 10.0 ft³/s. No flow most of the time.



E2015 Ten Site Canyon above Mortandad Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Sutron Accubar bubble sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is also equipped with an ISCO pump sampler for water quality collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provisions are made for measurement above wading stage.

Field Work. The station was visited 12 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. May 24, 2007, gage set to correct datum. Gage destroyed by flood on August 25, 2006. Bubbler outlet reset to gage datum of 1.33 ft.

Gage-Height Record. The data logger reference to the outside staff gave a complete and satisfactory record for the year.

Rating. The channel is about 8' wide and straight for about 60' upstream and about 30' downstream. The streambed through this reach is primarily sand with gravel.

Twelve inspections of no flow were made this year.

Rating No. 2 is based on a theoretical computation for 90° sharp-crested weir and one critical depth computation.

Discharge. Discharge was computed by applying Rating No. 2 directly.

Remarks. Records are good.

E2015 Ten Site Canyon above Mortandad Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	.03	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	.04	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0.03	0	0	0	0	0	0	0	0	0.04	0	0
Mean	.001	0	0	0	0	0	0	0	0	.001	0	0
Max	.03	0	0	0	0	0	0	0	0	.04	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.06	0	0	0	0	0	0	0	0	.08	0	0
Wtr Year	2009	Total	0.07	Mean	0	Max	.04	Min	0	Acre-Ft	.14	
Cal Year	2008	Total	8.04	Mean	.022	Max	7.2	Min	0	Acre-Ft	16	

E202 Mortandad Canyon above Sediment Traps

Location. Lat 35° 51' 39", long 106° 16' 15", SE ¼, Sec. 23, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 1.14 mi².

Period of Record. October 1, 1997, to September 30, 2009.

Revised Record. Average discharge 2007 (2008)

Gage. Data logger with 30" Parshall flume. Elevation of gage is 6,833 ft above NGVD from land survey.

Remarks. Records are good.

Average Discharge. 12 yr, 0.003 ft³/s, 2.17 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 292 ft³/s, gage height unknown, August 25, 2006 (from critical depth computation of peak flow). No flow most of the time.

Extremes for Current Year. No flow for the year.



E202 Mortandad Canyon above Sediment Traps

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 30" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 30" Parshall Flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. The station was visited 13 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from November 21–24, 26, December 9, 10, 15 to January 7, March 26–28, and April 7 when gage height was affected by ice and from August 10 to September 8 when the data logger malfunctioned.

Rating. Approach and escape sections are spread out because of overgrowth and debris in channel.

Thirteen inspections of no flow were made this year.

Rating No.1 was developed based on the computation of 30" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly.

Remarks. Records are good.

E202 Mortandad Canyon above Sediment Traps

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0*
2	0	0	0	0*	0	0	0	0	0	0	0	0*
3	0	0	0	0*	0	0	0	0	0	0	0	0*
4	0	0	0	0*	0	0	0	0	0	0	0	0*
5	0	0	0	0*	0	0	0	0	0	0	0	0*
6	0	0	0	0*	0	0	0	0	0	0	0	0*
7	0	0	0	0*	0	0	0*	0	0	0	0	0*
8	0	0	0	0	0	0	0	0	0	0	0	0*
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0*	0	0	0	0	0	0	0	0*	0
11	0	0	0	0	0	0	0	0	0	0	0*	0
12	0	0	0	0	0	0	0	0	0	0	0*	0
13	0	0	0	0	0	0	0	0	0	0	0*	0
14	0	0	0	0	0	0	0	0	0	0	0*	0
15	0	0	0*	0	0	0	0	0	0	0	0*	0
16	0	0	0*	0	0	0	0	0	0	0	0*	0
17	0	0	0*	0	0	0	0	0	0	0	0*	0
18	0	0	0*	0	0	0	0	0	0	0	0*	0
19	0	0	0*	0	0	0	0	0	0	0	0*	0
20	0	0	0*	0	0	0	0	0	0	0	0*	0
21	0	0*	0*	0	0	0	0	0	0	0	0*	0
22	0	0*	0*	0	0	0	0	0	0	0	0*	0
23	0	0*	0*	0	0	0	0	0	0	0	0*	0
24	0	0*	0*	0	0	0	0	0	0	0	0*	0
25	0	0	0*	0	0	0	0	0	0	0	0*	0
26	0	0*	0*	0	0	0*	0	0	0	0	0*	0
27	0	0	0*	0	0	0*	0	0	0	0	0*	0
28	0	0	0*	0	0	0*	0	0	0	0	0*	0
29	0	0	0*	0	----	0	0	0	0	0	0*	0
30	0	0	0*	0	----	0	0	0	0	0	0*	0
31	0	----	0*	0	----	0	----	0	----	0	0*	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	1.03	Mean	.003	Max	.73	Min	0	Acre-Ft	2.0	2.0

*Estimate

E203 Mortandad Canyon below Sediment Traps

Location. Lat 35° 51' 39", long 106° 16' 6", SE ¼, Sec. 23, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 1.17 mi².

Period of Record. October 1, 1996, to August 25, 2006 (destroyed by flood), September 2006 to September 30, 2008.

Revised Record. Drainage Area (2006).

Gage. Data logger and 6" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 6,817 ft above NGVD from land survey.

Remarks. Records are good.

Average Discharge. 13 yr, 0.025 ft³/s, 1.45 acre ft/yr.

Extremes for Period of Record. Maximum discharge, 220 ft³/s, August 25, 2006 (from critical depth computation), gage height unknown. No flow most of the time.

Extremes for Current Year. No flow for the year.



E203 Mortandad Canyon below Sediment Traps

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 6" Parshall flume and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 6" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 14 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from November 23, 26, 27; December 2, 3, 7, 9 to January 7; March 26–29, and April 17, 18 when gage height was affected by ice.

Rating. Approach and escape sections are spread out because channel is somewhat undefined.

Fourteen inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 6" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying Rating No. 1 directly.

Remarks. Records are good. No discharge for the year.

E203 Mortandad Canyon below Sediment Traps

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0*	0*	0	0	0	0	0	0	0	0
3	0	0	0*	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0*	0*	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0*	0	0	0	0	0	0	0	0	0
11	0	0	0*	0	0	0	0	0	0	0	0	0
12	0	0	0*	0	0	0	0	0	0	0	0	0
13	0	0	0*	0	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0*	0	0	0	0	0
18	0	0	0*	0	0	0	0*	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0*	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0*	0*	0	0	0*	0	0	0	0	0	0
27	0	0*	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0*	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0

*Estimate

E204 Mortandad Canyon at LANL Boundary

Location. Lat 35° 51' 21", long 106° 14' 43", NW ¼, Sec. 30, T. 19 N., R. 7 E., Santa Fe County.

Drainage Area. 1.61 mi².

Period of Record. October 1, 1993, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger with cellular telemetry and concrete control. Elevation of gage is 6,651 ft above NGVD from survey.

Remarks. Records are good.

Average Discharge. 15 yr, zero.

Extremes for Period of Record. No flow for period.

Extremes for Current Year. No flow for year.



E204 Mortandad Canyon at LANL Boundary

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 (5-min. interval) and shaft encoder float system with cellular phone and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter on top of a 24" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Samplers are triggered by stage through the data logger. An outside staff is available for reference. No provision for measurement above wading stage. All high-flow measurement will be by slope area or critical depth computation methods.

Field Work. This station was visited 13 times for the purpose of making a discharge measurement and or servicing the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra data base. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run May 24, 2007, showed the gage to be reading within allowable limits.

Gage-Height Record. The data logger referenced to the outside staff gage gave a complete and satisfactory record.

Rating. Channel is straight above and below gage for 100 ft. Channel is not well defined and resembles a low grass-covered swale. Flow is infrequent. The control is broad-crested weir with V notch 5' downstream from gage.

Thirteen inspections of no flow were made.

No rating has been developed; PZF is well defined for concrete broad-crested weir.

Discharge. All recorded values were below PZF. No flow most of the time. Days with rain did not produce enough flow to pass over control.

Remarks. Records are good.

E204 Mortandad Canyon at LANL Boundary

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0

E218 Cañada del Buey near TA-46

Location. Lat 35° 51' 31", long 106° 17' 17" SW ¼, Sec. 26, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 0.30 mi².

Period of Record. June 1, 2000, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 24" Parshall flume. Elevation of gage is 6,937 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 9 yr, 0.01 ft³/s, 10 acre-ft/year.

Extremes for Period of Record. Maximum discharge, 228 ft³/s, August 25, 2005, gage height 3.40 ft, from critical depth computation of peak flow. No flow most of the time.

Extremes for Current Year. No flow for the year.



E218 Cañada del Buey near TA-46

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Samplers are triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage. All high-flow measurement will be by slope area or peak flow computation methods.

Field Work. The station was visited 11 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the period from December 9 to January 13 when gage height was affected by ice.

Rating. The channel is 15' wide and straight upstream and downstream for about 100'. The streambed through this reach is boulders with sand and gravel. The low-flow control is the 24" Parshall flume; at very high flow the channel becomes control.

Eleven inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 24" Parshall flume and two peak flow computations.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly with shift adjustment based on PZF.

Remarks. Records are good.

E218 Cañada del Buey near TA-46

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	0	0	0	0
11	0	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	0.71	Mean	.002	Max	.42	Min	0	Acre-Ft	1.4	

*Estimate

E220 TA-54 RANT

Location. Lat 35° 50' 41", long 106° 15' 52", Sec. 25, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.0004 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 6,877 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 2.09 ft³/s, July 30, 2007, gage height 0.78 ft. No flow most of the time.

Extremes for Current Year. Peak discharge above base of 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
June 3	1510	1.67*	0.67*
July 30	1355	1.37	0.59

No flow most of the time.



E220 TA-54 RANT

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 16 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from November 13 to December 9 when data malfunctioned and December 10 to January 12 and January 18–22 when gage height was affected by ice.

Rating. Channel is straight above and below gage for 10'. The streambed is gravel and large cobble.

Sixteen inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E220 TA-54 RANT

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0*	0	0	0	0	0	0	0	0
2	0	0	0*	0*	0	0	0	0	0	0	0	0
3	0	0	0*	0*	0	0	0	0	.01	0	0	0
4	0	0	0*	0*	0	0	0	0	0	0	0	0
5	0	0	0*	0*	0	0	0	0	0	.01	0	0
6	0	0	0*	0*	0	0	0	0	0	.01	0	0
7	0	0	0*	0*	0	0	0	0	0	0	0	0
8	0	0	0*	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	.01	0	0	0
11	.02	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0	0*	0	0	0	0	0	0	0	0
13	0	0*	0*	0	0	0	0	0	.01	0	0	0
14	0	0*	0	0	0	0	0	0	.01	0	.01	0
15	0	0*	0*	0	0	0	0	0	0	0	0	0
16	0	0*	0*	0	0	0	0	0	0	0	0	0
17	0	0*	0*	0	0	0	0	0	0	0	0	0
18	0	0*	0*	0*	0	0	0	0	0	0	0	0
19	0	0*	0*	0*	0	0	0	0	0	0	0	0
20	0	0*	0*	0*	0	0	0	0	0	0	0	0
21	0	0*	0*	0*	0	0	0	0	0	0	0	0
22	0	0*	0*	0*	0	0	0	0	0	0	0	0
23	0	0*	0*	0	0	0	0	0	0	0	0	0
24	0	0*	0*	0	0	0	0	0	0	0	0	0
25	0	0*	0*	0	0	0	0	0	0	0	0	0
26	0	0*	0*	0	0	0	0	0	0	0	0	0
27	0	0*	0*	0	0	0	0	0	0	0	0	0
28	0	0*	0*	0	0	0	0	0	0	0	0	0
29	0	0*	0*	0	----	0	0	0	0	0	0	0
30	0	0*	0*	0	----	0	0	0	0	.01	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.02	0	0	0	0	0	0	0	0.04	0.03	0.01	0
Mean	.001	0	0	0	0	0	0	0	.001	.001	0	0
Max	.02	0	0	0	0	0	0	0	.01	.01	.01	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.04	0	0	0	0	0	0	0	.08	.06	.02	0
Wtr Year	2009	Total	0.10	Mean	0	Max	.02	Min	0	Acre-Ft	.20	
Cal Year	2008	Total	0.06	Mean	0	Max	.02	Min	0	Acre-Ft	.12	

*Estimate

E223 MDA AREA L

Location. Lat 35° 50' 8", long 106° 15' 2", Sec. 36, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.003 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 6,776 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 1.80 ft³/s, September 23, 2007, gage height 0.92 ft. No flow most of the time.

Extremes for Current Year. Peak discharge above base of 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
July 30	1355	1.28*	0.74*
July 31	1200	1.09	0.67

No flow most of the time.



E223 MDA Area L

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 25 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from November 13 to December 8 and February 5 to March 16 when the data logger malfunctioned and from December 9, 10, 15 to January 13, January 15 to January 23, and March 27 when gage height was affected by ice.

Rating. Upstream of 9" Parshall flume is asphalt-paved lot; below gage the channel drops steeply.

Twenty-five inspections of no flow were made.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E223 MDA Area L

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0*	0	0*	0	0	0	0	0	0
2	0	0	0*	0*	0	0*	0	0	0	0	0	0
3	0	0	0*	0*	0	0*	0	0	0	0	0	0
4	0	0	0*	0*	0	0*	0	0	0	0	0	0
5	0	0	0*	0*	0*	0*	0	0	0	0	0	0
6	0	0	0*	0*	0*	0*	0	0	0	0	0	0
7	0	0	0*	0*	0*	0*	0	0	0	0	0	0
8	0	0	0*	0*	0*	0*	0	0	0	0	0	0
9	0	0	0*	0*	0*	0*	0	0	0	0	0	0
10	0	0	0*	0*	0*	0*	0	0	0	0	0	0
11	.01	0	0	0*	0*	0*	0	0	0	0	0	0
12	0	0	0	0*	0*	0*	0	0	0	0	0	0
13	0	0*	0	0*	0*	0*	0	0	0	0	0	0
14	0	0*	0	0	0*	0*	0	0	0	0	0	0
15	0	0*	0*	0*	0*	0*	0	0	0	0	0	0
16	0	0*	0*	0*	0*	0*	0	0	0	0	0	0
17	0	0*	0*	0*	0*	0	0	0	0	0	0	0
18	0	0*	0*	0*	0*	0	0	0	0	0	0	0
19	0	0*	0*	0*	0*	0	0	0	0	0	0	0
20	0	0*	0*	0*	0*	0	0	0	0	0	0	0
21	0	0*	0*	0*	0*	0	0	0	0	0	0	0
22	0	0*	0*	0*	0*	0	0	0	0	0	0	0
23	0	0*	0*	0*	0*	0	0	0	0	0	0	0
24	0	0*	0*	0	0*	0	0	0	0	0	0	0
25	0	0*	0*	0	0*	0	0	0	0	0	0	0
26	0	0*	0*	0	0*	0	0	0	0	0	0	0
27	0	0*	0*	0	0*	0*	0	0	0	0	0	0
28	0	0*	0*	0	0*	0	0	0	0	0	0	0
29	0	0*	0*	0	----	0	0	0	0	0	0	0
30	0	0*	0*	0	----	0	0	0	0	.01	0	0
31	0	----	0*	0	----	0	----	0	----	.01	0	----
Total	0.01	0	0	0	0	0	0	0	0	0.02	0	0
Mean	0	0	0	0	0	0	0	0	0	.001	0	0
Max	.01	0	0	0	0	0	0	0	0	.01	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	0	0	0	.04	0	0
Wtr Year	2009	Total	0.03	Mean	0	Max	.01	Min	0	Acre-Ft	.06	
Cal Year	2008	Total	0.05	Mean	0	Max	.02	Min	0	Acre-Ft	.10	

*Estimate

E225 Cañada del Buey near MDA G

Location. Lat 35° 50' 1", long 106° 14' 22", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 1.48 mi².

Period of Record. October 1, 1993, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and concrete control. Elevation of gage is 6,599 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, zero.

Extremes for Period of Record. Maximum discharge, 17 ft³/s, September 8, 1995, gage height 2.71 ft. No flow most of the time.

Extremes for Current Year. No flow for the year.



E225 Cañada del Buey near MDA G

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and a shaft encoder float system. The system is powered by a solar panel battery system. All equipment is housed in a NEMA shelter on 18" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 13 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record.

Rating. Channel is straight for at least 100' above and below gage. Bed material is sand with thin covering of grass. The control is a concrete broad-crested weir 10' downstream of gage.

Thirteen inspections of no flow were made during the year.

Rating No. 1 was developed by broad-crested weir computation.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E225 Cañada del Buey near MDA G

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	0.02	Mean	0	Max	.02	Min	0	Acre-Ft	.04	

E227 MDA G-13

Location. Lat 35° 49' 58", long 106° 14' 21", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.012 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 6,614 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 1.7 ft³/s, July 26, 2007, gage height 0.67 ft. No flow most of the time.

Extremes for Current Year. No flow for the year.



E227 MDA G-13

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. This station was visited 22 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record.

Rating. Channel is straight above and below flume. Channel is shallow and streambed is mostly sand and gravel.

Twenty-two inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No 1 directly. No flow most of the time.

Remarks. Records are good.

E227 MDA G-13

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	0.01	Mean	0	Max	.01	Min	0	Acre-Ft	.02	

E230 Cañada del Buey above SR 4

Location. Lat 35° 49' 38", long 106° 12' 43", Sec. 33, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 2.15 mi².

Period of Record. October 1991 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger with cellular telemetry and concrete control. Elevation of gage is 6,395 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, 0.008 ft³/s, 5.80 acre-ft/yr.

Extremes for Period of Record. Maximum discharge 210 ft³/s June 17, 1999, gage height 3.30 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge, 12 ft³/s at 1425 h, July 30, gage height 0.95 ft. No peak discharges above base of 20 ft³/s. No flow most of the year.



E230 Cañada del Buey above SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5 min. interval) and shaft encoder float system with cellular phone and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter on top of a 24" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. A second auxiliary shelter will accommodate two additional ISCO samplers. No provision for discharge measurements above wading stage.

Field Work. This station was visited 24 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger reference to the outside staff gave a complete and satisfactory record.

Rating. Channel has fairly sharp right bend 50' above gage where two channels converge. Channel is straight for 100' below gage where it enters a rectangular double box culvert under SR 4. Control is a tapered (low-end on left) broad-crested weir.

Twenty-four inspections of no flow were made during the year.

Rating No. 1 is based on discharge measurements Nos. 1–8 that were made in previous years.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E230 Cañada del Buey above SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	.27	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	.12
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	.28	0	0
31	0	----	0	0	----	0	----	0	----	.13	0	----
Total	0.27	0	0	0	0	0	0	0	0	0.41	0	0.12
Mean	.009	0	0	0	0	0	0	0	0	.013	0	.004
Max	.27	0	0	0	0	0	0	0	0	.28	0	.12
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.54	0	0	0	0	0	0	0	0	.81	0	.24
Wtr Year	2009	Total	0.80	Mean	.002	Max	.28	Min	0	Acre-Ft	1.6	
Cal Year	2008	Total	3.74	Mean	.010	Max	2.9	Min	0	Acre-Ft	7.4	

E240 Pajarito Canyon below SR 501

Location. Lat 35° 52' 02", long 106° 21' 05", NW ¼, Sec. 19, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 1.90 mi².

Period of Record. October 1993 to June 28, 2000 (destroyed by flood); April 2001 to September 30, 2009.

Revised Records. WDR 1997: Gage height "Extremes for Period of Record." Drainage Area (2006). Levels date published as 2004, correction December 2001 (2008).

Gage. Data logger with cellular telemetry. Elevation of gage is 7,719 ft above NGVD from GPS survey. Formerly published as "Pajarito Canyon above Highway 501 near Los Alamos, NM" at different datum.

Remarks. Records are good.

Average Discharge. 15 yr, 0.09 ft³/s, 65 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 1,020 ft³/s, June 28, 2000, from peak flow computation, gage height not determined. No flow at times

Extremes for Current Year. Peak discharge above base of 5.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
August 30	1705	8.6*	1.32*

No flow most of the time.



E240 Pajarito Canyon below SR 501

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and shaft encoder float system with cellular phone and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter on top of a 24" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Station is also equipped with a rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 23 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run December 11, 2001, show gage to be within limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the period December 8, 9 when data logger malfunctioned.

Rating. Gage is about 300' below outlet of two round culverts through Highway 501 roadbed. Channel bed is sand and gravel and subject to movement. Grass and brush are fairly thick in over banks areas. Banks are not high (about 1' to 2' most places). Two gabions were installed in the fall of 2001, which act as low-water controls. One is 2' below gage across entire width of channel with a 6" V notch for low water. Another gabion is 50' above gage.

Twenty-three inspections of no flow were made this year.

Rating No. 3 was developed based on the six measurements and slope area from previous years.

Discharge. Discharge was computed by applying gage height to Rating No. 3 using variable shift diagrams.

Remarks. Records are good.

E240 Pajarito below SR 501

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0*	0	0	0	0	0	0	0	0	0
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	.05	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0.05	0
Mean	0	0	0	0	0	0	0	0	0	0	.002	0
Max	0	0	0	0	0	0	0	0	0	0	.05	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	.10	0
Wtr Year	2009	Total	0.05	Mean	0	Max	.05	Min	0	Acre-Ft	.10	
Cal Year	2008	Total	0.54	Mean	.002	Max	.06	Min	0	Acre-Ft	1.1	

*Estimate

E241 Pajarito Canyon above Starmer's Gulch

Location. Lat 35°51'33.6", long 106°20'12.6", SW ¼, Sec. 20, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 3.97 mi².

Period of Record. March 1999 to June 28, 2000 (destroyed by flood); July 2001 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 90° sharp-crested weir. Elevation of gage is 7,382 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 9 yr, 0.06 ft³/s, 42 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 300 ft³/s, June 28, 2000, from peak flow computation, gage height 5.0 ft. No flow at times.

Extremes for Current Year. Maximum discharge, 2.20 ft³/s at 1440 h, July 30, gage height 1.31 ft. No peak discharge above base of 10 ft³/s. No flow at times.



E241 Pajarito Canyon above Starmer's Gulch

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. An outside staff is available for reference. Gage was rebuilt after destruction by June 28, 2000, flood. Footbridge was installed as part of reconstruction and may be used for high-flow measurements and sampling. Bridge also provides access to gage E242 during high-flow periods.

Field Work. The station was visited 18 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run September 22, 2005, found the wire weight gage and PZF within limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the periods of December 28–30, January 11–16, 17–29, and February 1–4, 15–21 when gage height was affected by ice.

Rating. The channel is straight for 100' above and below weir. Banks have significant vegetation and streambed is sand and gravel, somewhat armored and firm.

Thirteen discharge measurements (Nos. 55–67) were made the year. Observed flow is usually very little falling over the V notch.

Rating No. 3 is based on standard 90° sharp-crested weir formula verified with current measurements. Point of zero flow is 0.70 ft from levels. Shifts defined by measurements were used for V diagrams. Shifts were computed and record worked to inside gage readings. Although wire weight is reference gage, natural fall occurs between the wire weight and the orifice from filling after flow events. Effectively, the wire weight becomes a general check at this station.

Weir should be very effective with virtually no approach velocity to interfere.

Discharge. Discharge was computed by applying gage height to Rating No. 3 directly.

Remarks. Records are good.

E241 Pajarito Canyon above Starmer's Gulch

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.01	.01	.03	.01*	.01	.02	.01	.01	.01	.01	.01
2	.01	.01	.01	.03	.01*	.01	.02	.02	.01	.01	.01	.01
3	.01	.01	.01	.01	.01*	.01	.02	.02	.03	.01	.01	.01
4	.01	.01	.01	.01	.01*	.01	.02	.01	.01	.01	.01	.01
5	.01	.01	.01	.01	.01	.01	.02	.01	.01	.05	.01	.01
6	.01	.01	.01	.01	.01	.01	.02	.01	.01	.02	.01	.01
7	.01	.01	.01	.01	.01	.01	.02	.01	.01	.01	.01	.01
8	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
9	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	0	.01
10	.01	.01	.02	.01	.01	.01	.01	.01	.02	.01	0	.01
11	.04	.01	.01	.02*	.01	.01	.01	.01	.01	.01	0	.01
12	.01	.01	.01	.02*	.01	.01	.01	.01	.01	.01	.01	.01
13	.01	.01	.01	.02*	.01	.01	.01	.01	.01	.01	.01	.01
14	.01	.01	.01	.02*	.01	.01	.01	.01	.01	.01	.01	.01
15	.01	.01	.01	.02*	.01*	.01	.01	.01	.01	.01	.01	.01
16	.01	.01	.01	.02*	.01*	.01	.01	.01	.01	.01	.01	.01
17	.01	.01	.01	.03	.01*	.01	.01	.01	.01	.01	.01	.02
18	.01	.01	.01	.02	.01*	.01	.02	.01	.01	.01	.01	.02
19	.01	.01	.01	.02	.01*	.01	.02	.01	.01	.01	.01	.01
20	.01	.01	.01	.01	.01*	.01	.02	.01	.01	.01	.01	.01
21	.01	.01	.02	.01	.01*	.01	.02	.01	.01	.01	.01	.01
22	.01	.01	.02	.01	.01	.01	.02	.01	.01	.01	.01	.01
23	.01	.01	.01	.01	.01	.02	.02	.02	.01	.01	.01	.01
24	.01	.01	.01	.01	.01	.02	.02	.02	.01	.01	.01	.02
25	.01	.01	.01	.01	.01	.03	.02	.01	.01	.01	.01	.02
26	.01	.01	.01	.01	.01	.02	.02	.01	.01	.01	.01	.02
27	.01	.01	.03	.01	.01	.04	.02	.03	.01	.01	.01	.01
28	.01	.01	.02*	.01*	.01	.03	.02	.02	.01	.08	.01	.01
29	.01	.01	.02*	.01*	----	.03	.02	.01	.01	.06	.01	.01
30	.01	.01	.02*	.01*	----	.03	.02	.01	.01	.13	.01	.01
31	.01	----	.01	.01	----	.02	----	.01	----	.01	.01	----
Total	0.34	0.30	0.39	0.45	0.28	0.46	0.50	0.38	0.33	0.60	0.28	0.35
Mean	.011	.010	.013	.015	.010	.015	.017	.012	.011	.019	.009	.012
Max	.04	.01	.03	.03	.01	.04	.02	.03	.03	.13	.01	.02
Min	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	0	.01
Acre-Ft	.67	.60	.77	.89	.56	.91	.99	.75	.65	1.2	.56	.69
Wtr Year	2009	Total	4.66	Mean	.013	Max	.13	Min	0	Acre-Ft	9.2	
Cal Year	2008	Total	7.45	Mean	.020	Max	1.4	Min	0	Acre-Ft	15	

*Estimate

E242 Starmer's Gulch above Pajarito Canyon

Location. Lat 35° 51' 33", long 106° 20' 13", SW ¼, Sec. 20, T. 19 N., R. 6 E., Los Alamos County.

Drainage Area. 1.03 mi².

Period of Record. March 1999 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger. Elevation of gage is 7,377 ft above NGVD from GPS survey.

Remarks. Records are good, except estimated daily discharges, which are fair.

Average Discharge. 9 yr, 0.23 ft³/s, 166 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 628 ft³/s, August 29, 2007, gage height 3.98 ft. No flow at times.

Extremes for Current Year. Peak discharges above base of 10 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
August 30	1750	10*	1.95*

Minimum daily 0.01 ft³/s, April 12.



E242 Starmer's Gulch above Pajarito Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor and Milltronics probe sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. An outside staff is available for reference. No provision for discharge measurement above wading stage.

Field Work. The station was visited 19 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run September 22, 2009, found gage within limits.

Gage-Height Record. The data logger reference to the outside staff gave a complete and satisfactory record, except for the periods from March 18–22, 29, 30, and April 7–10 when gage height was affected by ice.

Rating. The channel is about 13' wide and straight for about 100' upstream and straight for about 50' downstream then bends to the left. The streambed through this reach is rock with cobbles. The right and left bank are covered with scrub oak and some conifers.

Twelve discharge measurements (Nos. 61–72) were made this water year.

Rating No. 4 was used all year. Stage application of shifts is illustrated by V diagrams. Rating 4 is considered good.

Discharge. Discharge was computed by applying gage height directly to Rating No. 4 with V diagrams. Discharge estimates due to ice effect were based on bubbler.

Remarks. Records are good except for estimated daily discharges, which are fair.

E242 Starmer's Gulch above Pajarito Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.01	.01	.01	.01	.01	.01	1.6	.24	.08	.13	.12
2	.01	.01	.01	.01	.01	.01	.01	1.4	.21	.07	.08	.11
3	.01	.01	.01	.01	.01	.01	.01	1.1	.27	.06	.06	.08
4	.01	.01	.01	.01	.01	.01	.01	.91	.32	.05	.05	.07
5	.01	.01	.01	.01	.01	.01	.01	.78	.27	.10	.04	.07
6	.01	.01	.01	.01	.01	.01	.01	.62	.24	.14	.03	.06
7	.01	.01	.01	.01	.01	.01	.01*	.52	.20	.16	.03	.06
8	.01	.01	.01	.01	.01	.01	.01*	.38	.16	.12	.03	.07
9	.01	.01	.01	.01	.01	.01	.01*	.31	.15	.08	.03	.08
10	.01	.01	.01	.01	.01	.01	.01*	.27	.41	.05	.03	.08
11	.18	.01	.01	.01	.01	.01	.01	.26	.27	.03	.02	.06
12	.01	.01	.01	.01	.01	.01	.01	.22	.29	.03	.03	.04
13	.01	.01	.01	.01	.01	.01	.08	.19	.25	.03	.03	.04
14	.01	.01	.01	.01	.01	.01	.05	.14	.21	.02	.09	.04
15	.01	.01	.01	.01	.01	.01	.10	.12	.17	.02	.09	.03
16	.01	.01	.01	.01	.01	.01	.30	.13	.16	.03	.08	.07
17	.01	.01	.01	.01	.01	.02	.62	.14	.14	.03	.06	.09
18	.01	.01	.01	.01	.01	.01*	1.2	.10	.12	.03	.05	.19
19	.01	.01	.01	.01	.01	.01*	1.6	.08	.11	.03	.05	.11
20	.01	.01	.01	.01	.01	.01*	1.7	.08	.20	.03	.04	.08
21	.01	.01	.01	.01	.01	.01*	1.9	.08	.23	.04	.03	.05
22	.01	.01	.01	.01	.01	.01*	2.2	.09	.28	.05	.03	.04
23	.01	.01	.01	.01	.01	.01	2.3	.18	.25	.05	.03	.04
24	.01	.01	.01	.01	.01	.01	2.3	.25	.17	.04	.03	.12
25	.01	.01	.01	.01	.01	.01	2.3	.44	.15	.03	.04	.08
26	.01	.01	.01	.01	.01	.01	2.2	.47	.12	.03	.04	.08
27	.01	.01	.01	.01	.01	.01	2.1	.56	.11	.04	.04	.05
28	.01	.01	.01	.01	.01	.01	2.0	.72	.11	.19	.04	.04
29	.01	.01	.01	.01	----	.01*	1.8	.47	.09	.11	.03	.03
30	.01	.01	.01	.01	----	.01*	1.7	.38	.09	.18	.42	.03
31	.01	----	.01	.01	----	.01	---	.29	----	.16	.21	----
Total	0.48	0.30	0.31	0.31	0.28	0.32	26.57	13.28	5.99	2.11	1.99	2.11
Mean	.015	.010	.010	.010	.010	.010	.89	.43	.20	.068	.064	.070
Max	.18	.01	.01	.01	.01	.02	2.3	1.6	.41	.19	.42	.19
Min	.01	.01	.01	.01	.01	.01	.01	.08	.09	.02	.02	.03
Acre-Ft	.95	.60	.61	.61	.56	.63	53	26	12	4.2	3.9	4.2
Wtr Year	2009	Total	54.05	Mean	.15	Max	2.3	Min	.01	Acre-Ft	107	
Cal Year	2008	Total	165.45	Mean	.45	Max	5.8	Min	0	Acre-Ft	328	

*Estimate

E2425 Arroyo de la Delfe above Pajarito Canyon

Location. Lat 35° 51' 25", long 106° 19' 56", NW ¼, Sec. 29, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.15 mi².

Period of Record. June 1, 2000, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 90° sharp-crested weir. Elevation of gage is 7,311 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 9 yr, 0.04 ft³/s, 28 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 30 ft³/s, August 24, 2005, gage height 2.64 ft. No flow at times.

Extremes for Current Year. Maximum discharge, 0.10 ft³/s at 1350 h, July 6, gage height 0.84 ft. No peak discharge above base of 5.0 ft³/s.



E2425 Arroyo de la Delfe above Pajarito Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for measurements above wading stage.

Field Work. The station was visited 16 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the periods from January 14–22, January 28 to February 5, February 14–22, and March 27 when gage height was affected by ice.

Rating. Channel is straight and narrow above and below gage. Bed material is sand and coarse gravel. Control is 90° sharp-crested weir plate.

Fourteen discharge measurements (Nos. 31–44) were made this year.

Rating No. 1 was continued in use. V diagrams were used to apply shift when necessary.

Discharge. Discharge was computed by applying gage height to Rating No.1.

Remarks. Records are good, except estimated daily discharge, which are fair.

E2425 Arroyo de la Delfe above Pajarito Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.01	.01	.01	.01*	.01	.02	.05	.04	.02	.03	.02
2	.01	.01	.01	.01	.01*	.01	.02	.05	.04	.02	.03	.02
3	.01	.01	.01	.01	.01*	.02	.02	.05	.04	.02	.03	.02
4	.01	.01	.01	.01	.01*	.02	.02	.05	.03	.02	.03	.02
5	.01	.01	.01	.01	.01*	.02	.02	.05	.03	.03	.02	.02
6	.01	.01	.01	.01	.01	.02	.02	.04	.03	.04	.01	.02
7	.01	.01	.01	.01	.01	.02	.02	.03	.03	.04	.01	.02
8	.01	.01	.01	.01	.01	.02	.02	.03	.03	.03	.01	.02
9	.01	.01	.01	.01	.01	.02	.02	.03	.03	.03	.01	.02
10	.01	.01	.03	.01	.01	.02	.02	.03	.04	.03	.01	.02
11	.02	.01	.02	.01	.01	.02	.02	.03	.04	.03	.01	.02
12	.01	.01	.01	.01	.02	.02	.02	.03	.03	.03	.01	.01
13	.01	.01	.01	.01	.02	.02	.03	.03	.03	.03	.01	.01
14	.01	.01	.01	.01*	.02*	.02	.03	.03	.03	.03	.02	.01
15	.01	.01	.01	.01*	.02*	.02	.03	.03	.03	.03	.02	.01
16	.01	.01	.01	.01*	.02*	.02	.03	.03	.03	.03	.01	.02
17	.01	.01	.01	.01*	.02*	.02	.03	.03	.03	.03	.01	.02
18	.01	.01	.01	.01*	.02*	.02	.03	.03	.03	.03	.02	.02
19	.01	.01	.01	.01*	.02*	.02	.04	.03	.03	.03	.02	.02
20	.01	.01	.01	.01*	.02*	.01	.04	.03	.03	.03	.02	.02
21	.01	.01	.01	.01*	.02*	.01	.04	.03	.03	.04	.02	.02
22	.01	.01	.01	.01*	.02*	.01	.05	.03	.03	.03	.02	.02
23	.01	.01	.01	.01	.02	.02	.05	.04	.03	.03	.02	.02
24	.01	.01	.01	.01	.01	.02	.05	.04	.03	.03	.02	.02
25	.01	.01	.01	.01	.01	.02	.06	.03	.03	.03	.02	.02
26	.01	.01	.01	.01	.02	.02	.06	.03	.03	.03	.02	.02
27	.01	.01	.01	.01	.02	.02*	.06	.04	.03	.03	.02	.02
28	.01	.01	.01	.01*	.01	.02	.05	.05	.03	.02	.02	.02
29	.01	.01	.01	.01*	----	.02	.05	.04	.02	.02	.01	.02
30	.01	.01	.01	.01*	----	.02	.05	.04	.02	.03	.02	.02
31	.01	----	.01	.01*	----	.02	----	.04	----	.04	.02	----
Total	0.32	0.30	0.34	0.31	0.42	0.57	1.02	1.12	0.93	0.91	0.55	0.56
Mean	.010	.010	.011	.010	.015	.018	.034	.036	.031	.029	.018	.019
Max	.02	.01	.03	.01	.02	.02	.06	.05	.04	.04	.03	.02
Min	.01	.01	.01	.01	.01	.01	.02	.03	.02	.02	.01	.01
Acre-Ft	.63	.60	.67	.61	.83	1.1	2.0	2.2	1.8	1.8	1.1	1.1
Wtr Year	2009	Total	7.35	Mean	.020	Max	.06	Min	.01	Acre-Ft	15	
Cal Year	2008	Total	9.19	Mean	.025	Max	.21	Min	0	Acre-Ft	18	

*Estimate

E243 Pajarito Canyon above Two Mile Canyon

Location. Lat 35° 51' 14", long 106° 17' 48", Sec. 27, T. 19N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 4.24 mi².

Period of Record. February 2002 to September 30, 2009.

Revisions. Drainage Area (2006).

Gage. Data logger with cellular telemetry. Elevation of gage 6,941 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 7 yr, 0.23 ft³/s, 165 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 272 ft³/s August 24, 2005, gage height 4.38 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.62 ft³/s at 0130 h, April 26, gage height 1.23 ft. No peak discharges above base of 5.0 ft³/s and maximum. No flow part of the time.



E243 Pajarito Canyon above Two Mile Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor with cellular telemetry and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. No provision for direct measurement above wading stage.

Field Work. The station was visited 22 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels run April 7, 2006, found gage within limits, no corrections necessary.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except during the periods from January 27, 28, February 3, 15, 20, 27, 28, and March 1, 2, 8, 11, 12, 27 when gage height was affected by ice.

Rating. The channel is straight for 150' above and below gage. It is trapezoidal with the bed fairly well armored with large gravel and some cobbles. Banks are fairly well vegetated with grasses and should remain stable at all flows.

Eight discharge measurements (Nos. 30–37) were made this year.

Rating No. 4 was continued in use and considered fair.

Discharge. Discharge was computed by applying gage height to Rating No. 4 with shifts at low flow applied by V diagrams. PZF shows some estimated zero flow in winter from icing over orifice, during this time stream was frozen dry.

Remarks. This station was originally at a site downstream about 0.5 mi. With the building of the Pajarito Flood Control Structure, it had to be moved. That site was never rated and although gage height record is available in Hydstra, the record for 1998–2002 will not be published. Records are good.

E243 Pajarito Canyon above Two Mile Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	.02	.02*	.06	.32	.13	.03	.02	0
2	0	0	0	0	.02	.03*	.05	.29	.13	.02	.01	0
3	0	0	0	0	.01*	.04	.04	.26	.19	.02	.01	0
4	0	0	0	0	.01	.07	.04	.23	.18	.01	.01	0
5	0	0	0	0	.01	.05	.03	.21	.14	.12	.01	0
6	0	0	0	0	.01	.05	.03	.19	.13	.19	0	0
7	0	0	0	0	.02	.05	.03	.17	.11	.13	0	0
8	0	0	0	0	.01	.03*	.03	.14	.10	.06	0	0
9	0	0	0	0	.01	.04	.03	.13	.09	.04	0	0
10	0	0	0	0	.01	.04	.02	.13	.25	.04	0	0
11	0	0	0	0	.02	.02*	.04	.12	.18	.03	0	0
12	0	0	0	0	.02	.02*	.08	.11	.13	.03	0	0
13	0	0	0	0	.02	.03	.14	.11	.13	.02	0	0
14	0	0	0	0	.02	.03	.15	.10	.13	.02	0	0
15	0	0	0	0	.01*	.03	.13	.10	.11	.02	0	0
16	0	0	0	0	.02	.03	.14	.10	.09	.02	0	0
17	0	0	0	0	.02	.03	.18	.09	.08	.01	0	0
18	0	0	0	0	.02	.02	.23	.09	.07	.01	0	0
19	0	0	0	0	.02	.02	.28	.08	.06	.01	0	0
20	0	0	0	0	.01*	.01	.29	.07	.12	.01	0	0
21	0	0	0	0	.02	.01	.35	.08	.12	.01	0	0
22	0	0	0	0	.02	.01	.41	.11	.10	.01	0	0
23	0	0	0	0	.01	.01	.45	.23	.10	.02	0	0
24	0	0	0	0	.01	.01	.47	.19	.08	.02	0	0
25	0	0	0	0	.01	.02	.49	.20	.06	.01	0	0
26	0	0	0	0	.02	.05	.49	.19	.06	.01	0	0
27	0	0	0	0*	.03*	.05*	.47	.29	.05	.02	0	0
28	0	0	0	.04*	.02*	.07	.45	.26	.04	.02	0	0
29	0	0	0	.04	-----	.08	.42	.19	.04	.02	0	0
30	0	0	0	.03	-----	.07	.37	.16	.03	.02	0	0
31	0	-----	0	.03	-----	.07	-----	.14	-----	.02	0	-----
Total	0	0	0	0.14	0.45	1.11	6.39	5.08	3.23	1.02	0.06	0
Mean	0	0	0	.005	.016	.036	.21	.16	.11	.033	.002	0
Max	0	0	0	.04	.03	.08	.49	.32	.25	.19	.02	0
Min	0	0	0	0	.01	.01	.02	.07	.03	.01	0	0
Acre-Ft	0	0	0	.28	.89	2.2	13	10	6.4	2.0	.12	0
Wtr Year	2009	Total	17.48	Mean	.048	Max	.49	Min	0	Acre-Ft	35	
Cal Year	2008	Total	113.11	Mean	.31	Max	4.7	Min	0	Acre-Ft	224	

*Estimate

E2435 Two Mile Canyon Tributary at TA-3

Location. Lat 35° 52' 08", long 106° 19' 21", NE ¼, Sec. 20, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.02 mi².

Period of Record. October 1, 2005, to September 30, 2009.

Revisions. Drainage Area (2006).

Gage. Data logger and 12" Parshall flume. Elevation of gage is 7,402 ft above NGVD from land survey.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 60 ft³/s July 14, 2007, gage height 2.40 ft. No flow most time.

Extremes for Current Year. Peak discharges above base of 6.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1140	7.7*	1.54*
May 23	1215	6.9	1.44

No flow most of the time.



E2435 Two Mile Canyon Tributary at TA-3

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 12" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 12" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. The station was visited 37 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the periods from December 13, 15–17, December 22–29, January 4, 5, and March 14 when gage height was affected by ice and June 1 to July 9 when the data logger malfunctioned.

Rating. The channel is straight above and below gage. It is confined to the main channel by cut banks on both sides. The bottom is a 10' wide channel prone to some shifting with vegetation on each bank. Low-water control is the 12" Parshall flume.

Thirty-five inspections of no flow and two inspections of observed flow were made this year.

Rating No. 1 was developed based on the computation of 12" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good, except daily discharges, which are fair.

E2435 Two Mile Canyon Tributary at TA-3

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0*	0	0	0	0	0	0	0	0*	0*	0	0
2	0	0	0	0	0	0	0	0	0*	0*	0	0
3	0	0	0	0	0	0	0	0	.10*	0*	0	0
4	.03	0	0	0*	0	0	0	0	0*	0*	0	0
5	0	0	0	0*	0	0	0	0	0*	.10*	0	0
6	0	0	0	0	0	0	0	0	0*	.05*	0	.03
7	0	0	0	0	0	0	0	0	0*	0*	0	0
8	0	0	0	0	0	0	0	0	0*	0*	0	.01
9	0	0	0	0	0	0	0	0	0*	0*	0	0
10	0	0	0	0	0	0	0	0	.10*	0	0	.03
11	.22	0	0	0	0	0	.02	0	0*	0	0	0
12	0	0	0	0	0	0	.04	0	0*	0	.06	0
13	0	0	0*	0	0	0	0	0	0*	0	0	0
14	.01	0	0	0	0	0*	0	0	.05*	0	.06	0
15	0	0	0*	0	0	0	0	0	0*	0	0	.02
16	0	0	0*	0	0	0	0	0	0*	0	0	.05
17	0	0	0*	0	0	0	0	0	0*	0	0	.03
18	0	0	0	0	0	0	.02	0	0*	0	0	0
19	0	0	0	0	0	0	0	0	0*	0	0	0
20	0	0	0	0	0	0	0	0	.10*	.06	0	0
21	0	0	0	0	0	0	0	.03	0*	.08	0	0
22	0	0	0*	0	0	0	0	.01	0*	0	0	0
23	0	0	0*	0	0	0	0	.15	0*	0	.01	.04
24	0	0	0*	0	0	0	0	.03	0*	0	.01	.01
25	0	0	0*	0	0	0	0	0	.03*	0	0	0
26	0	0	0*	0	0	0	0	0	0*	.03	0	0
27	0	.04	0*	0	0	0	0	.04	0*	0	0	0
28	0	0	0*	0	0	0	0	0	0*	.07	0	0
29	0	0	0*	0	----	0	0	0	0*	.05	0	0
30	0	0	0	0	----	0	0	0	0*	.05	.09	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0.26	0.04	0	0	0	0	0.08	0.26	0.38	0.49	0.23	0.22
Mean	.008	.001	0	0	0	0	.003	.008	.013	.016	.007	.007
Max	.22	.04	0	0	0	0	.04	.15	.10	.10	.09	.05
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.52	.08	0	0	0	0	.16	.52	.75	.97	.46	.44
Wtr Year	2009	Total	1.96	Mean	.005	Max	.22	Min	0	Acre-Ft	3.9	
Cal Year	2008	Total	1.45	Mean	.004	Max	.22	Min	0	Acre-Ft	2.9	

*Estimate

E244 Two Mile Canyon above Pajarito Canyon

Location. Lat 35° 51' 15", long 106° 17' 46", Sec. 27, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 3.15 mi².

Period of Record. October 1, 2002, to September 30, 2009.

Revised Record. Drainage Area (2006). Period of Record (2008).

Gage. Data logger with cellular telemetry. Elevation of gage is 6,940 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 7 yr, 0.10 ft³/s, 72 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 628 ft³/s August 25, 2006, gage height 6.01 ft (from flood marks). No flow most of the time.

Extremes for Current Year. Maximum discharge, 4.0 ft³/s at 1310 h, July 23, gage height 1.05 ft. No peak discharges above base of 30 ft³/s. No flow most of the time.



E244 Two Mile Canyon above Pajarito Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe with cellular phone and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff gage is available for reference. Wading measurements can be in the vicinity of the gage. No provision for measurement above wading stages.

Field Work. The station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gage gave a complete and satisfactory record, except for the periods from December 8 to January 8, February 10, March 13, 26–30, and April 11, 17, 18 when gage height was affected by ice.

Rating. The channel at the gage is straight for about 150' above gage and 50' feet below gage. Channel expands quite a bit below gage. Bed material is coarse sand and gravel. Banks are grassy with some small trees and outcrops affecting roughness at higher flows.

Four discharge measurements (Nos. 21–24) and 10 inspections of no flow were made this year.

Rating No. 2 was developed from previous measurements and one slope area measurement.

Discharge. Discharge was computed by applying gage height to Rating No. 2 directly. Some periods have large shifts on lower end because of dry condition varying the PZF.

Remarks. Records are good. This station was operated at a site 200' downstream but never rated. It had to be moved because that site is in backwater from the Pajarito Flood Control structure, which was built in 2000 just after the Cerro Grande fire.

E244 Two Mile Canyon above Pajarito Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	.01	.06	0
2	0	0	0	0*	0	0	0	0	0	.01	.07	0
3	0	0	0	0*	0	0	0	0	.02	0	.06	0
4	0	0	0	0*	0	0	0	0	.02	0	.06	0
5	0	0	0	0*	0	0	0	0	.02	.08	.06	0
6	0	0	0	0*	0	0	0	0	.02	.14	.04	0
7	0	0	0	0*	0	0	0	0	.02	0	.03	0
8	0	0	0*	0*	0	0	0	0	.03	0	.02	0
9	0	0	0*	0	0	0	0	0	.02	0	.02	0
10	0	0	0*	0	0*	0	0	0	.04	0	.01	0
11	.08	0	0*	0	0	0	0*	0	.01	0	.01	0
12	0	0	0*	0	0	0	0	0	0	0	.02	0
13	0	0	0*	0	0	0*	0	0	0	0	.02	0
14	0	0	0*	0	0	0	0	0	0	.01	.05	0
15	0	0	0*	0	0	0	0	0	0	.01	.02	0
16	0	0	0*	0	0	0	0	0	0	.01	.01	0
17	0	0	0*	0	0	0	0*	0	.01	.01	.01	.01
18	0	0	0*	0	0	0	0*	0	.01	.01	0	.01
19	0	0	0*	0	0	0	0	0	.01	.01	0	0
20	0	0	0*	0	0	0	0	0	.03	.02	0	0
21	0	0	0*	0	0	0	0	0	.02	.02	0	0
22	0	0	0*	0	0	0	0	0	.01	.02	0	0
23	0	0	0*	0	0	0	0	.01	.01	.18	0	0
24	0	0	0*	0	0	0	0	.01	.01	.08	0	.01
25	0	0	0*	0	0	0	0	.02	.02	.05	0	0
26	0	0	0*	0	0	0*	0	.01	.02	.06	0	0
27	0	0	0*	0	0	0*	0	.04	.01	.03	0	0
28	0	0	0*	0	0	0*	0	.02	.01	.11	0	0
29	0	0	0*	0	----	0*	0	.01	.01	.06	0	0
30	0	0	0*	0	----	0*	0	0	.01	.15	0	0
31	0	----	0*	0	----	0	----	0	----	.08	0	----
Total	0.08	0	0	0	0	0	0	0.12	0.39	1.16	0.57	0.03
Mean	.003	0	0	0	0	0	0	.004	.013	.037	.018	.001
Max	.08	0	0	0	0	0	0	.04	.04	.18	.07	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.16	0	0	0	0	0	0	.24	.77	2.3	1.1	.06
Wtr Year	2009	Total	2.35	Mean	.006	Max	.18	Min	0	Acre-Ft	4.7	
Cal Year	2008	Total	30.06	Mean	.082	Max	8.3	Min	0	Acre-Ft	60	

*Estimate

E245 Pajarito Canyon above TA-18

Location. Lat 35° 51' 4", long 106° 17' 11", Sec. 27, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 7.56 mi².

Period of Record. November 1993 to September 30, 2009.

Revisions. Drainage Area (2006).

Gage. Data logger and concrete control. Elevation of gage is 6,880 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, 0.20 ft³/s, 141 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 517 ft³/s June 28, 2000, gage height 5.03 ft (from flood mark). No flow most of the time.

Extremes for Current Year. Maximum discharge 2.1 ft³/s at 1530 h, July 6, gage height 1.04 ft. No peak discharge above base of 25 ft³/s. No flow most of the time.



E245 Pajarito Canyon above TA-18

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and shaft encoder float system. The system is powered by a solar panel battery system housed in NEMA shelter on 18" CMP well on the right bank. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Field Work. The station was visited 26 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels run May 12, 2008, show gage to be reading within allowable limits.

Gage-Height Record. The data logger referenced to the outside staff gage gave a complete and satisfactory record, except for the periods from October 1–14, May 4 to June 15, June 19–23, and August 17 to September 10 when the data logger malfunctioned.

Rating. The channel is straight for 100' above and below gage. Bed material is gravel with fine sand movement during flow events. Control is a concrete broad-crested weir.

Twenty-six inspections of no flow were made this year.

Rating No. 2 was used all year.

Discharge. Discharge was computed by applying Rating No. 2 using V shift diagrams. Long periods of lost record were estimated at zero flow based on precipitation and nearby gage stations.

Remarks. Records are good.

E245 Pajarito Canyon above TA-18

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0*	0	0	0	0	0	0	.05	0*	0	0	0*
2	0*	0	0	0	0	0	0	.04	0*	0	0	0*
3	0*	0	0	0	0	0	0	0	0*	0	0	0*
4	0*	0	0	0	0	0	0	0*	0*	0	0	0*
5	0*	0	0	0	0	0	0	0*	0*	0	0	0*
6	0*	0	0	0	0	0	0	0*	0*	.37	0	0*
7	0*	0	0	0	0	0	0	0*	0*	0	0	0*
8	0*	0	0	0	0	0	0	0*	0*	0	0	0*
9	0*	0	0	0	0	0	0	0*	0*	0	0	0*
10	0*	0	0	0	0	0	0	0*	0*	0	0	0*
11	0*	0	0	0	0	0	0	0*	0*	0	0	0
12	0*	0	0	0	0	0	0	0*	0*	0	0	0
13	0*	0	0	0	0	0	0	0*	0*	0	0	0
14	0*	0	0	0	0	0	0	0*	0*	0	0	0
15	0	0	0	0	0	0	0	0*	0*	0	0	0
16	0	0	0	0	0	0	0	0*	0	0	0	0
17	0	0	0	0	0	0	0	0*	0	0	0*	0
18	0	0	0	0	0	0	0	0*	0	0	0*	0
19	0	0	0	0	0	0	0	0*	0*	0	0*	0
20	0	0	0	0	0	0	0	0*	0*	0	0*	0
21	0	0	0	0	0	0	0	0*	0*	0	0*	0
22	0	0	0	0	0	0	0	0*	0*	0	0*	0
23	0	0	0	0	0	0	0	0*	0*	0	0*	0
24	0	0	0	0	0	0	0	0*	0	0	0*	0
25	0	0	0	0	0	0	0	0*	0	0	0*	0
26	0	0	0	0	0	0	0	0*	0	0	0*	0
27	0	0	0	0	0	0	0	0*	0	0	0*	0
28	0	0	0	0	0	0	0	0*	0	0	0*	0
29	0	0	0	0	----	0	.06	0*	0	0	0*	0
30	0	0	0	0	----	0	.07	0*	0	.07	0*	0
31	0	----	0	0	----	0	----	0*	----	0	0*	----
Total	0	0	0	0	0	0	0.13	0.09	0	0.44	0	0
Mean	0	0	0	0	0	0	.004	.003	0	.014	0	0
Max	0	0	0	0	0	0	.07	.05	0	.37	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	.26	.18	0	.87	0	0
Wtr Year	2009	Total	0.66	Mean	.002	Max	.37	Min	0	Acre-Ft	1.3	
Cal Year	2008	Total	93.65	Mean	.26	Max	4.6	Min	0	Acre-Ft	186	

*Estimate

E2455 Pajarito Canyon above Three Mile Canyon

Location. Lat 35° 50' 45.3", long 106° 16' 29", Sec. 16, T. 19N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 7.81 mi².

Period of Record. October 1, 2002, to September 30, 2009.

Revisions. Drainage Area (2008).

Gage. Data logger and cellular telemetry and rain gage. Elevation of gage is 6,796 ft from LIDAR DEM.

Remarks. Records are good.

Average Discharge. 7 yr, 0.20 ft³/s, 146 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 228 ft³/s, August 24, 2005, gage height 2.86 ft.

Extremes for Current Year. No flow for the year.



E2455 Pajarito Canyon above Three Mile Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 21 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. Levels run May 12, 2008, show gage within limits.

Gage-Height Record. The data logger referenced to the outside staff gage gave a complete and satisfactory record for the year.

Rating. The channel is straight for 80' above and below gage. Banks have some vegetation, and streambed is sand and gravel.

Twenty-one inspections of no flow were made this year.

Rating No. 4 was developed from previous measurements and one critical depth computation.

Discharge. Discharge was computed by applying Rating No. 4 directly.

Remarks. Records are good. The records for 2007 are available but are not reliable.

E2455 Pajarito Canyon above Three Mile Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	0	0	0	0
11	0	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0*
17	0	0	0*	0	0	0	0*	0	0	0	0	0*
18	0	0	0*	0	0	0	0	0	0	0	0	0*
19	0	0	0*	0	0	0	0	0	0	0	0	0*
20	0	0	0*	0	0	0	0	0	0	0	0	0*
21	0	0	0*	0	0	0	0	0	0	0	0	0*
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	91.85	Mean	.25	Max	14	Min	0	Acre-Ft	182	182

*Estimate

E246 Three Mile Canyon above Pajarito Canyon

Location. Lat 35° 50' 20", long 106° 16' 17", Sec. 35, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 1.62 mi².

Period of Record. October 1998 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 9" Parshall flume with cellular telemetry. Elevation of gage is 6,755 ft above NGVD.

Remarks. Records are good.

Average Discharge. 11 yr, 0.02 ft³/s, 12 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 536 ft³/s August 25, 2006, gage height 3.50 ft from critical dept computation of peak flow. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.04 ft³/s at 0745 h, August 10, gage height of 0.40 ft. No peak discharge above base of 1.0 ft³/s. Minimal flow during the year. No flow most of the time.



E246 Three Mile Canyon above Pajarito Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on 9" Parshall flume and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter on right bank. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. There is no provision for direct discharge measurements above wading stage.

Field Work. The station was visited 18 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record except for the periods from December 9, January 13, March 26–28, and April 11, 17 when gage height was affected by ice.

Rating. The channel is straight above and below gage. It is confined to the main channel by cut banks on both sides. The bottom is 10' wide, channel prone to some shifting with vegetation on each bank. Low-water control is the 9" Parshall flume.

Eighteen inspections of now flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume and was extended on the basis of two critical depth computations. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E246 Three Mile Canyon above Pajarito Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	0	0	0	0
11	0	0	0*	0*	0	0	0*	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0*	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	.01	0	0	0	0
23	0	0	0*	0	0	0	0	.01	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0.02	0	0	0	0
Mean	0	0	0	0	0	0	0	.001	0	0	0	0
Max	0	0	0	0	0	0	0	.01	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	.04	0	0	0	0
Wtr Year	2009	Total	0.02	Mean	0	Max	.01	Min	0	Acre-Ft	.04	
Cal Year	2008	Total	12.84	Mean	.035	Max	1.8	Min	0	Acre-Ft	25	

*Estimate

E247 MDA G-1

Location. Lat 35° 49' 51", long 106° 14' 41", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.002 mi².

Period of Record. October 1, 2004, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 6,626 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 0.94 ft³/s, September 23, 2007, gage height 0.46 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.51 ft³/s at 1525 h, October 11, gage height 0.31 ft. No peak discharge above base of 1.0 ft³/s. No flow most of the time.



E247 MDA G-1

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage. All high measurements will be by slope area or peak flow computation methods.

Field Work. This station was visited 12 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record.

Rating. The channel is straight 30' upstream with sand and gravel. The channel downstream from the flume is 40' long with vegetation on both banks. Streambed is sand and gravel. The control for this station is the 9" Parshall flume.

Twelve inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E247 MDA G-1

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	.01	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	.01	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0.01	Mean	0	Max	.01	Min	0	Acre-Ft	.02	
Cal Year	2008	Total	0.06	Mean	0	Max	.05	Min	0	Acre-Ft	.12	

E248 MDA G-2

Location. Lat 35° 49' 48", long 106° 14' 33", Sec. 31. T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.016 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall Flume. Elevation of gage is 6,621 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 4.9 ft³/s, January 28, 2008, gage height 1.72 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1535	1.40*	0.60*

No flow most of the time.



E248 MDA G-2

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage. All high measurements will be by slope area or peak flow computation methods.

Field Work. This station was visited 29 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra data base.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the period from December 15 to January 14 when gage height was affected by ice.

Rating. The control for this station is the 9" Parshall flume. The channel is straight 30' upstream with sand, gravel, and vegetation. The channel downstream from the flume is 40' long with large boulders on both banks.

Twenty-nine inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E248 MDA G-2

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0	0*	0	0	0	0	0	0	0	0
10	0	0	0	0*	0	0	0	0	0	0	0	0
11	.01	0	0	0*	0	0	0	0	0	0	0	0
12	0	0	0	0*	0	0	0	0	0	0	0	0
13	0	0	0	0*	0	0	0	0	0	0	0	0
14	0	0	0	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0	0	0	0	0	0	0
27	0	0	0*	0	0	0	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	.01	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0.01	Mean	0	Max	.01	Min	0	Acre-Ft	.02	
Cal Year	2008	Total	0.03	Mean	0	Max	.02	Min	0	Acre-Ft	.06	

*Estimate

E2485 MDA G-6U

Location. Lat 35° 49' 45", long 106° 14' 12", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.03 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume. Elevation of gage is 6,602 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 3.8 ft³/s, September 17, 2007, gage height 1.15 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above base of 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1400	1.40*	0.60*

No flow most of the time.



E2485 MDA G-6U

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage. All measurements above wading stage will be by slope area or peak flow computation methods.

Field Work. This station was visited 28 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra data base.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the period from December 9 to January 14, 17, February 22, and March 26–28 when gage height was affected by ice.

Rating. The control for this station is the 9" Parshall flume. The channel is straight 40' upstream with sand, gravel, and vegetation. The channel downstream from the flume is 70' long with vegetation and sand on both banks.

Twenty-eight inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E2485 MDA G-6U

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	.01	0	0	0
11	.07	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0*	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	.01	0	0	0	0
22	0	0	0*	0	0*	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	.02	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.07	0	0	0	0	0	0	0.01	0.01	0.02	0	0
Mean	.002	0	0	0	0	0	0	0	0	.001	0	0
Max	.07	0	0	0	0	0	0	.01	.01	.02	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.14	0	0	0	0	0	0	.02	.02	.04	0	0
Wtr Year	2009	Total	0.11	Mean	0	Max	.07	Min	0	Acre-Ft	.22	
Cal Year	2008	Total	0.31	Mean	.001	Max	.16	Min	0	Acre-Ft	.61	

*Estimate

E249 MDA G-4

Location. Lat 35° 49' 42", long 106° 14' 17", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.007 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger 9" Parshall flume. Elevation of gage is 6,602 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 1.20 ft³/s, July 17, 2008, gage height 0.54 ft. No flow most of the time

Extremes for Current Year. No peak discharge above 1.0 ft³/s. No flow for the year.



E249 MDA G-4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Field Work. The station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 11 to January 24 and March 26–29 when gage height was affected by ice.

Rating. The control for this station is the 9" Parshall flume. The channel is straight 20' above and below gage. The streambed is sand and boulders.

Fifteen inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of a 9" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations.

Remarks. Records are good.

E249 MDA G-4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0	0*	0	0	0	0	0	0	0	0
10	0	0	0	0*	0	0	0	0	0	0	0	0
11	0	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0*	0	0	0	0	0	0	0	0
17	0	0	0*	0*	0	0	0	0	0	0	0	0
18	0	0	0*	0*	0	0	0	0	0	0	0	0
19	0	0	0*	0*	0	0	0	0	0	0	0	0
20	0	0	0*	0*	0	0	0	0	0	0	0	0
21	0	0	0*	0*	0	0	0	0	0	0	0	0
22	0	0	0*	0*	0	0	0	0	0	0	0	0
23	0	0	0*	0*	0	0	0	0	0	0	0	0
24	0	0	0*	0*	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0*	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	0.07	Mean	0	Max	.04	Min	0	Acre-Ft	.14	

*Estimate

E2495 MDA G-7

Location. Lat 35° 49' 47", long 106° 14' 05", Sec. 31, T. 19 N., R. 7 E., Ramon Vigil Grant, Los Alamos County on left bank.

Drainage Area. 0.01 mi².

Period of Record. October 1, 2005, to September 30, 2009.

Gage. Data logger and 9" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 6,633 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 5.7 ft³/s, August 7, 2006, gage height 1.50 ft. No flow most of the time.

Extremes for Current Year. Peak discharges above 1.0 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1345	1.82*	0.71*
May 23	1215	1.03	0.41
June 10	0610	1.51	0.63
September 6	2210	1.16	0.53
September 16	0210	1.33	0.58

No flow most of the time.



E2495 MDA G-7

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume with cellular phone and speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 28 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 17 to January 3, 7, 8, March 26–28 when gage height was affected by ice and March 11–19 and July 24–27 when the data logger malfunctioned.

Rating. The channel is straight above and below gage. It is confined to the main channel by cut banks on both sides. The bottom is 4' wide channel; both banks should be very stable. Low-water control is the 9" Parshall flume.

Twenty-seven visits of no flow and one inspection of observed flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. Point of zero flow is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E2495 MDA G-7

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	.04	0	0	0	0	0	0	0	0	0	0	0
5	.02	0	0	0	0	0	0	0	0	.01	0	0
6	0	0	0	0	0	0	0	0	0	0	0	.05
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	.08	0	0	0
11	.18	0	0	0	0	0*	.06	0	0	0	0	0
12	0	0	0	0	0	0*	.01	0	0	0	0	0
13	0	0	0	0	0	0*	.01	0	0	0	0	0
14	.05	0	0	0	0	0*	0	0	0	0	0	0
15	0	0	0	0	0	0*	0	0	0	0	0	0
16	0	0	0	0	0	0*	0	0	0	0	0	.10
17	0	0	0*	0	0	0*	.02	0	0	0	0	.03
18	0	0	0*	0	0	0*	0	0	0	0	0	0
19	0	0	0*	0	0	0*	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	.01	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	.03	0	0	0	.01
24	0	0	0*	0	0	0	0	.02	0	0*	0	.02
25	0	0	0*	0	0	0	0	0	0	0*	0	0
26	0	0	0*	0	0	0*	0	0	0	.10*	0	0
27	0	.04	0*	0	0	0*	0	.01	0	0*	0	0
28	0	0	0*	0	0	0*	0	0	0	.01	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	.03	.01	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.29	0.04	0	0	0	0	0.10	0.06	0.09	0.15	0.01	0.21
Mean	.009	.001	0	0	0	0	.003	.002	.003	.005	0	.007
Max	.18	.04	0	0	0	0	.06	.03	.08	.10	.01	.10
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.58	.08	0	0	0	0	.20	.12	.18	.30	.02	.42
Wtr Year	2009	Total	0.95	Mean	.003	Max	.18	Min	0	Acre-Ft	1.9	
Cal Year	2008	Total	0.96	Mean	.003	Max	.18	Min	0	Acre-Ft	1.9	

*Estimate

E250 Pajarito Canyon above SR 4

Location. Lat 35° 49' 26", long 106° 13' 40", Sec. 5, T. 18 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 10.6 mi².

Period of Record. November 1993 to August 25, 2006 (destroyed by flood); September 2006 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger with cellular telemetry and concrete control. Elevation of gage is 6,528 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, 0.05 ft³/s, 37 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 206 ft³/s, August 25, 2006, gage height 4.62 ft (from peak flow computations). No flow most of the time.

Extremes for Current Water Year. No peak discharge above base of 5.0 ft³/s. No flow for the year.



E250 Pajarito Canyon above SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) and cellular phone with speech modem. The system is powered by a solar panel battery system housed in NEMA shelter on 18" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Field Work. The station was visited 24 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Most recent levels run November 17, 2004, found gage within acceptable limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the period from July 8–28 when data logger malfunctioned.

Rating. The channel is straight for 50' above and 100' below gage. Streambed material is gravel. The control is concrete with a 90° weir plate.

Twenty-four inspections of no flow were made this year.

Rating No. 1 was developed from 90° weir plate formula and broad-crested weir computation above notch. Rating No. 1 was continued in use and is considered good.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good. Access to this station is controlled by DX access control.

E250 Pajarito Canyon above SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0*	0	0
9	0	0	0	0	0	0	0	0	0	0*	0	0
10	0	0	0	0	0	0	0	0	0	0*	0	0
11	0	0	0	0	0	0	0	0	0	0*	0	0
12	0	0	0	0	0	0	0	0	0	0*	0	0
13	0	0	0	0	0	0	0	0	0	0*	0	0
14	0	0	0	0	0	0	0	0	0	0*	0	0
15	0	0	0	0	0	0	0	0	0	0*	0	0
16	0	0	0	0	0	0	0	0	0	0*	0	0
17	0	0	0	0	0	0	0	0	0	0*	0	0
18	0	0	0	0	0	0	0	0	0	0*	0	0
19	0	0	0	0	0	0	0	0	0	0*	0	0
20	0	0	0	0	0	0	0	0	0	0*	0	0
21	0	0	0	0	0	0	0	0	0	0*	0	0
22	0	0	0	0	0	0	0	0	0	0*	0	0
23	0	0	0	0	0	0	0	0	0	0*	0	0
24	0	0	0	0	0	0	0	0	0	0*	0	0
25	0	0	0	0	0	0	0	0	0	0*	0	0
26	0	0	0	0	0	0	0	0	0	0*	0	0
27	0	0	0	0	0	0	0	0	0	0*	0	0
28	0	0	0	0	0	0	0	0	0	0*	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	26.14	Mean	.071	Max	3.2	Min	0	Acre-Ft	52	52

*Estimate

E252 Water Canyon above SR 501

Location. Lat 35° 50' 18", long 106° 21' 42", Sec. 36, T. 19 N., R. 5 E., Los Alamos County in Santa Fe National Forest.

Drainage Area. 3.25 mi².

Period of Record. October 1994 to June 2000 (destroyed by flood); April 2001 to September 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger with cellular telemetry. Elevation of gage is 7,553 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, 0.11 ft³/s, 83 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 840 ft³/s on June 28, 2000, from peak flow computation, gage height 7.91 ft. No flow at times.

Extremes for Current Year. Maximum discharge 0.21 ft³/s at 0610 h, May 2, gage height 2.53 ft. No peak discharges above base of 2.0 ft³/s. Minimal flow most of the time.



E252 Water Canyon above SR 501

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval), with shaft encoder float system (5-min. interval) and cellular phone with speech modem. The system is powered by a solar panel battery system housed in NEMA shelter on 24" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. There is no low-water control. No provision for direct discharge measurements above wading stages.

Field Work. The station was visited 22 times to conduct discharge measurement and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels run when gage was established April 16, 2001. New gage is at same datum as old and is about 20' upstream.

Gage-Height Record. The data logger referenced to the inside staff and reference point gave a complete and satisfactory record for the year.

Rating. The channel at the gage is 30' wide and straight for about 40' upstream then bends to the left; downstream the gage is straight for 100'. The streambed through this reach is primary sand, gravel, and cobbles. Low-flow control is rock riffle 5' below gage. The channel has been scoured and filled significantly by high flows resulting from the Cerro Grande fire.

Two discharge measurements (Nos. 57–58) were made this year. Small shifts were applied based on PZF.

Rating No. 3 should be considered good except for the extreme lower end (less than 0.5 ft³/s), which will continue to change back and forth in response to high flows. Steep slopes in the gage reach and throughout the region cause considerable movement of material either scours or fills. Low-water records at this site will continue to be a problem until increased runoff from the burned areas returns to something close to pre-fire conditions.

Discharge. Discharge was computed by applying inside gage height to Rating No. 3 directly.

Remarks. Records are good.

E252 Water Canyon above SR 501

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
2	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
3	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
4	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
5	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.05	.03
6	.01	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
7	0	.06	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03
8	0	.06	.06	.07	.07	.07	.11	.17	.06	.06	.05	.03
9	0	.06	.06	.07	.07	.07	.11	.17	.06	.06	.04	.03
10	.01	.07	.06	.07	.07	.08	.11	.17	.06	.06	.04	.03
11	.01	.07	.06	.07	.07	.08	.11	.17	.06	.05	.04	.03
12	.01	.07	.06	.07	.07	.09	.11	.17	.06	.06	.03	.03
13	.01	.07	.07	.07	.07	.09	.11	.17	.06	.06	.03	.03
14	.01	.07	.07	.07	.07	.09	.11	.17	.06	.06	.03	.03
15	.01	.07	.07	.07	.07	.09	.11	.17	.06	.06	.03	.03
16	.01	.07	.07	.07	.07	.10	.11	.17	.06	.06	.03	.03
17	.01	.06	.07	.07	.07	.10	.11	.17	.05	.06	.03	.04
18	.01	.06	.07	.07	.07	.11	.11	.17	.04	.06	.03	.04
19	.01	.06	.07	.07	.07	.11	.11	.15	.04	.06	.03	.04
20	.01	.06	.07	.07	.07	.11	.11	.14	.04	.05	.03	.04
21	.01	.06	.07	.07	.07	.11	.11	.14	.05	.05	.03	.04
22	.01	.06	.07	.07	.07	.11	.13	.14	.06	.06	.03	.04
23	.01	.06	.07	.07	.07	.11	.14	.14	.06	.06	.03	.04
24	.01	.06	.07	.07	.07	.11	.14	.08	.06	.05	.03	.04
25	.01	.06	.07	.07	.07	.11	.17	.06	.06	.05	.03	.04
26	.01	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03	.04
27	.01	.06	.07	.07	.07	.11	.17	.06	.06	.06	.03	.04
28	.01	.06	.07	.07	.07	.11	.17	.06	.05	.06	.03	.04
29	.01	.06	.07	.07	----	.11	.17	.06	.06	.06	.03	.04
30	.05	.06	.07	.07	----	.11	.17	.06	.06	.06	.03	.04
31	.06	----	.07	.07	----	.11	----	.06	----	.06	.03	----
Total	0.37	1.87	2.05	2.17	1.96	2.89	3.74	4.27	1.71	1.81	1.18	1.04
Mean	.012	.062	.066	.070	.070	.093	.12	.14	.057	.058	.038	.035
Max	.06	.07	.07	.07	.07	.11	.17	.17	.06	.06	.06	.04
Min	0	.06	.06	.07	.07	.07	.11	.06	.04	.05	.03	.03
Acre-Ft	.73	3.7	4.1	4.3	3.9	5.7	7.4	8.5	3.4	3.6	2.3	2.1
Wtr Year	2009	Total	25.06	Mean	.069	Max	.17	Min	0	Acre-Ft	50	
Cal Year	2008	Total	80.28	Mean	.22	Max	1.6	Min	0	Acre-Ft	159	

E2525 Water Canyon above S Site Canyon

Location. Lat 35° 49' 50", long 106° 18' 26", Sec. 33, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 5.64 mi².

Period of Record. October 1, 2008, to September 30, 2009.

Gage. Data logger and 90° sharp-crested weir. Elevation of gage is 6,980 ft above NGVD from GPS survey.

Remarks. Records are good. Records for this site existed before published record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge 0.27 ft³/s, June 10, 2009, gage height 1.13 ft.

Extremes for Current Year. Maximum discharge of 0.27 ft³/s at 0940 h, June 10, gage height of 1.13 ft. No peak discharge above base of 1.00 ft³/s.



E2525 Water Canyon above S Site Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 16 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Level run February 27, 2006, show gage to be within allowable limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the period from November 16 to February 26 when gage height was affected by ice.

Rating. The channel is straight 50' above and below the gage 30' then forks to the right. The streambed consists of rock and cobble. The banks are stable with vegetation.

Eight discharge measurements (Nos. 33–40) and five inspections of no flow were made this year.

Rating No. 2 was developed using the current-year measurements and one critical depth computation.

Discharge. Discharge was computed by applying gage height to Rating No. 2 directly.

Remarks. Records are good.

E2525 Water Canyon above S Site Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	.03*	.03*	.09*	.08	.11	.14	.18	.10	0	0	0
2	0	.03*	.03*	.09*	.08*	.12	.14	.19	.11	0	0	0
3	0	.03*	.03*	.16	.07	.15	.14	.19	.12	0	0	0
4	0	.03*	.03*	.12	.08*	.18	.14	.18	.11	0	0	0
5	0	.03*	.03*	.11	.08	.15	.14	.18	.09	0	0	0
6	0	.03*	.03*	.09	.08*	.14	.14	.18	.06	0	0	0
7	0	.03*	.03*	.07	.08*	.11	.13	.17	.03	0	0	0
8	0	.03*	.03*	.07	.08	.10	.14	.17	0	0	0	0
9	0	.03*	.03*	.08	.07	.10	.14	.17	0	0	0	0
10	0	.03*	.03*	.07	.07*	.10	.14	.17	.14	0	0	0
11	0	.03*	.02	.07	.07*	.09	.19	.17	.10	0	0	0
12	0	.03*	.04	.07	.07*	.09	.18	.16	.06	0	0	0
13	.03*	.03*	.08	.07	.07*	.11	.19	.16	.02	0	0	0
14	.03*	.03*	.07*	.08	.07*	.10	.19	.16	.02	0	0	0
15	.03*	.03*	.07*	.08	.07*	.10	.17	.15	.02	0	0	0
16	.03*	.03*	.07*	.07	.07*	.10	.15	.15	0	0	0	0
17	.03*	.03*	.07*	.07	.07	.10	.16	.15	0	0	0	0
18	.03*	.03*	.07*	.07	.06	.10	.18	.14	0	0	0	0
19	.03*	.03*	.07*	.07	.05	.10	.18	.14	0	0	0	0
20	.03*	.03*	.06	.07*	.06	.10	.17	.13	.04	0	0	0
21	.03*	.03*	.05	.07*	.08*	.10	.16	.14	.03	0	0	0
22	.03*	.03*	.07	.08	.08*	.10	.16	.16	0	0	0	0
23	.03*	.03*	.10	.09	.09	.09	.16	.20	0	0	0	0
24	.03*	.03*	.07	.05*	.10	.09	.16	.17	0	0	0	.01
25	.03*	.03*	.09	.05*	.10*	.10	.16	.15	0	0	0	0
26	.03*	.03*	.09*	.05*	.10*	.11	.17	.13	0	.03	0	0
27	.03*	.03*	.09*	.05*	.13	.13	.18	.15	0	0	0	0
28	.03*	.03*	.09*	.06	.12	.14	.18	.13	0	0	0	0
29	.03*	.03*	.09*	.07	----	.14	.18	.11	0	0	0	0
30	.03*	.03*	.09*	.06	----	.14	.18	.11	0	.01	0	0
31	.03*	----	.09*	.08	----	.14	----	.11	----	.02	0	----
Total	0.57	0.90	1.84	2.38	2.23	3.53	4.84	4.85	1.05	0.06	0	0.01
Mean	.018	.030	.059	.077	.080	.11	.16	.16	.035	.002	0	0
Max	.03	.03	.10	.16	.13	.18	.19	.20	.14	.03	0	.01
Min	0	.03	.02	.05	.05	.09	.13	.11	0	0	0	0
Acre-Ft	1.1	1.8	3.6	4.7	4.4	7.0	9.6	9.6	2.1	.12	0	.02
Wtr Year	2009	Total	22.26	Mean	.061	Max	.20	Min	0	Acre-Ft	44	
Cal Year	2008	Total	36.14	Mean	.099	Max	3.8	Min	0	Acre-Ft	72	

*Estimate

E2528 S Site Canyon above Water Canyon

Location. Lat 35° 49' 51", long 106° 18' 27", Sec. 33, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.76 mi².

Period of Record. April 1999 to September 30, 2009.

Revised Record. Drainage Area (2006)

Gage. Data logger and 90° sharp-crested weir. Elevation of gage is 6,840 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 10 yr, 0.006 ft³/s, 4.3 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, of 162 ft³/s, August 20, 2004, gage height 4.03 ft. No flow most of the time.

Extremes for Current Year. No peak discharge above base of 10 ft³/s. No flow for the year.



E2528 S Site Canyon above Water Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Milltronics sonic probe. The system is powered by a solar panel battery system housed in a NEMA shelter on left bank. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 14 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 3 to January 15, 17, 21, 30, February 4, 9, 10, 17, March 4, 7, 8, 15, 26, 27, and April 12, 17 when gage height was affected by ice.

Rating. Control is 90° weir with 2' deep notch. Canyon is very steep directly above station, but does flatten out enough to allow weir to be effective.

Fourteen inspections of no flow were made this year.

Rating No. 1 was developed using weir formula and one critical depth computation. Rating No. 1 is considered fair. Large shifts were applied to the low end (PZF) because of filling in the pool. These are most likely to change over time when fill conditions occur.

Discharge. Discharge was computed by applying gage height to Rating No. 1 with V diagrams adjusting the PZF. Those periods estimated at zero flow were based on precipitation and adjoining stations E2525 and E262.

Remarks. Records are good.

E2528 S Site Canyon above Water Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0*	0*	0	0	0	0	0	0	0	0
4	0	0	0*	0*	0*	0*	0	0	0	0	0	0
5	0	0	0*	0*	0	0	0	0	0	0	0	0
6	0	0	0*	0*	0	0	0	0	0	0	0	0
7	0	0	0*	0*	0	0*	0	0	0	0	0	0
8	0	0	0*	0*	0	0*	0	0	0	0	0	0
9	0	0	0*	0*	0*	0	0	0	0	0	0	0
10	0	0	0*	0*	0*	0	0	0	0	0	0	0
11	0	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0*	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0*	0	0*	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0*	0*	0	0*	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0*	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0*	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	6.80	Mean	.019	Max	3.5	Min	0	Acre-Ft	13	13

*Estimate

E253 Cañon de Valle above SR 501

Location. Lat 35° 51' 6", long 106° 21' 17", NE ¼, Sec. 25, T. 19 N., R. 5 E., Los Alamos County in Santa Fe National Forest.

Drainage Area. 2.27 mi².

Period of Record. October 1994 to June 2000 (gage destroyed by flood); January 31, 2001, to September 30, 2009.

Gage. Data logger and 120° weir plate, rain gage with cellular telemetry. Elevation of gage is 7,701 ft above NGVD from GPS survey.

Remarks. Records are good.

Average Discharge. 15 yr, 0.02 ft³/s, 16 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 740 ft³/s, June 28, 2000, from peak flow computation, gage height 8.42 ft. No flow most of the time.

Extremes for Current Year. No peak discharge above base of 5.0 ft³/s. No flow for the year.



E253 Cañon del Valle above SR 501

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) and cellular phone with speech modem. The system is powered by a solar panel battery system housed in NEMA shelter on 24" CMP well, 16' long attached to a 60' metal walkway. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Station is also equipped with a rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 43 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels were run in April 16, 2001, when gage was reestablished.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the periods from March 4–20 and May 11–19 when data logger malfunctioned.

Rating. The channel at the gage is about 8' wide and straight for about 50' upstream then bends to the left and straight for 100' downstream and bends to the right. The streambed through this reach is primarily gravel with cobbles. The low-flow control is a 120° sharp-crested weir. The channel becomes the control at high flow.

Forty-three inspections of no flow were made this year.

Rating No. 2 is based on four discharge measurements, one critical depth computation, and theoretical computation for 120° sharp-crested weir to a gage height of 2.30 feet. Broad-crested weir computation is used above that stage.

Discharge. Discharge was computed by applying gage height to Rating No. 2 directly with one variable shift applied. Those days estimated at zero flow were based on precipitation and nearby stations.

Remarks. Records are good.

E253 Cañon del Valle above SR 501

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0*	0	0	0	0	0	0
5	0	0	0	0	0	0*	0	0	0	0	0	0
6	0	0	0	0	0	0*	0	0	0	0	0	0
7	0	0	0	0	0	0*	0	0	0	0	0	0
8	0	0	0	0	0	0*	0	0	0	0	0	0
9	0	0	0	0	0	0*	0	0	0	0	0	0
10	0	0	0	0	0	0*	0	0	0	0	0	0
11	0	0	0	0	0	0*	0	0*	0	0	0	0
12	0	0	0	0	0	0*	0	0*	0	0	0	0
13	0	0	0	0	0	0*	0	0*	0	0	0	0
14	0	0	0	0	0	0*	0	0*	0	0	0	0
15	0	0	0	0	0	0*	0	0*	0	0	0	0
16	0	0	0	0	0	0*	0	0*	0	0	0	0
17	0	0	0	0	0	0*	0	0*	0	0	0	0
18	0	0	0	0	0	0*	0	0*	0	0	0	0
19	0	0	0	0	0	0*	0	0*	0	0	0	0
20	0	0	0	0	0	0*	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0

*Estimate

E256 Cañon de Valle below MDA P

Location. Lat 35° 51' 01", long 106° 19' 57", Sec. 29, T.19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 3.13 mi².

Period of Record. January 24, 2002, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 24" Parshall flume. Elevation of gage is 7,329 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 7 yr, 0.03 ft³/s, 41 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 19 ft³/s, August 24, 2005, gage height 1.74 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 0.19 ft³/s at 1125 h, October 11, gage height of 0.18 ft. No peak discharge above base of 10 ft³/s.



E256 Cañon del Valle below MDA P

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor within 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter on left bank. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. An outside staff is available for reference. There is no provision for discharge measurement above wading stage.

Field Work. The station was visited 15 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Corrections. None.

Gage-Height Record. The data logger referenced to the inside staff gave a complete and satisfactory record, except for the periods from December 15 to January 3 and January 11 to February 28 when gage height was affected by ice.

Rating. The channel is straight for 50' upstream and 20' downstream from gage. The streambed consists of sand with gravel subject to fill behind flume from flow events and gage silting problems. The banks are covered with vegetation.

Fifteen observations of flow were made this year.

Rating No. 1 is based on 24" Parshall flume.

Discharge. Discharge computed by applying gage height to Rating No. 1 using variable shift diagrams.

Remarks. Records are good.

E256 Cañon del Valle below MDA P

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.04	.06	.06	.03*	.03*	.02	.04	.02	.02	.01	.01	0
2	.04	.06	.06	.03*	.03*	.02	.03	.02	.02	.01	.01	0
3	.04	.06	.06	.03*	.03*	.03	.04	.02	.03	.02	.01	0
4	.05	.06	.07	.04	.03*	.03	.04	.02	.03	.02	.01	0
5	.05	.06	.05*	.03	.03*	.03	.05	.02	.02	.03	.01	0
6	.05	.06	.05*	.03	.02*	.03	.06	.02	.02	.02	.01	.01
7	.05	.06	.05*	.04	.02*	.03	.07	.02	.02	.02	.01	.01
8	.06	.06	.05*	.03	.02*	.03	.07	.02	.02	.02	0	.01
9	.05	.06	.05*	.03	.02*	.03	.06	.02	.02	.02	0	.01
10	.05	.06	.05*	.04	.02*	.02	.06	.02	.03	.02	0	.01
11	.07	.06	.02*	.03*	.02*	.02	.06	.02	.03	.01	0	.01
12	.06	.06	.02*	.03*	.02*	.02	.04	.02	.02	.01	.01	.02
13	.05	.06	.02*	.03*	.02*	.02	.05	.02	.02	.01	0	.02
14	.06	.06	.02*	.03*	.02*	.02	.04	.02	.02	.01	.02	.02
15	.05	.06	.02*	.03*	.02*	.02	.04	.02	.02	.01	.01	.02
16	.05	.06	.03*	.03*	.02*	.02	.03	.02	.02	.01	0	.02
17	.05	.06	.03*	.03*	.02*	.02	.02	.02	.02	.01	0	.03
18	.05	.06	.03*	.03*	.02*	.02	.03	.02	.02	0	0	.03
19	.06	.06	.03*	.03*	.02*	.02	.03	.02	.02	0	0	.02
20	.06	.06	.03*	.03*	.02*	.02	.03	.02	.03	.01	0	.03
21	.06	.06	.03*	.03*	.02*	.02	.03	.02	.02	.01	0	.03
22	.06	.06	.03*	.03*	.02*	.02	.03	.02	.02	.01	0	.03
23	.06	.06	.03*	.03*	.02*	.02	.03	.03	.02	.01	0	.03
24	.06	.06	.03*	.03*	.02*	.02	.02	.03	.02	.01	.01	.04
25	.06	.06	.03*	.03*	.02*	.01	.02	.02	.02	.01	0	.04
26	.06	.06	.03*	.03*	.02*	.02	.02	.02	.02	.02	0	.04
27	.06	.07	.03*	.03*	.02*	.07	.02	.04	.02	.01	0	.04
28	.06	.06	.03*	.03*	.02*	.07	.02	.03	.02	.02	0	.05
29	.06	.06	.03*	.03*	----	.06	.02	.03	.01	.02	0	.05
30	.06	.06	.03*	.03*	----	.06	.02	.03	.02	.02	.01	.05
31	.06	----	.03*	.03*	----	.04	----	.03	----	.02	.01	----
Total	1.70	1.81	1.13	0.96	0.61	0.88	1.12	0.70	0.64	0.43	0.14	0.67
Mean	.055	.060	.036	.031	.022	.028	.037	.023	.021	.014	.005	.022
Max	.07	.07	.07	.04	.03	.07	.07	.04	.03	.03	.02	.05
Min	.04	.06	.02	.03	.02	.01	.02	.02	.01	0	0	0
Acre-Ft	3.4	3.6	2.2	1.9	1.2	1.7	2.2	1.4	1.3	.85	.28	1.3
Wtr Year	2009	Total	10.79	Mean	.030	Max	.07	Min	0	Acre-Ft	21	
Cal Year	2008	Total	19.82	Mean	.054	Max	2.6	Min	0	Acre-Ft	39	

*Estimate

E2565 Cañon del Valle at Q Site

Location. Lat 35° 50' 52", long 106° 19' 0.9", Sec. 28, T.19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.00 mi²; 0.11 acre.

Period of Record. October 1, 2007, to September 30, 2009.

Gage. Data logger and 24" Parshall flume. Elevation of gage is 7,346 ft above NGVD from GPS survey.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge 1.0 ft³/s, August 8, 2008, gage height 0.26 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 0.87 ft³/s at 1230 h, April 17, gage height of 0.26 ft. No peak discharge above base of 1.0 ft³/s.



E2565 Cañon del Valle at Q Site

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 23 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Corrections. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 9 to January 15, 18, February 12, 13, 15–24, February 26, 27, and March 3, 5, 26–28 when gage height was affected by ice.

Rating. The channel is lined with angular rock and filter fabric. It is confined to the main channel. The bottom is a 4' wide channel and prone to some shifting with vegetation on each bank. Low-water control is the 12" Parshall flume.

Twenty-three inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 12" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E2565 Cañon del Valle at Q Site

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0*	0	0	.01	0	0	0
4	.01	0	0	0*	0	0	0	0	0	0	0	0
5	.01	0	0	0*	0	0*	0	0	0	.01	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	.02
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	.01
10	0	0	0*	0*	0	0	0	0	.01	0	0	0
11	.01	0	0*	0*	0	0	.06	0	0	0	0	.01
12	0	0	0*	0*	0*	0	0	0	0	0	.01	0
13	0	0	0*	0*	0*	0	0	0	0	0	.01	0
14	0	0	0*	0*	0	0	0	0	0	0	.01	.01
15	0	0	0*	0*	0*	0	0	0	0	0	0	.01
16	0	0	0*	0	0*	0	0	0	0	0	0	.01
17	0	0	0*	0	0*	0	.03	0	0	0	0	.01
18	0	0	0*	0*	0*	0	0	0	0	0	0	0
19	0	0	0*	0	0*	0	0	0	0	0	0	0
20	0	0	0*	0	0*	0	0	0	.01	0	0	0
21	0	0	0*	0	0*	0	0	.01	0	0	0	0
22	0	0	0*	0	0*	0	0	.01	0	0	0	0
23	0	0	0*	0	0*	0	0	.02	0	0	0	0
24	0	0	0*	0	0*	0	0	.01	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0*	0*	0	0	0	0	0	0
27	0	0	0*	0	0*	0*	0	.01	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	.01	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.03	0	0	0	0	0	0.09	0.06	0.03	0.02	0.03	0.08
Mean	.001	0	0	0	0	0	.003	.002	.001	.001	.001	.003
Max	.01	0	0	0	0	0	.06	.02	.01	.01	.01	.02
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.06	0	0	0	0	0	.18	.12	.06	.04	.06	.16
Wtr Year	2009	Total	0.34	Mean	.001	Max	.06	Min	0	Acre-Ft	.67	
Cal Year	2008	Total	0.99	Mean	.003	Max	.08	Min	0	Acre-Ft	2.0	

*Estimate

E257 Cañon del Valle Tributary at Burn Grounds

Location. Lat 35° 50' 47", long 106° 19' 50", Sec. 29, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.040 mi².

Period of Record. October 1, 2002, to September 30, 2009.

Gage. Data logger and 12" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 7,359 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable. Legal location based on projected values.

Average Discharge. 7 yr, 0.01 ft³/s, 9 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 9.5 ft³/s, August 29, 2007, gage height 1.77 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 0.71 ft³/s at 1320 h, April 17, gage height 0.32 ft. No peak discharges above base of 3.0 ft³/s.



E257 Cañon del Valle Tributary at Burn Grounds

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 12" Parshall flume and cellular phone with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 12" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 34 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra data base.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 9 to January 7, 24, 25, January 28 to February 3, 8, 9, 15, and March 24–29 when gage height was affected by ice.

Rating. The channel is straight above and below gage. It is confined to the main channel by cut banks on both sides. The bottom is 10' wide; channel is prone to some shifting with vegetation on each bank. Low-water control is the 12" Parshall flume.

Thirty-four inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 12" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E257 Cañon del Valle Tributary at Burn Grounds

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0*	0	0	0	0	0	0	0
2	0	0	0	0*	0*	0	0	0	0	0	0	0
3	0	0	0	0*	0*	0	0	0	.01	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	.01	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0	0*	0	0	0	0	0	0	0
9	0	0	0*	0	0*	0	0	0	0	0	0	0
10	0	0	0*	0	0	0	0	0	.01	0	0	0
11	.01	0	0*	0	0	0	.02	0	0	0	0	0
12	0	0	0*	0	0	0	0	0	0	0	0	0
13	0	0	0*	0	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0*	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	.05	0	0	0	0	.01
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0*	0	0*	0	0	0	0	0	.01
25	0	0	0*	0*	0	0*	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	.01	0	0	0	0
28	0	0	0*	0*	0	0*	0	0	0	0	0	0
29	0	0	0*	0*	----	0*	0	0	0	0	0	0
30	0	0	0*	0*	----	0	0	0	0	.01	0	0
31	0	----	0*	0*	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0.07	0.01	0.02	0.02	0	0.02
Mean	0	0	0	0	0	0	.002	0	.001	.001	0	.001
Max	.01	0	0	0	0	0	.05	.01	.01	.01	0	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	.14	.02	.04	.04	0	.04
Wtr Year	2009	Total	0.15	Mean	0	Max	.05	Min	0	Acre-Ft	.30	
Cal Year	2008	Total	1.01	Mean	.003	Max	.40	Min	0	Acre-Ft	2.0	

*Estimate

E262 Cañon de Valle above Water Canyon

Location. Lat 35° 49' 51", long 106° 18' 14", Sec. 33, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 4.32 mi².

Period of Record. October 1, 1998, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 90° weir plate. Elevation of gage is 6,840 ft above NGVD.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 10 yr, 0.012 ft³/s, 8.7 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 63 ft³/s, August 20, 2004, gage height 4.10 ft. No flow most of the time.

Extremes for Current Year. No peak discharge above base of 5.0 ft³/s. No flow for the year.



E262 Cañon del Valle above Water Canyon

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 6" channel cantilevered spanning into stream. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. The station was visited 14 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from November 19, 20 when data logger malfunctioned and December 15 to January 15, 21, February 5, March 27, and April 3, 17 when gage height was affected by ice.

Rating. The channel is about 10' wide and straight for about 50' upstream and straight for about 30' downstream. The streambed through this reach is primarily rock with gravel, sand, and cobbles.

Fourteen inspections of no flow were made this year.

Rating No. 1 is based on a theoretical computation for 90° sharp-crested weir up to a gage height of 2.95 ft. Broad-crested weir computation is used above that stage.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E262 Cañon del Valle above Water Canyon

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0*	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0*	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0	0*	0	0	0	0	0	0	0	0
10	0	0	0	0*	0	0	0	0	0	0	0	0
11	0	0	0	0*	0	0	0	0	0	0	0	0
12	0	0	0	0*	0	0	0	0	0	0	0	0
13	0	0	0	0*	0	0	0	0	0	0	0	0
14	0	0	0	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0*	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0*	0*	0	0	0	0	0	0	0	0	0
20	0	0*	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0*	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	1.38	Mean	.004	Max	.98	Min	0	Acre-Ft	2.7	

*Estimate

E2624 Phermex

Location. Lat 35° 49' 57", long 106° 17' 47", Sec. 34, T. 19 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.008 mi².

Period of Record. October 1, 2008, to September 30, 2009.

Gage. Data logger and 24" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 6,998 ft above NGVD.

Remarks. Records are good. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 0.71 ft³/s, July 28, 2009, gage height 0.21 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 0.71 ft³/s at 1250 h, July 28, gage height 0.21 ft. No peak discharges above base of 1.0 ft³/s.



E2624 Phermex

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 24" Parshall flume. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 24" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 37 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods of November 15 to December 2 when data logger malfunctioned and December 3 to January 31, February 11, and March 6, 9–19, 21, 26–31 when gage height was affected by ice.

Rating. Channel is straight above and below gage. The streambed consists of mostly sand. The flume is subject to silting after storm events.

Thirty-seven inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 24" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E2624 Phermex

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0*	0*	0	0	0	0	0	0	0	.01
2	0	0	0*	0*	0	0	0	0	.01	0	0	0
3	0	0	0*	0*	0	0	0	0	.02	0	0	0
4	.02	0	0*	0*	0	0	0	0	0	0	0	0
5	.04	0	0*	0*	0	0	0	0	0	.03	0	0
6	0	0	0*	0*	0	0*	0	0	0	.01	0	.01
7	0	0	0*	0*	0	0	0	0	0	0	0	0
8	0	0	0*	0*	0	0	0	0	0	0	0	.01
9	0	0	0*	0*	0	0*	0	0	0	0	0	0
10	0	0	0*	0*	0	0*	0	0	.05	0	0	.01
11	.05	0	0*	0*	0*	0*	0*	0	0	0	0	0
12	0	0	0*	0*	0	0*	0*	0	0	0	0	0
13	0	0	0*	0*	0	0*	0	0	0	0	.03	0
14	.04	0	0*	0*	0	0*	0	0	0	0	.06	0
15	0	0*	0*	0*	0	0*	0	0	0	0	0	0
16	0	0*	0*	0*	0	0*	0	0	0	0	0	.02
17	0	0*	0*	0*	0	0*	0*	0	0	0	0	0
18	0	0*	0*	0*	0	0*	0	0	0	0	0	0
19	0	0*	0*	0*	0	0*	0	0	0	0	0	0
20	0	0*	0*	0*	0	0	0	0	.04	0	0	0
21	0	0*	0*	0*	0	0	0	.03	0	0	0	0
22	0	0*	0*	0*	0	0*	0	.07	0	0	0	0
23	0	0*	0*	0*	0	0	0	.06	0	.02	.01	.01
24	0	0*	0*	0*	0	0	0	0	0	0	.01	.02
25	0	0*	0*	0*	0	0	0	0	0	0	0	0
26	0	0*	0*	0*	0	0*	0	0	0	.02	0	0
27	0	0*	0*	0*	0	0*	0	.02	0	0	0	0
28	0	0*	0*	0*	0	0*	0	0	0	.03	0	0
29	0	0*	0*	0*	----	0*	0	0	0	.01	0	0
30	0	0*	0*	0*	----	0*	0	0	0	.01	.01	0
31	0	----	0*	0*	----	0*	----	0	----	.01	.01	----
Total	0.15	0	0	0	0	0	0	0.18	0.12	0.14	0.13	0.09
Mean	.005	0	0	0	0	0	0	.006	.004	.005	.004	.003
Max	.05	0	0	0	0	0	0	.07	.05	.03	.06	.02
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.30	0	0	0	0	0	0	.36	.24	.28	.26	.18
Wtr Year	2009	Total	0.81	Mean	.002	Max	.07	Min	0	Acre-Ft	1.6	
Cal Year	2008	Total	0.38	Mean	.003	Max	.07	Min	0	Acre-Ft	.75	

*Estimate

E2625 Water Canyon below MDA AB

Location. Lat 35° 49' 31", long 106° 17' 03", Sec. 3, T. 18 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 11.55 mi².

Period of Record. October 1, 2001, to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and 90° weir plate. Elevation of gage is 6,666 ft above NGVD.

Remarks. Records are fair. Legal location based on projected values. Record existed before period of record but are not reliable.

Average Discharge. 8 yr, 0.13 ft³/s, 97 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 306 ft³/s, August 29, 2007, gage height 4.57 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 2.7 ft³/s at 0705 h, June 25, gage height 1.93 ft. No peak discharges above base of 10 ft³/s.



E2625 Water Canyon below MDA AB

Station Analysis

2009 Water Year

Equipments. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 6" channel cantilevered over the stream. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provisions are made for measurement above wading stage.

Field Work. The station was visited 13 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels on May 29, 2009, found gage within allowable limits.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the periods from December 9 to January 15, March 26–28, and April 12, 13 when gage height was affected by ice.

Rating. The channel is about 20' wide and straight for about 75' upstream and about 100' downstream. The streambed through this reach is primarily sand and cobbles. The low-water control is a 90° sharp-crested weir. During high flow, the channel becomes the control.

One discharge measurements (No. 19) and 12 inspections of no flow were made this year. All inspections of no flow were used to develop a V diagram shift needed to adjust for PZF.

Rating No. 2 is based on a theoretical computation for 90° sharp-crested weir up to a gage height of 2.75 ft and extended to 4.38 ft gage height based on a slope area measurement.

Shifts were applied to low flow using V diagrams. Large negatives (about 0.76 ft) were also applied to zero flow observations.

Discharge. Discharge was computed by applying gage height to Rating No. 2 through shift adjustment based on V diagrams.

Remarks. Records are fair.

E2625 Water Canyon below MDA AB

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0	0*	0	0	0	0	0	0	0	0
11	0	0	0	0*	0	0	0	0	0	0	0	0
12	0	0	0	0*	0	0	0*	0	0	0	0	0
13	0	0	0	0*	0	0	0*	0	0	0	0	0
14	0	0	0	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	0
17	0	0	0*	0	0	0	0	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	.04	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0*	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0.04	0	0	0
Mean	0	0	0	0	0	0	0	0	.001	0	0	0
Max	0	0	0	0	0	0	0	0	.04	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	.08	0	0	0
Wtr Year	2009	Total	0.04	Mean	0	Max	.04	Min	0	Acre-Ft	.08	
Cal Year	2008	Total	81.17	Mean	.22	Max	11	Min	0	Acre-Ft	161	

*Estimate

E263 Water Canyon at SR 4

Location. Lat 35° 48' 20", long 106° 14' 52" Sec. 12, T. 18 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 12.43 mi².

Period of Record. April 1999 to September 30, 2009.

Revised Record. Drainage Area (2006).

Gage. Data logger and cellular telemetry. Elevation of gage is 6,365 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge: 9 yr, 0.07ft³/s, 51 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 306 ft³/s, June 28, 2000, gage height 3.78 ft. No flow most of the time.

Extremes for Current Year. No peak discharge above base of 35 ft³/s. No flow for the year.



E263 Water Canyon at SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe and cellular telemetry. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for discharge measurements above wading stage.

Field Work. This station was visited 16 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for March 27 when gage height was affected by ice.

Rating. The channel is straight for 400' upstream and 200' downstream. Streambed is well armored with bedrock and boulders. Some pockets of sand exist from sediment deposition. Vegetation is sparse in the channel bottom and the banks. Scour should be minimal to nonexistent.

Rating No. 1 continued in use.

Discharge. Discharge was computed by applying gage height to Rating No. 1.

Remarks. Records are good.

E263 Water Canyon at SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0*	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	13	Mean	.036	Max	13	Min	0	Acre-Ft	26	26

*Estimate

E264 Indio Canyon at SR 4

Location. Lat 35° 48' 18", long 106° 14' 51", Sec. 12, T. 18 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 0.49 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 120° sharp-crested weir. Elevation of gage is 6,366 ft above NGVD.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, of 0.03 ft³/s, March 2, 2007, gage height 0.76 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge of 0.01 ft³/s at 0105 h, September 16, gage height 0.74 ft. No peak discharge above 1.0 ft³/s. No flow most of the time.



E264 Indio Canyon at SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with Sutron Accubar bubble sensor. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. An outside staff is available for reference. No provision for discharge measurement above wading stage.

Field Work. The station was visited 18 times to conduct discharge measurements and service the instrumentation. Inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None. Levels run May 13, 2005, found gage correct to datum.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year, except for the periods of December 27, January 2, January 26 to February 28, and April 12, 18 when gage height was affected by ice and March 4–16 when data logger malfunctioned.

Rating. The channel at the gage is about 8' wide and straight for about 50' upstream and 25' downstream and bends to the right. The streambed through this reach is primarily sand. The low-flow control is a 120° sharp-crested weir. The channel becomes the control at high flow.

Eighteen inspections of no flow were made this year.

Rating No.1 is based on a theoretical computation for 120° sharp-crested weir to a gage height of 2.60 ft. Broad-crested weir computation is used above that stage.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E264 Indio Canyon at SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0*	0	0	0	0	0	0	0
2	0	0	0	0*	0*	0	0	0	0	0	0	0
3	0	0	0	0	0*	0	0	0	0	0	0	0
4	0	0	0	0	0*	0*	0	0	0	0	0	0
5	0	0	0	0	0*	0*	0	0	0	0	0	0
6	0	0	0	0	0*	0*	0	0	0	.01	0	0
7	0	0	0	0	0*	0*	0	0	0	0	0	0
8	0	0	0	0	0*	0*	0	0	0	0	0	0
9	0	0	0	0	0*	0*	0	0	0	0	0	0
10	0	0	0	0	0*	0*	0	0	0	0	0	0
11	0	0	0	0	0*	0*	0	0	0	0	0	0
12	0	0	0	0	0*	0*	0*	0	0	0	0	0
13	0	0	0	0	0*	0*	0	0	0	0	0	0
14	.01	0	0	0	0*	0*	0	0	0	0	0	0
15	0	0	0	0	0*	0*	0	0	0	0	0	0
16	0	0	0	0	0*	0*	0	0	0	0	0	.01
17	0	0	0	0	0*	0	0	0	0	0	0	.01
18	0	0	0	0	0*	0	0*	0	0	0	0	0
19	0	0	0	0	0*	0	0	0	0	0	0	0
20	0	0	0	0	0*	0	0	0	0	0	0	0
21	0	0	0	0	0*	0	0	0	0	0	0	0
22	0	0	0	0	0*	0	0	0	0	0	0	0
23	0	0	0	0	0*	0	0	0	0	0	0	0
24	0	0	0	0	0*	0	0	0	0	0	0	0
25	0	0	0	0	0*	0	0	0	0	0	0	0
26	0	0	0	0*	0*	0	0	0	0	0	0	0
27	0	0	0*	0*	0*	0	0	0	0	0	0	0
28	0	0	0	0*	0*	0	0	0	0	0	0	0
29	0	0	0	0*	----	0	0	0	0	0	0	0
30	0	0	0	0*	----	0	0	0	0	0	0	0
31	0	----	0	0*	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0	0	0	0.01	0	0.02
Mean	0	0	0	0	0	0	0	0	0	0	0	.001
Max	.01	0	0	0	0	0	0	0	0	.01	0	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	0	0	0	.02	0	.04
Wtr Year	2009	Total	0.04	Mean	0	Max	.01	Min	0	Acre-Ft	.08	
Cal Year	2008	Total	0.01	Mean	0	Max	.01	Min	0	Acre-Ft	.02	

*Estimate

E265 Water Canyon below SR 4

Location. Lat 35° 48' 18", long 106° 14' 31" Sec. 7, T. 18 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 13.11 mi².

Period of Record. October 1993 to September 30, 2009.

Revised Records. Drainage area (2006).

Gage. Data logger with cellular telemetry, rain gage and stabilized natural rock control. Elevation of gage is 6,309 ft above NGVD from GPS survey.

Remarks. Records good. Legal location based on projected values.

Average Discharge. 15 yr, 0.04ft³/s, 29 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 274 ft³/s, June 28, 2000, gage height 5.13 ft (from flood mark). No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.16 ft³/s 1520 h, October 11, gage height 0.42 ft. No peak discharge above base of 50 ft³/s.



E265 Water Canyon below SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) and cellular phone with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter on 24" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. The station was visited 25 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave complete and satisfactory record, except for the period from July 13–17 when data logger malfunctioned.

Rating. The channel is straight for 100' above and below gage. Banks are low and have very little vegetation. Streambed is mostly rock with lenses of sand.

Twenty-five inspections of no flow were made this year.

Rating No. 4 was used for the entire water year.

Discharge. Discharge was computed by applying gage height to Rating No. 4 directly.

Remarks. Records are good.

E265 Water Canyon below SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0*	0	0
14	0	0	0	0	0	0	0	0	0	0*	0	0
15	0	0	0	0	0	0	0	0	0	0*	0	0
16	0	0	0	0	0	0	0	0	0	0*	0	0
17	0	0	0	0	0	0	0	0	0	0*	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	0
Cal Year	2008	Total	8.61	Mean	.024	Max	8.6	Min	0	Acre-Ft	17	17

*Estimate

E267 Potrillo Canyon above SR 4

Location. Lat 35° 48' 48", long 106° 14' 00", Sec. 6, T. 18 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 2.26 mi².

Period of Record. October 1, 1995, to September 30, 2009.

Revised Record. LA-13551-PR (1998): Station number; Drainage Area (2006).

Gage. Data logger with cellular telemetry and concrete control. Elevation of gage is 6,454 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 15 yr, 0.003 ft³/s, 2.17 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 63 ft³/s, August 29, 1995, gage height 2.70 ft (from slope-area determination). No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.03 ft³/s 1435 h, July 30, gage height 0.58 ft. No peak discharge above base of 5.0 ft³/s. No flow most of the time.



E267 Potrillo Canyon above SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) and cellular phone with speech modem. The system is powered by a solar panel battery system housed in NEMA shelter on 18" CMP well. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. An outside staff is available for reference. No provision for direct discharge measurements above wading stages.

Field Work. The station was visited 20 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year.

Rating. The channel is fairly straight for 300' above gage and 150' below. Streambed is mostly sand. Brush is fairly thick along stream bank. The control is a concrete broad-crested weir.

Twenty inspections of no flow were made this year.

Rating No. 1 is considered good.

Original shape and definition of rating was by computation using weir geometry with slope area used to define peak discharge and slope of upper end.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E267 Potrillo Canyon above SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	----	0	0	0	0	0	0	0
30	0	0	0	0	----	0	0	0	0	0	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	0	0	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	0	0	0	0	0	0	0	0	0	0	0	0
Wtr Year	2009	Total	0	Mean	0	Max	0	Min	0	Acre-Ft	0	
Cal Year	2008	Total	0.07	Mean	0	Max	.04	Min	0	Acre-Ft	.14	

E2674 TA-36 Minie Site

Location. Lat 35° 49' 38", long 106° 16' 36", Sec. 35, T. 19 N., R. 6 E., Ramon Vigil Grant, Santa Fe National Forest.

Drainage Area. 0.061 mi².

Period of Record. October 1, 2006, to September 30, 2009.

Gage. Data logger and 9" Parshall flume, rain gage with cellular telemetry. Elevation of gage is 6,858 ft above NGVD.

Remarks. Records are good. Records for this site existed before published period but are not reliable. Legal location based on projected values.

Extremes for Period of Record. Maximum discharge, 0.99 ft³/s, January 28, 2008, gage height 0.45 ft. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.30 ft³/s, at 1520 h, October 11, gage height 0.22 ft. No peak above base of 1.0 ft³/s. No flow most of the time.



E2674 TA-36 Minie Site

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe mounted on a 9" Parshall flume and cellular phone with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. The staff in the 9" Parshall flume is the reference gage. No provision for discharge measurements above wading stage.

Station is also equipped with a tipping bucket rain gage, Rain Collection II. All equipment is powered with a solar panel battery charging system.

Field Work. This station was visited 33 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record, except for the periods from December 9 to January 7 and March 26, 27 when gage height was affected by ice.

Rating. The channel is straight above and below the gage for 100'. The channel near the gage is lined with angular rock. The streambed is mostly sand.

Thirty-three inspections of no flow were made this year.

Rating No. 1 was developed based on the computation of 9" Parshall flume. PZF is 0.00 gage height.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly. Those days estimated at zero flow were based on precipitation and nearby gage stations for verification.

Remarks. Records are good.

E2674 TA-36 Minie Site

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0	0	0	0	0	0	0	0
2	0	0	0	0*	0	0	0	0	0	0	0	0
3	0	0	0	0*	0	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0*	0	0	0	0	0	0	0	0	0
10	0	0	0*	0	0	0	0	0	0	0	0	0
11	.01	0	0*	0	0	0	0	0	0	0	0	0
12	0	0	0*	0	0	0	0	0	0	0	0	0
13	0	0	0*	0	0	0	0	0	0	0	0	0
14	0	0	0*	0	0	0	0	0	0	0	0	0
15	0	0	0*	0	0	0	0	0	0	0	0	0
16	0	0	0*	0	0	0	0	0	0	0	0	.01
17	0	0	0*	0	0	0	.01	0	0	0	0	0
18	0	0	0*	0	0	0	0	0	0	0	0	0
19	0	0	0*	0	0	0	0	0	0	0	0	0
20	0	0	0*	0	0	0	0	0	0	0	0	0
21	0	0	0*	0	0	0	0	0	0	0	0	0
22	0	0	0*	0	0	0	0	0	0	0	0	0
23	0	0	0*	0	0	0	0	0	0	0	0	0
24	0	0	0*	0	0	0	0	0	0	0	0	0
25	0	0	0*	0	0	0	0	0	0	0	0	0
26	0	0	0*	0	0	0*	0	0	0	0	0	0
27	0	0	0*	0	0	0*	0	0	0	0	0	0
28	0	0	0*	0	0	0	0	0	0	0	0	0
29	0	0	0*	0	----	0	0	0	0	0	0	0
30	0	0	0*	0	----	0	0	0	0	0	0	0
31	0	----	0*	0	----	0	----	0	----	0	0	----
Total	0.01	0	0	0	0	0	0.01	0	0	0	0	0.01
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	.01	0	0	0	0	0	.01	0	0	0	0	.01
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	0	0	0	0	0	.02	0	0	0	0	.02
Wtr Year	2009	Total	0.03	Mean	0	Max	.01	Min	0	Acre-Ft	.06	
Cal Year	2008	Total	0.08	Mean	0	Max	.05	Min	0	Acre-Ft	.16	

*Estimate

E274 North Fork Ancho Canyon below SR 4

Location. Lat 35° 47' 12", long 106° 15' 4.7", Sec. 13, T. 18 N., R. 6 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 1.53 mi².

Period of Record. October 1, 2007, to September 30, 2009.

Gage. Data logger. Elevation of gage is 6,398 ft above NGVD from GPS survey.

Remarks. Records are good. Records for this site existed before period of record but are not reliable.

Extremes for Period of Record. Maximum discharge, 89 ft³/s, gage height 2.79 ft, August 4, 2008. No flow most of the time.

Extremes for Current Year. Maximum discharge, 0.53 ft³/s at 1435 h, July 30, gage height 0.70 ft. No peak discharge above base of 5 ft³/s.



E274 North Fork Ancho Canyon below SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) and Milltronics sonic probe. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with an ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3'× 4' metal box. Sampler is triggered by stage through the data logger. Outside staff is available for reference. No provision for measurements above wading stage.

Field Work. The station was visited 16 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Corrections. None.

Gage-Height Record. The data logger referenced to the outside gage gave a complete and satisfactory record for the year, except for the periods from November 29 when gage height became silted and January 9 to February 3 when gage height was affected by ice.

Rating. The channel is straight above and below the gage. Streambed is mostly sand.

Sixteen inspections of no flow were made this year.

Discharge. Discharge was computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E274 North Fork Ancho Canyon below SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0*	0*	0	0	0	0	0	0	0
2	0	0	0	0*	0*	0	0	0	0	0	0	0
3	0	0	0	0*	0*	0	0	0	0	0	0	0
4	0	0	0	0*	0	0	0	0	0	0	0	0
5	0	0	0	0*	0	0	0	0	0	0	0	0
6	0	0	0	0*	0	0	0	0	0	0	0	0
7	0	0	0	0*	0	0	0	0	0	0	0	0
8	0	0	0	0*	0	0	0	0	0	0	0	0
9	0	0	0*	0*	0	0	0	0	0	0	0	0
10	0	0	0*	0*	0	0	0	0	0	0	0	0
11	.01	0	0*	0*	0	0	0	0	0	0	0	0
12	0	0	0*	0*	0	0	0	0	0	0	0	0
13	0	0	0*	0*	0	0	0	0	0	0	0	0
14	0	0	0*	0*	0	0	0	0	0	0	0	0
15	0	0	0*	0*	0	0	0	0	0	0	0	0
16	0	0	0*	0*	0	0	0	0	0	0	0	0
17	0	0	0*	0*	0	0	0	0	0	0	0	0
18	0	0	0*	0*	0	0	0	0	0	0	0	0
19	0	0	0*	0*	0	0	0	0	0	0	0	0
20	0	0	0*	0*	0	0	0	0	0	0	0	0
21	0	0	0*	0*	0	0	0	0	0	0	0	0
22	0	0	0*	0*	0	0	0	0	0	0	0	0
23	0	0	0*	0*	0	0	0	0	0	0	0	0
24	0	0	0*	0*	0	0	0	0	0	0	0	0
25	0	0	0*	0*	0	0	0	0	0	0	0	0
26	0	0	0*	0*	0	0	0	0	0	0	0	0
27	0	0	0*	0*	0	0	0	0	0	0	0	0
28	0	.01	0*	0*	0	0	0	0	0	0	0	0
29	0	0*	0*	0*	----	0	0	0	0	0	0	0
30	0	0	0*	0*	----	0	0	0	0	.01	0	0
31	0	----	0*	0*	----	0	----	0	----	0	0	----
Total	0.01	0.01	0	0	0	0	0	0	0	0.01	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Max	.01	.01	0	0	0	0	0	0	0	.01	0	0
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	.02	.02	0	0	0	0	0	0	0	.02	0	0
Wtr Year	2009	Total	0.03	Mean	0	Max	.01	Min	0	Acre-Ft	.06	
Cal Year	2008	Total	1.36	Mean	.004	Max	1.3	Min	0	Acre-Ft	2.7	

*Estimate

E275 Ancho Canyon below SR 4

Location. Lat 35° 46' 54", long 106° 14' 42", Sec. 19, T. 18 N., R. 7 E., Ramon Vigil Grant, Los Alamos County.

Drainage Area. 4.75 mi².

Period of Record. December 1993 to September 30, 2009.

Revised Record. Drainage Area (2006)

Gage. Data logger with cellular telemetry and concrete stabilized natural control. Elevation of gage is 6,190 ft above NGVD from GPS survey.

Remarks. Records are good. Legal location based on projected values.

Average Discharge. 14 yr, 0.015 ft³/s, 10.87 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 536 ft³/s, gage height 2.89 ft, August 4, 2008 (from flood marks). No flow most of the time.

Extremes for Current Year. Peak discharge above base of 15 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage Height (ft)
October 11	1425	30	1.60
July 28	1335	144	1.92
July 30	1445	414*	2.48*
September 16	0125	16	1.51

No flow most of the time.



E275 Ancho Canyon below SR 4

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) and cellular telemetry with speech modem. The system is powered by a solar panel battery system housed in a NEMA shelter. Station is equipped with and ISCO pump sampler for water quality sample collection. ISCO is housed in a separate shelter, a 3' × 4' metal box. Sampler is triggered by stage through the data logger. Outside staff is available for reference. No provision for measurements above wading stage.

Field Work. The station was visited 26 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Corrections. None. Levels run August 27 show gage within acceptable limits.

Gage-Height Record. The data logger referenced to the outside gage gave a complete and satisfactory record for the year.

Rating. Streambed is a series of outcrops and sand pockets with moderate sand movement during flow events. High-water channel is straight for 200' upstream. Flow below gage goes into supercritical flow as fall increases radically below station. One-fourth mi upstream channel has very low banks and may spread out to large widths. It contracts markedly from there to the gage. The control is natural rock outcrop stabilized by concrete.

Twenty-five inspections of no flow and one observation of flow were made this year.

Rating No. 1 was developed from PZF and previous measurement and slope area. Rating No. 1 was extended from 1.85 ft to 2.75 ft from logarithmic plotting.

Discharge. Discharge computed by applying gage height to Rating No. 1 directly.

Remarks. Records are good.

E275 Ancho Canyon below SR 4

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	1.1	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	.22
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	1.8	0	0
29	0	0	0	0	----	0	0	0	0	.07	0	0
30	0	0	0	0	----	0	0	0	0	5.4	0	0
31	0	----	0	0	----	0	----	0	----	0	0	----
Total	1.1	0	0	0	0	0	0	0	0	7.27	0	0.22
Mean	.035	0	0	0	0	0	0	0	0	.23	0	.007
Max	1.1	0	0	0	0	0	0	0	0	5.4	0	.22
Min	0	0	0	0	0	0	0	0	0	0	0	0
Acre-Ft	2.2	0	0	0	0	0	0	0	0	14	0	.44
Wtr Year	2009	Total	8.59	Mean	.024	Max	5.4	Min	0	Acre-Ft	17	
Cal Year	2008	Total	17.73	Mean	.048	Max	15	Min	0	Acre-Ft	35	

E350 Rito de los Frijoles at Bandelier

Location. Lat 35° 46' 37", long 106° 16' 09", Sec. 23, T. 18 N., R. 6 E., Ramon Vigil Grant, Sandoval County, in Bandelier National Monument.

Drainage Area. 18.35 mi².

Period of Record. July 1963 to September 1969; July 1977 to September 1982; May 1993 to September 1996; and October 1998 to September 30, 2009.

Revised Record. Drainage Area (2006)

Gage. Data logger and concrete control. Elevation of gage is 6,046 ft above NGVD from GPS survey.

Remarks. Records are good, except winter period, which are fair. Small diversion from left bank about 1.0 mi upstream for irrigation of small orchard. The La Mesa fire, which occurred during mid June 1977, burned about 40% of the forest covering this watershed. Legal location based on projected values.

Average Discharge. 11 yr (1999–2009), 1.25 ft³/s, 902 acre-ft/yr.

Extremes for Period of Record. Maximum discharge, 3,030 ft³/s, July 21, 1978, gage height 6.34 ft site and datum then in use. Minimum daily discharge, 0 ft³/s, July 16–19 and 26, 2003.

Extremes for Current Year. Maximum discharge 5.0 ft³/s at 1430 h, July 30 gage height of 2.04 ft. No peak discharge above base of 20 ft³/s. Minimum daily discharge, 0.24 ft³/s August 11.



E350 Rito de los Frijoles at Bandelier

Station Analysis

2009 Water Year

Equipment. Station is equipped with Sutron 8210 data logger (5-min. interval) with shaft encoder float system (5-min. interval) housed in a 4'× 4' metal shelter over a 24" CMP stilling well on right bank. An outside staff is available for reference. Wading measurement are made 30'–40' upstream from gage. High-flow measurement can be made up from bridge upstream from gage 200' above gage.

Field Work. The station was visited 27 times to conduct discharge measurements and service the instrumentation. Field inspections for the gage are listed under site history files on the Hydstra database. Discharge measurements for the gage are listed under site gauging files on the Hydstra database.

Datum Correction. None from levels.

Gage-Height Record. The data logger referenced to the outside staff gave a complete and satisfactory record for the year.

Rating. The channel is about 10' wide and straight for about 150' upstream and downstream of gage. Low-water control is a concrete-tapered notch with low point on right bank. The channel bed through this reach is composed of gravel and cobbles and should be stable. Vegetation is grasses and fairly sparse.

Thirteen discharge measurements (Nos. 198–210) and 14 inspections of observed flow.

Rating No. 5 was developed based on the measurements and the slope conveyance measurement. The shifts were distributed based on time. Rating No. 5 is considered good.

Discharge. Discharge was computed by applying gage height to Rating No. 5 through a shift based on time.

Remarks. Records are good, except for estimated daily discharges, which are fair.

E350 Rito De los Frijoles at Bandelier

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.76	.98	.65	.91	.99	1.0	1.2	1.3	.62	.37	.49	.43
2	.76	1.0	.66	.88	.95	1.0	1.2	1.3	.67	.32	.48	.38
3	.76	.98	.63	.87	.96	1.1	1.2	1.3	.78	.45	.53	.41
4	.76	.97	.63	.89	.98	1.1	1.1	1.2	.69	.44	.50	.47
5	.76	.92	.62	.90	.96	1.2	1.1	1.1	.61	.83	.42	.42
6	.76	.81	.64	1.6	.96	1.1	1.1	1.0	.57	.67	.42	.51
7	.76	.81	.66	1.7	.96	1.1	1.1	.99	.53	.55	.40	.53
8	.76	.81	.67	1.7	1.0	1.1	1.0	.92	.50	.41	.34	.60
9	.77	.81	.69	1.6	.99	1.2	1.0	.90	.48	.36	.32	.51
10	.72	.81	.65	1.6	.97	1.2	.99	.87	1.0	.36	.28	.42
11	1.3	.81	.66	1.6	.85	1.1	1.4	.84	.71	.34	.24	.41
12	1.3	.81	.69	1.5	.96	1.1	1.3	.79	.56	.30	.26	.40
13	.97	.75	.75	1.4	.91	1.3	1.3	.75	.51	.27	.32	.51
14	1.1	.68	.71	1.0	.85	1.2	1.2	.73	.55	.28	.74	.80
15	1.1	.70	.43	.99	.76	1.2	1.2	.70	.54	.28	.57	.73
16	.99	.72	.28	.98	1.0	1.1	1.2	.71	.46	.29	.42	.96
17	.97	.72	1.1	.98	.86	1.1	1.3	.72	.45	.28	.35	.73
18	.98	.72	.95	.98	.96	1.1	1.4	.68	.43	.26	.31	.60
19	.98	.71	.82	.80	.54	1.1	1.4	.64	.40	.27	.28	.50
20	.95	.71	.68	.77	.79	1.1	1.3	.61	.73	.34	.27	.49
21	.94	.69	.74	.83	.80	1.1	1.4	.70	.63	.33	.27	.40
22	.89	.64	.75	.89	.82	1.1	1.4	.84	.47	.46	.25	.38
23	.92	.69	.86	.95	.86	1.2	1.5	1.2	.41	.41	.25	.39
24	.99	.62	.57	.94	.88	1.3	1.5	1.0	.40	.54	.50	.51
25	.95	.63	1.0	.96	.98	1.3	1.5	.91	.40	.40	.56	.44
26	.92	.63	.98	.92	1.1	1.3	1.5	.86	.48	.58	.48	.38
27	.89	.80	.37	.85	1.0	1.4	1.4	.93	.42	.53	.40	.36
28	.91	.79	.36	.54	1.0	1.3	1.4	.85	.49	.45	.36	.33
29	.91	.71	.58	.73	----	1.3	1.3	.74	.48	.46	.33	.33
30	.91	.67	.87	.79	----	1.2	1.3	.67	.39	.84	.39	.32
31	.95	----	1.0	1.0	----	1.2	----	.66	----	.60	.52	----
Total	28.39	23.10	21.65	33.05	25.64	36.2	38.19	27.41	16.36	13.27	12.25	14.65
Mean	.92	.77	.70	1.07	.92	1.17	1.27	.88	.55	.43	.40	.49
Max	1.3	1.0	1.1	1.7	1.1	1.4	1.5	1.3	1.0	.84	.74	.96
Min	.72	.62	.28	.54	.54	1.0	.99	.61	.39	.26	.24	.32
Acre-Ft	56	46	43	66	51	72	76	54	32	26	24	29
Wtr Year	2009	Total	290.16	Mean	.79	Max	1.7	Min	.24	Acre-Ft	576	
Cal Year	2008	Total	968.96	Mean	2.65	Max	57	Min	.28	Acre-Ft	1920	

S001 SWSC Line Spring at TA-16

Location. Lat 35° 51' 1", long 106° 20' 23", 30 ft upstream from the SWSC line crossing of Cañon de Valle in LANL TA-16.

Gage. Data logger with 90° weir. Elevation of gage is 7,437 ft above NGVD from survey.

Period of Record. October 1, 1996, to September 30, 2009.

Remarks. Water discharge records are good. This spring is in the Cañon de Valle drainage.



S001 SWSC Line Spring at TA-16

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.001	.001	.008	.001*	.003	.002	.003	.003	.004	.003	.003	.002
2	.001	.001	.008	.001*	.003	.002	.003	.003	.004	.003	.003	.002
3	.001	.001	.006	.001*	.003	.002	.003	.004	.004	.003	.003	.002
4	.001	.001	.007	.001*	.003	.002	.003	.004	.004	.003	.003	.002
5	.001	.001	.009	.001*	.003	.002	.003	.004	.004	.020	.003	.002
6	.001	.002	.010	.001*	.003	.002	.003	.004	.003	.003	.003	.002
7	.001	.006	.010	.001*	.002	.002	.003	.004	.003	.003	.003	.002
8	.001	.004	.006	.001	.002	.002	.003	.004	.003	.003	.003	.002
9	.002	.001	0	.001	.002	.002	.003	.004	.003	.003	.003	.002
10	.001	.001	0*	.001	.002	.002	.003	.004	.004	.003	.002	.002
11	.002	.001	0*	.001	.002	.002	.004	.004	.004	.003	.003	.002
12	.002	.001	0*	.002	.002	.002	.004	.004	.003	.003	.003	.002
13	.002	.001	0*	.003	.002	.002	.003	.004	.004	.003	.002	.002
14	.002	.001	0*	.007	.002	.002	.003	.004	.004	.003	.002	.002
15	.002	.001	0*	.010	.002	.002	.003	.004	.003	.003	.002	.002
16	.002	.001	0*	.011	.002	.002	.003	.004	.003	.003	.002	.002
17	.002	.001	0*	.012	.001	.002	.004	.004	.003	.003	.002	.002
18	.002	.001	0*	.012	.001	.002	.004	.004	.003	.003	.002	.003
19	.002	.001	0*	.012	.001	.002	.004	.004	.003	.003	.002	.003
20	.002	.001	0*	.012	.002	.003	.004	.005	.004	.003	.002	.003
21	.002	.002	0*	.011	.002	.003	.006	.005	.003	.003	.002	.003
22	.002	.005	0*	.010	.002	.003	.004	.005	.003	.003	.002	.003
23	.002	.006	0*	.008	.001	.002	.004	.005	.003	.003	.002	.003
24	.002	.006	0*	.009	.001	.002	.003	.005	.003	.002	.002	.004
25	.002	.006	0*	.009	.001	.002	.003	.004	.003	.003	.002	.003
26	.002	.006	0*	.006	.002	.003	.003	.004	.003	.003	.002	.003
27	.002	.005	0*	.003	.002	.002	.004	.005	.003	.002	.002	.003
28	.002	.004	0*	.003	.002	.002	.004	.005	.003	.003	.001	.003
29	.002	.005	0*	.003	----	.003	.004	.005	.003	.003	.001	.003
30	.001	.007	0*	.003	----	.003	.004	.005	.003	.003	.001	.003
31	.001	----	0*	.003	----	.003	----	.005	----	.003	.002	----
Total	0.051	0.081	0.064	0.160	0.056	0.069	0.105	0.132	0.100	0.108	0.070	0.074
Mean	.002	.003	.002	.005	.002	.002	.004	.004	.003	.003	.002	.002
Max	.002	.007	.010	.012	.003	.003	.006	.005	.004	.020	.003	.004
Min	.001	.001	0	.001	.001	.002	.003	.003	.003	.002	.001	.002
Acre-Ft	.101	.161	.127	.317	.111	.137	.208	.262	.198	.214	.139	.147
Wtr Year	2009	Total	1.070	Mean	.003	Max	.020	Min	0	Acre-Ft	2.12	
Cal Year	2008	Total	1.789	Mean	.005	Max	.276	Min	0	Acre-Ft	3.55	

*Estimate

S002 Burn Ground Spring at TA-16

Location. Lat 35° 50' 58", long 106° 20' 17", 450 ft downstream from the SWSC line crossing of Cañon de Valle in LANL TA-16.

Gage. Data logger with 90° weir. Elevation of gage is 7,420 ft above NGVD from survey.

Period of Record. October 1, 1996, to September 30, 2009.

Remarks. Water discharge records fair. This spring is in the Cañon de Valle drainage.



S002 Burn Ground Spring at TA-16

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.004	.007	.006	.002*	.005	.005	.013	.006	.005*	.005*	.005	.005*
2	.004	.007	.006	.002*	.005	.004	.009	.006	.005*	.005*	.005	.005*
3	.005	.006	.006	.002*	.005	.004	.007	.006	.005*	.005*	.005	.005*
4	.006	.006	.006	.002*	.005	.005	.010	.005	.005*	.005*	.005	.005*
5	.011	.006	.006	.002*	.005	.005	.009	.006	.005*	.005*	.005	.004
6	.010	.005	.006	.002*	.005	.005	.008	.006	.005*	.005*	.005*	.004
7	.008	.005	.006	.002*	.005	.006	.009	.006	.005*	.005*	.005*	.005
8	.005	.005	.006	.004	.005	.007	.013	.006	.005*	.005*	.005*	.005
9	.005	.005	.005	.005	.005	.009	.010	.005	.005*	.005*	.005*	.005
10	.005	.005	.006	.004	.005	.006	.007	.006	.005*	.005*	.005*	.005
11	.007	.005	.006	.004	.004	.007	.010	.006	.005*	.005*	.005*	.005
12	.009	.005	.007	.004	.005	.007	.013	.006	.005*	.005*	.005*	.005
13	.009	.005	.008	.004	.004	.007	.008	.006	.005*	.005*	.005*	.005
14	.009	.005	.002*	.005	.005	.007	.012	.006	.005*	.005	.005*	.005
15	.009	.005	.002*	.004	.004	.007	.010	.006	.005*	.005	.005*	.005
16	.009	.005	.002*	.004	.004	.007	.006	.006	.005*	.005	.005*	.005
17	.009	.005	.002*	.004	.005	.007	.005	.006	.005*	.005	.005*	.005
18	.009	.005	.002*	.004	.004	.008	.005	.006	.005*	.005	.005*	.005
19	.009	.005	.002*	.004	.004	.009	.005	.006	.005*	.005	.005*	.005
20	.007	.006	.002*	.004	.004	.009	.005	.006	.005*	.005	.005*	.005
21	.006	.005	.002*	.004	.004	.010	.005	.007	.005*	.005	.005*	.005
22	.005	.006	.002*	.004	.004	.010	.005	.007	.005*	.005	.005*	.005
23	.005	.005	.002*	.004	.004	.012	.005	.007	.005*	.005	.005*	.005
24	.005	.006	.002*	.005	.004	.007	.005	.007	.005*	.004	.005*	.005
25	.005	.005	.002*	.005	.004	.004	.005	.007	.005*	.005	.005*	.005
26	.005	.005	.002*	.005	.004	.005	.005	.007	.005*	.005	.005*	.005
27	.005	.006	.002*	.005	.004	.005	.006	.007	.005*	.004	.005*	.005
28	.005	.005	.002*	.005	.004	.007	.007	.007	.005*	.005	.005*	.005
29	.005	.005	.002*	.005	-----	.006	.005	.006	.005*	.005	.005*	.005
30	.006	.005	.002*	.005	-----	.009	.006	.007	.005*	.005	.005*	.005
31	.007	-----	.002*	.005	-----	.012	----	.006	----	.005	.005*	----
Total	0.208	0.161	0.116	0.120	0.125	0.218	0.228	0.193	0.150	0.153	0.155	0.148
Mean	.007	.005	.004	.004	.004	.007	.008	.006	.005	.005	.005	.005
Max	.011	.007	.008	.005	.005	.012	.013	.007	.005	.005	.005	.005
Min	.004	.005	.002	.002	.004	.004	.005	.005	.005	.004	.005	.004
Acre-Ft	.413	.319	.230	.238	.248	.432	.452	.383	.298	.303	.307	.294
Wtr Year	2009	Total	1.975	Mean	.005	Max	.013	Min	.002	Acre-Ft	3.92	
Cal Year	2008	Total	3.182	Mean	.009	Max	.027	Min	.002	Acre-Ft	6.31	

*Estimate

S003 Martin Spring at TA-16

Location. Lat 35°50'32", long 106°20'11", 0.25 mi south of Building 344 in LANL TA-16.

Gage. Data logger with 90° weir. Elevation of gage is 7,429 ft above NGVD from survey.

Period of Record. October 1, 1996, to September 30, 2009.

Remarks. Water discharge records good. This spring is in the Water Canyon drainage.



S003 Martin Spring at TA-16

Daily Mean Discharge in Cubic Feet per Second

Water Year October 2008 to September 2009

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.010	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
2	.011	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
3	.010	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
4	.012	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
5	.015	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
6	.006	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
7	.003	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
8	.002	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
9	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
10	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
11	.003	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
12	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
13	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
14	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
15	.002	0	0	0	0	.001	.002	.001	.001	.001	.001	.001
16	.002	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
17	.002	0	0	0	0	.001	.001	.002	.001	.001	.001	.001
18	.001	0	0	0	.001	.001	.001	.002	.001	.001	.001	.001
19	.001	0	0	0	.001	.001	.001	.001	.001	.001	.001	.001
20	.001	0	0	0	.001	.001	.001	.001	.001	.001	.001	.001
21	.001	0	0	0	.001	.001	.002	.001	.001	.001	.001	.001
22	.001	0	0	0	.001	.001	.001	.001	.001	.001	.001	.001
23	.001	0	0	0	.001	.001	.001	.001	.001	.001	.001	.001
24	.001	0	0	0	.001	.001	.001	.001	.001	.001	.001	.001
25	.001	0	0	0	.001	.002	.002	.001	.001	.001	.001	.001
26	.001	0	0	0	.001	.002	.002	.001	.001	.001	.001	.001
27	0	0	0	0	.001	.001	.002	.001	.001	.001	.001	.001
28	0	0	0	0	.001	.001	.002	.001	.001	.001	.001	.001
29	0	0	0	0	----	.001	.002	.001	.001	.001	.001	.001
30	0	0	0	0	----	.001	.002	.001	.001	.001	.001	.001
31	0	----	0	0	----	.001	----	.001	----	.001	.001	----
Total	0.097	0	0	0	0.011	0.033	0.038	0.038	0.030	0.031	0.031	0.030
Mean	.003	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
Max	.015	0	0	0	.001	.002	.002	.002	.001	.001	.001	.001
Min	0	0	0	0	0	.001	.001	.001	.001	.001	.001	.001
Acre-Ft	.192	0	0	0	.022	.065	.075	.075	.059	.061	.061	.059
Wtr Year	2009	Total	0.339	Mean	.001	Max	.015	Min	0	Acre-Ft	.672	
Cal Year	2008	Total	0.405	Mean	.001	Max	.015	Min	0	Acre-Ft	.803	

Gage Stations Omitted from this Publication

For existing stations that were omitted from this publication, information was extracted from existing raw or partially reduced data files using the following procedure.

All field-collected electronic data are transferred into a commercial program referred to as "HYDSTRA". These data were accessed via the "Hydstra Data Manager's Workbench." "Raw Level" and, where available, discharge files were evaluated for relative change to the recorded stage. If visually obvious, then it was considered to be a day where some stream flow was recorded. The highest relative change was assumed to be the peak for the water year. Documented missing data or gaps in station's electronic record were tallied to estimate the days without available data. A number of these stations have been recently upgraded with equipment that should reduce the gaps in station data and provide a better record for future publication.

Station	Estimated days with flow	Estimated date of peak flow	Gap in record (days)	Comments
E049 (LA Weir)	2	10/11/2008	28	Raw Stage (i.e., water level behind low-head weir)
E070 (Bayo Canyon at Pueblo Canyon)	0	0	0	Rating curve in development
E089 (Guaje Canyon above Mouth of Rendija Canyon)	9	9/10/2009	0	Will publish in WY 200? To include previous water years
E124 (Sandia Canyon Truck Route)	12	7/30/2009	0	Record flow above 0.62 gage height. No rating curve
E266 (Potrillo Canyon above Discharge Sink)	0	0	0	Rating curve in development
E2733(TA-39-57)	1	10/11/2008	0	Rating curve in development
E2737 (TA-39-6)	4	7/30/2009	0	Rating curve in development
E338 (Chaquehui Canyon South Site)	0	0	0	Rating curve in development
E340 (Chaquehui Canyon Main Site)	0	0	26	Rating curve in development

Monthly Precipitation (inches)
Los Alamos National Laboratory Meteorological Stations
Water Year 2009 (October 2008–September 2009)

Data Source: LANL Weather Machine; for further documentation and information,
<http://weather.lanl.gov>

Month	TA-6	TA-49	TA-53	TA-54	NCOM¹	PJMT²
October	1.43	1.64	1.34	1.99	1.10	0.16
November	0.60	0.46	0.44	0.39	0.63	0.34
December	1.63	1.50	1.49	1.30	1.07	0.83
January	0.26	0.33	0.20	0.15	0.39	0.02
February	0.02	0.01	0.03	0.02	0.06	0.01
March	1.18	1.14	1.10	0.91	1.21	0.51
April	1.31	1.35	1.27	0.83	1.66	0.79
May	2.14	1.75	1.94	1.05	1.67	0.30
June	2.67	1.78	1.86	1.74	3.02	1.56
July	4.01	3.12	2.40	2.01	4.13	1.96
August	1.66	1.67	1.26	0.95	1.80	1.39
September	1.95	3.17	1.42	1.93	2.00	1.98
Total	18.86	17.92	14.75	13.27	18.74	9.95

¹North Community

²Pajarito Mountain

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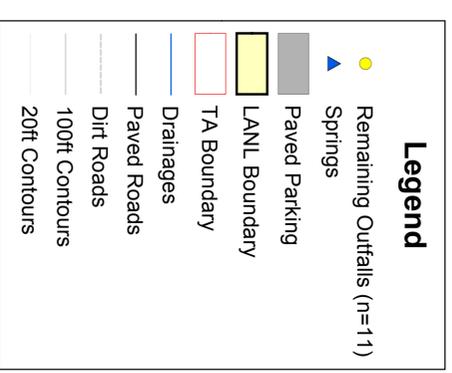
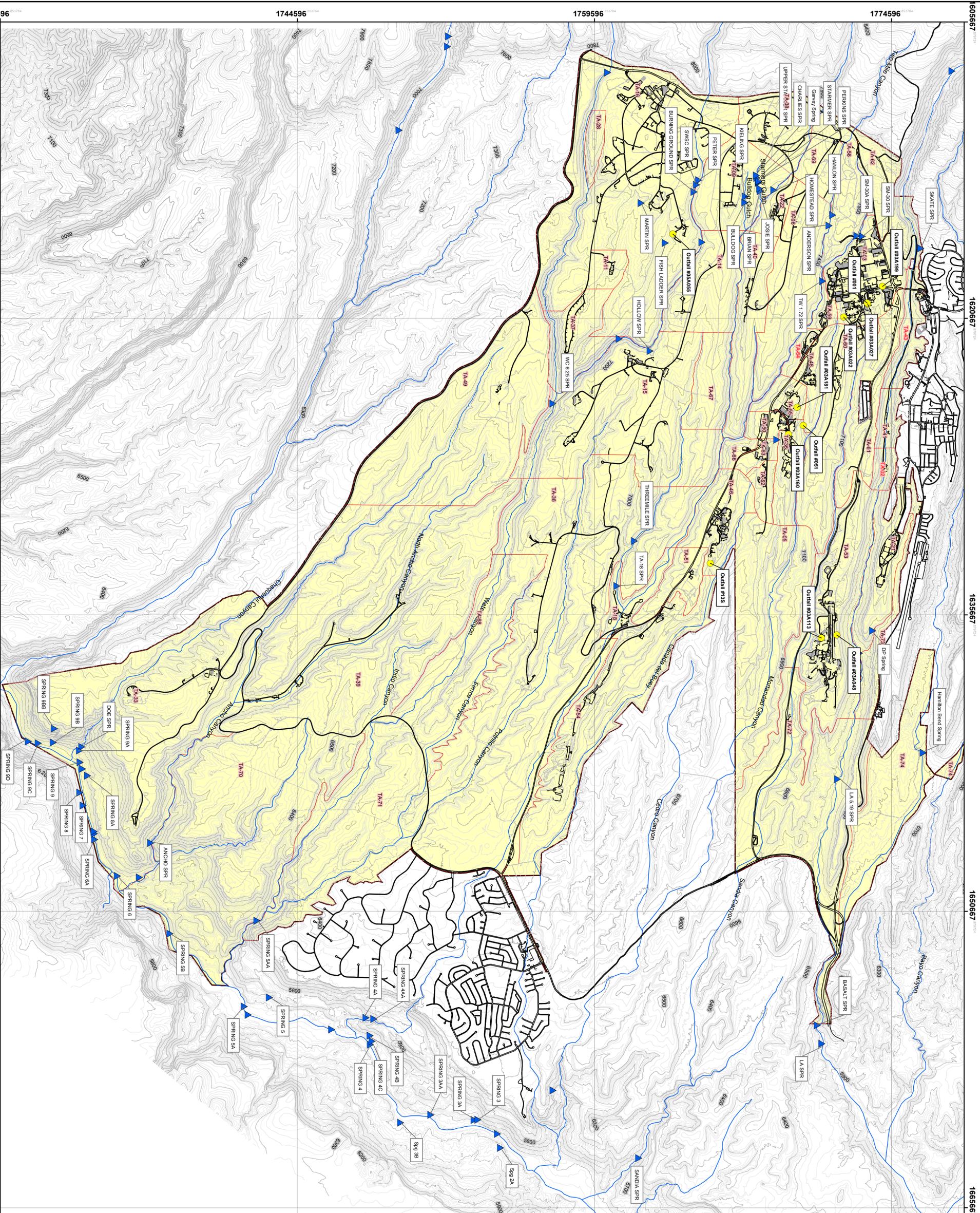
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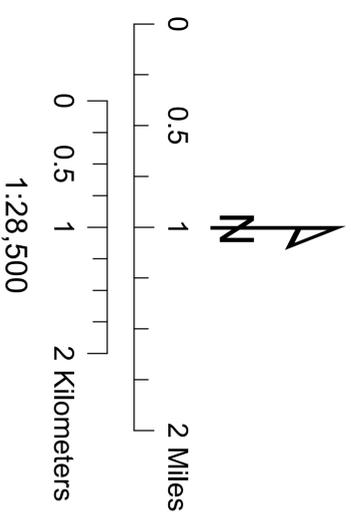


APPENDIX G
Map of Springs and NPDES Outfall Locations

Los Alamos National Laboratory Spring and Outfall Locations, Los Alamos Area NPDES Permit No. NM0028355



State Plane Coordinate System New Mexico, Central Zone, US Feet
 NAD 1983 Datum National Geodetic Datum 1929
 Created by Winlers Red Star, 17 August 2011,
 Map #11-0096-01



Technical Area Boundaries: Los Alamos National Laboratory, Site Planning & Project
 Initiation Group, Infrastructure Planning Office, September 2007, as published 04 December
 2008.

Ownership Boundaries Around LANL Area, Los Alamos National Laboratory, Site Planning &
 Project Initiation Group, Infrastructure Planning Office, 19 September 2007, as published 04
 December 2008.

Paved Road Acqs: Los Alamos National Laboratory, KSI, Site Support Services, Planning,
 Locating and Mapping Section, 06 January 2004, as published 28 May 2009.

Hydrography: 100' 20' Foot Contour Interval, Los Alamos National Laboratory, ENV
 Environmental Remediation and Surveillance Program, 1991.

WOH Drainage, acq: Los Alamos National Laboratory, ENV Water Quality and Hydrology
 Group, 124,000 Scale Data, 03 June 2003.

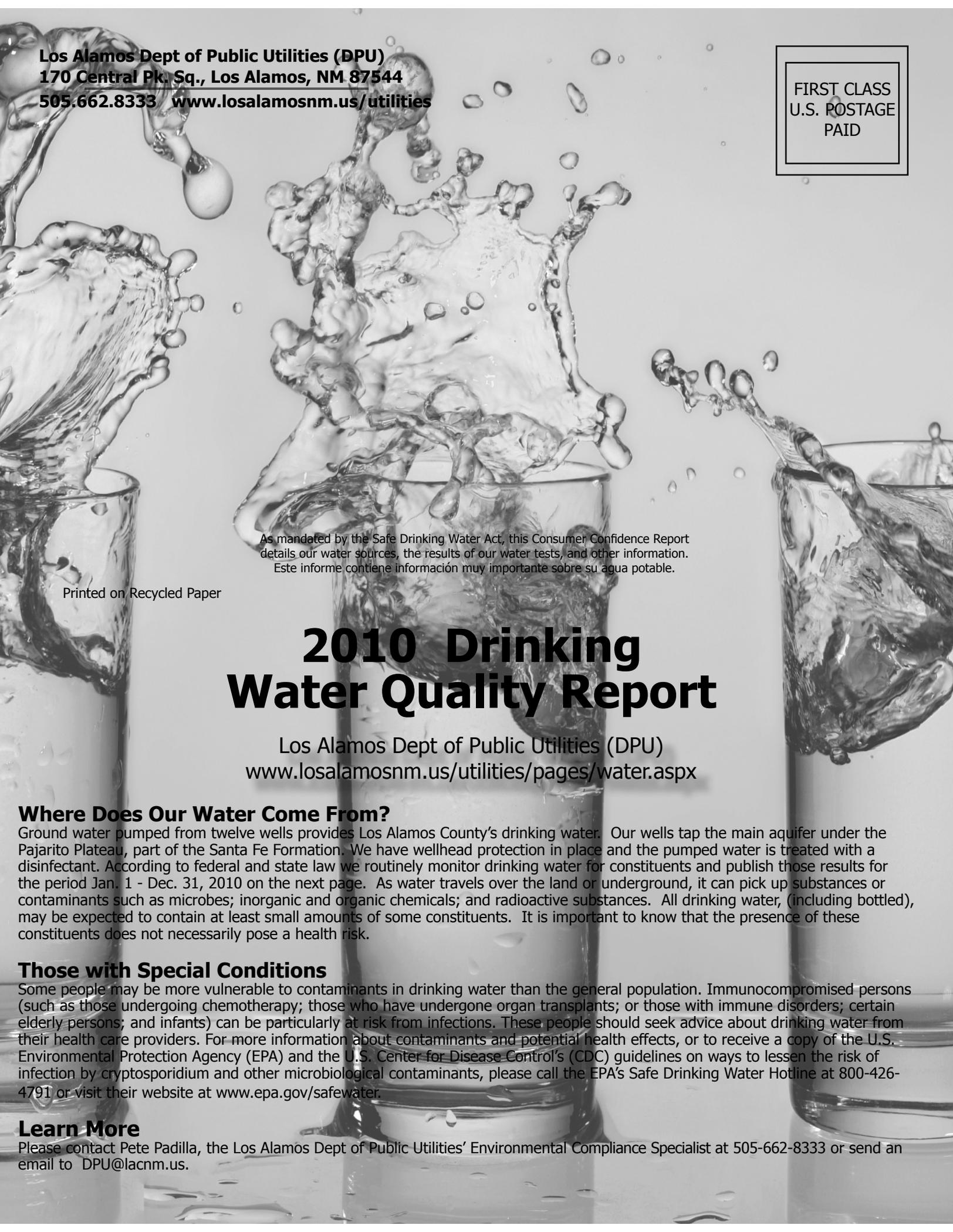
Locations of Springs: Los Alamos National Laboratory, Waste and Environmental Services
 Division, Operation of the National Environmental Data Center, Department of Energy
 Oversight Bureau, EP22008-0138, 1:2,500 Scale Data, 17 March 2008.

Paved Parking: Los Alamos National Laboratory, KSI, Site Support Services, Planning, Locating
 and Mapping Section, 06 January 2004, as published 29 November 2010.

Dirt Road Acqs: Los Alamos National Laboratory, KSI, Site Support Services, Planning, Locating
 and Mapping Section, 06 January 2004, as published 29 November 2010.

This map was created for work processes associated with the Water Quality & RCRA(CAP). All other uses for
 this map should be confirmed with LANL ENV/RCRA staff.

APPENDIX H
2010 Drinking Water Quality Data Report



Los Alamos Dept of Public Utilities (DPU)
170 Central Pk. Sq., Los Alamos, NM 87544
505.662.8333 www.losalamosnm.us/utilities

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As mandated by the Safe Drinking Water Act, this Consumer Confidence Report details our water sources, the results of our water tests, and other information. Este informe contiene información muy importante sobre su agua potable.

Printed on Recycled Paper

2010 Drinking Water Quality Report

Los Alamos Dept of Public Utilities (DPU)
www.losalamosnm.us/utilities/pages/water.aspx

Where Does Our Water Come From?

Ground water pumped from twelve wells provides Los Alamos County's drinking water. Our wells tap the main aquifer under the Pajarito Plateau, part of the Santa Fe Formation. We have wellhead protection in place and the pumped water is treated with a disinfectant. According to federal and state law we routinely monitor drinking water for constituents and publish those results for the period Jan. 1 - Dec. 31, 2010 on the next page. As water travels over the land or underground, it can pick up substances or contaminants such as microbes; inorganic and organic chemicals; and radioactive substances. All drinking water, (including bottled), may be expected to contain at least small amounts of some constituents. It is important to know that the presence of these constituents does not necessarily pose a health risk.

Those with Special Conditions

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons (such as those undergoing chemotherapy; those who have undergone organ transplants; or those with immune disorders; certain elderly persons; and infants) can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency (EPA) and the U.S. Center for Disease Control's (CDC) guidelines on ways to lessen the risk of infection by cryptosporidium and other microbiological contaminants, please call the EPA's Safe Drinking Water Hotline at 800-426-4791 or visit their website at www.epa.gov/safewater.

Learn More

Please contact Pete Padilla, the Los Alamos Dept of Public Utilities' Environmental Compliance Specialist at 505-662-8333 or send an email to DPU@lacnm.us.

Consumer Confidence Report on Drinking Water Quality for 2010

Detected Contaminant (Unit Measurement)	Violation Y/N	Range of Levels Detected	System Average	Date Tested	MCLG	MCL	Likely Source of Contamination
Inorganic Compounds							
Arsenic (ppb)	N	Non-detect - 5.15ppb	1.03ppb	5/27/10 5/28/10 8/11/10	0	10ppb	Natural deposits
Chromium (ppb)	N	Non-detect - 6.7ppb	3.66ppb	2/17/10 5/27/10 5/28/10 9/11/10	100ppb	100ppb	Natural deposits
Fluoride (ppm)	N	0.315 - 0.673ppm	0.421ppm	5/27/10 5/28/10 8/11/10	4ppm	4ppm	Natural deposits
Nitrate & Nitrite (ppm)	N	0.32 - 0.51	0.433	5/5/10	10ppm	10ppm	Leaching septic tanks, sewage; natural deposits
Lead (residential taps) (ppb)	N	Non-detect - 14ppb	98.7% < detection limit of 5ppb	7/08	0	AL= 15ppb ¹	Corrosion of household plumbing
Copper (residential taps) (ppm)	N	Non-detect - 0.19ppm	96.7% < detection limit of 0.09 ppm	7/08	0	AL= 1.3ppm ¹	Corrosion of household plumbing
Hardness (as CaCO ₃) (grains/gal)	N	1.64 - 5.34 grains/gal	3.18 grains/gal	5/18/10 5/19/10	-	-	Natural deposits
Disinfection By-Products							
Total Trihalomethanes (TTHMs) ² (ppb)	N	0.6 - 0.9ppb	0.76ppb	5/18/10	0	80ppb	By-product of drinking water chlorination
Radionuclides							
Alpha emitters ³ (pCi/L)	N	-0.09 - 50.2Ci/L	8.18pCi/L	5/18/10 5/19/10	0	15pCi/L	Erosion of natural deposits
Beta/photon emitters (pCi/L)	N	0.719 - 28.4pCi/L	5.035pCi/L	5/18/10 5/19/10	0	50pCi/L	Decay of natural and man-made deposits
Microbiology							
Total Coliform (cfu per 100mL) ³	N	Monthly Samples max. positive 0 of 29 (0%) min. positive 0 of 28 (0%)	Total positive samples 2010: 0 of 346	Monthly 2010	0	5%	Naturally present in the environment

Notes

¹The Action Level (AL) for lead/copper is exceeded if 90 percent of homes tested have lead levels above 15 ppb and copper levels above 1.3 ppm. Note that 98.7% of home taps tested for lead in 2008 were lower than the detection limit of 0.5ppb. Samples are collected every three years with the next test in 2011. (Send email to DPU@lacnm.us if interested in participating in 2011 testing.) No lead/copper samples collected in 2008 exceeded the Action Level.

²On October 23, 2006 the NMED Drinking Water Bureau reduced the monitoring requirements for TTHM's to once per year due to the Los Alamos County running average of 30 µg/L Halo Acetic Acid (HAA5) and 40 µg/L TTHM under the 30/40 rule. The change was allowed because Los Alamos water is consistently well-below the threshold values in this rule.

³In 2009 the NMED Drinking Water Bureau reduced funding for bacteriological samples to only 25 per month. Prior to this, up to 43 samples were collected in the system each month. The MCL for total coliforms is exceeded when coliform bacteria are present in 5% or more of the monthly samples.

Updates

On May 5, 2010 the New Mexico Environmental Dept./Drinking Water Bureau sampled for the U.S. Environmental Protection Agency water samples from the water system entry points as part of the Unregulated Contaminants Monitoring Rule (UCMR2). All results were Non-Detect (ND).

Beginning in January 2011, new regulations from the NMED Drinking Water Bureau mandate that the Los Alamos Dept. of Public Utilities be responsible for the collection of all Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAA5s) samples from the water distribution system. Another new requirement for 2011 will be the collection of asbestos samples from areas in the distribution systems that contain Asbestos Cement Pipe (ACP) which occur in small sections within Los Alamos County.

Water Quality

We are pleased to report that once again, there were no violations of drinking water quality standards in 2010. Our water production and water distribution divisions provide water to approximately 7,000 customer meters in Los Alamos County, Bandelier National Monument and at Los Alamos National Laboratory. We're proud to provide Los Alamos with water that not only meets federal and state requirements; it beats them. Although certain low-level contaminants are detected through our continuous monitoring and testing of the water supply, the Environmental Protection Agency has determined that Los Alamos' water is safe. The Consumer Confidence Report (CCR) on the facing page provides the data and notes supporting this safe determination.

About Certain CCR Substances

Arsenic. While Los Alamos drinking water contains a low level of naturally occurring arsenic, it is less than the current Maximum Contaminant Level (MCL) of 10 ppb. The MCL standard balances the current understanding of arsenic's possible health effects against the costs of its removal from drinking water. The Environmental Protection Agency continues to research the health effects of very low levels of arsenic. At high concentrations, the mineral arsenic is known to cause cancer in humans, and is linked to other health effects such as skin damage and circulatory problems.

Chromium. In response to an elevated detection of chromium in a regional aquifer monitoring well during 2005, Los Alamos National Laboratory (LANL) and the DPU began monitoring Los Alamos' drinking water supply wells for both total and hexavalent [Cr(VI)] chromium. Hexavalent chromium was detected on Oct. 23, 2007 at safe levels in Otowi Well 1 for the first time, which is not in use for drinking water. Detected levels at 6.1 ppb are well below the EPA's drinking water standard of 100 ppb and New Mexico's established ground water standard of 50 ppb. Chromium is everywhere and can be found in three forms: metal ore, trivalent [Cr(III)], and hexavalent [Cr(VI)]. Trivalent chromium, a required nutrient, occurs naturally in

fresh produce, meat, grains, and yeast. Relatively insoluble, it is the most prevalent form of chromium found in surface soils. Hexavalent chromium can sometimes be an indicator of human pollution. Hexavalent chromium is relatively soluble, can move through soil to ground water, and is considered more toxic than trivalent chromium.

Lead Safety

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. The lead levels in Los Alamos drinking water are not elevated and do not exceed EPA action levels. Lead in drinking water is primarily from material and components associated with service lines and home plumbing. The Los Alamos Dept. of Public Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. After water has been sitting in a pipe for several hours, the potential for lead exposure can be minimized by flushing the tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at www.epa.gov/drink/info/lead/index.cfm.

About Other Substances

Cryptosporidium. This is a microbial pathogen found in surface water (rivers and streams) throughout the United States. When ingested, cryptosporidium can result in diarrhea, fever, and other gastrointestinal symptoms. Los Alamos water is ground water, not surface water. Hence it is pumped from wells and does not come from rivers. As expected, cryptosporidium has not been detected in our water supply.

Perchlorate. Very low, but positive, detections of perchlorate (1.5-2.0 ppb) were identified over the last few years in Otowi Well 1, which is not in use for drinking water. Although EPA has not set an MCL for perchlorate, it has established an official reference dose (RfD) of 0.0007 mg/kg/day of perchlorate ingested from all sources, including drinking water. The equivalent level would be 24.5 ppb if a person's total exposure to perchlorate were from drinking water alone. Perchlorate interferes with the production of thyroid hormones, which are required for normal pre- and postnatal development in humans, as well as normal body metabolism. See <http://water.epa.gov/drink/contaminants/unregulated/perchlorate.cfm>

About Organic Chemicals

Organic chemical contaminants, such as synthetic organic compounds (SOCs) and volatile organic compounds (VOCs) are by-products of industrial processes and petroleum production. Sources of contamination can come from gas stations, urban storm water run-off, and septic systems. Entry points into our drinking water supply were sampled by the New Mexico Environmental Dept./Drinking Water Bureau for SOCs and VOCs and all sample results were below detectable levels.

Special Water Quality Monitoring

Under the Unregulated Contaminant Monitoring Rule, the EPA collected water samples from the Los Alamos water system to test for contaminants that are currently not listed as regulated. Based in part on this sampling, EPA may decide to regulate one or more such contaminant candidates in the future to protect the public health. All sample results were below the reporting limit (none detected).

How To Read the CCR's Headings & Measurement Units

- ppm = Parts per Million or Milligrams per Liter (mg/l). A ppm corresponds to a minute in two years or a penny in \$10,000.
- ppb = Parts per Billion or Micrograms per Liter. A ppb corresponds to a minute in 2,000 years, or a penny in \$10,000,000.
- pCi/L = Picocuries per Liter. Picocuries per liter is a measure of the radioactivity in water.
- MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- MCL = Maximum Contaminant Level. The "Maximum Allowed" is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- Range of Levels Detected = The minimum to maximum test results observed in 2010.

Source Water Assessment & Protection

We protect our drinking water from contamination based on well construction, hydrogeologic settings, and system operations and management. A Source Water Assessment & Protection (SWAP) analysis was performed in 2003 by the New Mexico Environment Department (NMED) to identify any possible sources of contamination. NMED ranked the susceptibility of our entire water system as "moderately high." To discuss findings please contact Pete Padilla, Environmental Compliance Specialist, (505) 662-8333.

Water Rights

Total water rights available to the Los Alamos townsite and White Rock, as determined by the Office of the New Mexico State Engineer, amount to 5,541.3 acre-feet per year. Los Alamos also has a contract with the U.S. Bureau of Reclamation for 1,200 more acre-feet of water per year from the San Juan/Chama transmountain diversion project. DPU is performing feasibility studies to utilize this water.

This additional source, coupled with conservation, will provide sufficient water to support future population growth and may help support the County Council's goal of diversifying the economy and bringing affordable housing to Los Alamos.

Water System Projects

DPU continued with capital improvements in 2010 that keep our water safe, enhance public safety and improve quality of life for all customers. System improvements were completed which replaced aging infrastructure and enhanced fire protection capacity as well.

2010 Diamond IV & V Water Line Renewal

Diamond Drive reconstruction Phases IV and V included significant water line improvements. As part of Diamond Phase IV, 2,300 feet of 16 inch ductile iron pipe was installed to replace two waterlines installed in the 1940s. In addition, 1600 feet of 8 inch PVC was installed to replace a 1940s 8 inch line. Phase V included the replacement of three waterlines that cross Diamond Drive. Each of the existing crossings were installed in the 1940s.

Pajarito Booster Tank 1

The 1.5 million gallon water tank located on Los Alamos National Laboratory property was built in 1965 and was due for re-coating, inside and out. To maintain uninterrupted water service to White Rock from an upstream water tank in the system. A bypass line was constructed to ensure adequate water for fire protection and drinking purposes. The project was completed protecting the tank for the next 25 years.

Gold Street Improvements

We replaced 425 feet of vintage 1940s cast iron pipe with PVC pipe. Natural gas work was already underway in the area, and the waterlines here had been prioritized for replacement due to previous line failures. DPU took the opportunity to dig once,

and address two different utility issues. The efficiency not only keeps costs down but reduces disruption for citizens and motorists.

LA Reservoir

Years of negotiation and coordination with multiple state and federal agencies for the rehabilitation of the Los Alamos Reservoir finally came to fruition in 2010. Final approvals occurred, and a permit was issued for the project which was awarded to the contractor. Although the LA Reservoir water is nonpotable, its use for irrigation reduces the use of potable water for the same purpose. In this way the LA Reservoir project, once completed next year will help reduce costs and conserve ground water supply.



Los Alamos Reservoir, February 2011.

Utilities Board

As a public enterprise, the DPU reports to the Board of Public Utilities. The Board approves the DPU's rules regulations, policies, and standards which are designed to ensure the provision of safe, adequate, and proper utility services at reasonable rates. Composed of five county residents appointed by the County Council, our Utilities Board members are your local friends and neighbors. They are: D. Chris Ortega, Chair; Glenn Woodwell, Vice Chair; Thurman Talley; Paul Smith; and Timothy Neal.

Your Input is Welcome

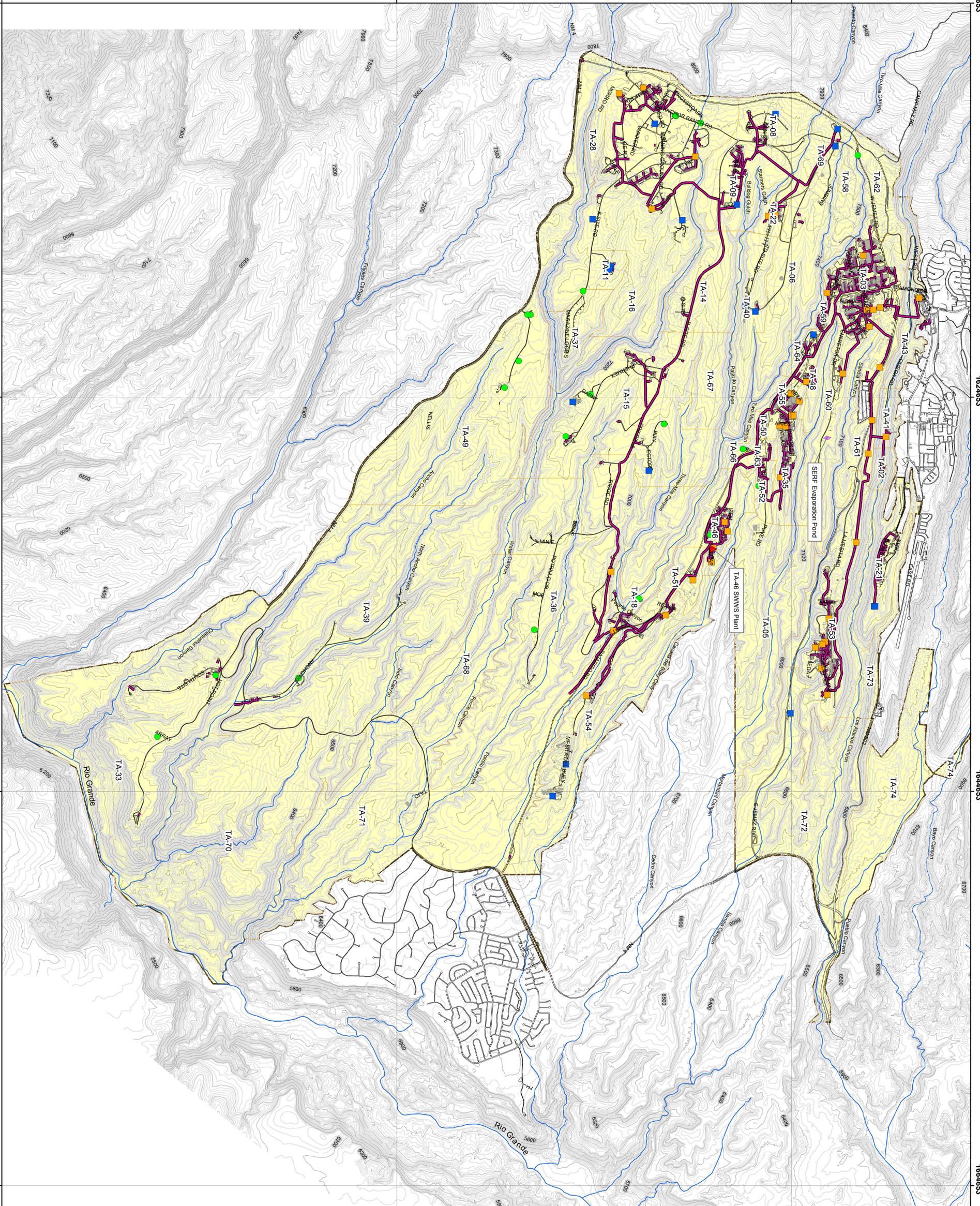
The public is always welcome to join us at each month's Utility Board meeting held on the third Wednesday 5:30 p.m. at 170 Central Park Square. Please call or email to receive an agenda at 505-662-8333 or DPU@lacnm.us, or download your own copy at our website:

www.LosAlamosNM.us/gov/bcc/UtilitiesBoard.

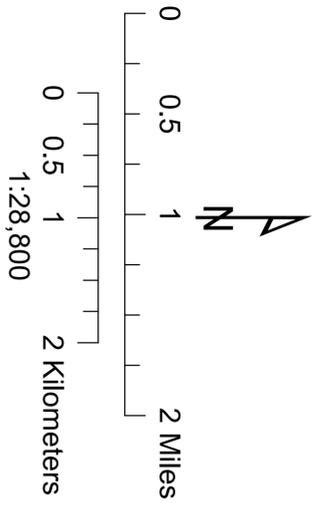
APPENDIX I
Map of the Sanitary Waste Water System (SWWS) Plant
Collection System

Los Alamos National Laboratory's Sanitary Wastewater Collection System

NPDES Permit No. NM0028355



- SERF Evaporation Pond
- Holding tank
- Lift station
- Septic tank
- Sanitary Waste Water System (SWWS)
- Paved Roads
- Dirt Roads
- Drainages
- 100ft Contours
- 20ft Contours
- TA Boundary
- Structures
- LANL Boundary

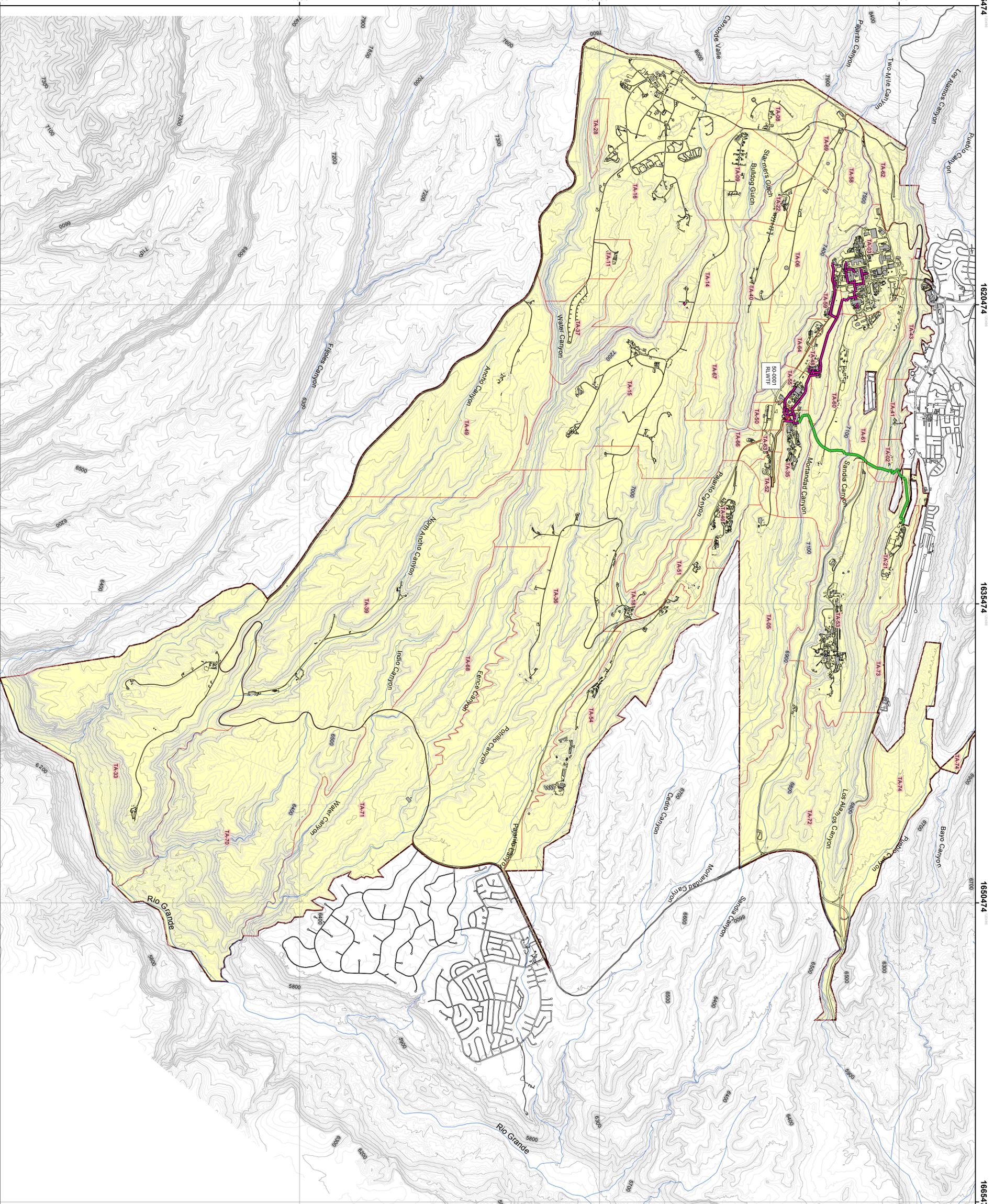


Dirt Road Arcs: Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.
 Hypsography, 100, 20 Foot Contour Interval: Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, 1991.
 LANL Areas Used and Occupied: Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office, 19 September 2007, as published 13 August 2010.
 Point Features of the Sewer Line System: Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.
 Paved Road Arcs: Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 28 May 2009.
 SERF Evap. Pond: Los Alamos National Laboratory, WES-EDA Group, X:\projects\04-projects\04-0014\SERF_Evap_pond_poly_GCS.shp
 Sewer Line System: Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.
 Structures: Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.
 Technical Area Boundaries: Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office, September 2007, as published 13 August 2010.
 WOH Drainage, arc: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 1:24,000 Scale Data, 03 June 2003.

This map was created for work processes associated with the Water Quality & RCRA (CSP). All other uses for this map should be confirmed with LANL ENV/RCRA staff.

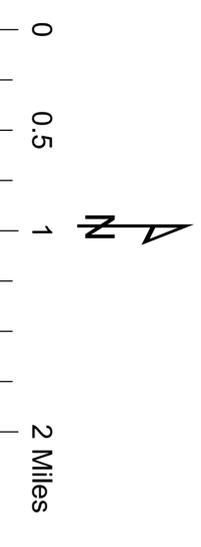
APPENDIX J
Map of the Radioactive Liquid Waste Collection System

Los Alamos National Laboratory Radioactive Liquid Waste Collection System NPDES Permit No. NM0028355



Legend	
	ZLD Line
	Abandoned RLW Line
	Radioactive Waste Collection System
	Paved Roads
	Dirt Roads
	Drainages
	100ft Contours
	20ft Contours
	TA-50 RLWTF
	ZLD Tank
	Structures
	LANL Boundary
	TA Boundary

State Plane Coordinate System New Mexico, Central Zone, US Feet
 NAD 1983 Datum National Geodetic Datum 1929
 Created by Wilbers Red Star, 17 August 2011,
 Map # 11-0096-02



Technical Area Boundaries: Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office, September 2007, as published 04 December 2008.

Ownership Boundaries Around LANL Area, Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office, 19 September 2007, as published 04 December 2008.

Paved Road Arcs: Los Alamos National Laboratory, KSI, Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 28 May 2008.

Hydrography: 100, 20 Foot Contour Interval, Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, 1991.

WQHD Drainage arcs: Los Alamos National Laboratory, ENV Water Quality and Hydrology Group, 124,000 Scale Data, 03 June 2003.

Locations of Springs: Los Alamos National Laboratory, Waste and Environmental Services Division Operations, the National Environmental Department of Energy Oversight Bureau, EP2008-0138, 1:2,500 Scale Data, 17 March 2008.

Paved Parking: Los Alamos National Laboratory, KSI, Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.

Dirt Road Arcs: Los Alamos National Laboratory, KSI, Site Support Services, Planning, Locating and Mapping Section, 06 January 2004, as published 29 November 2010.

This map was created for work processes associated with the Water Quality & RCRA/CERCLA. All other uses for this map should be confirmed with LANL ENV/RCRA staff.

APPENDIX K
LA-UR-11-01005, Radioactive Liquid Waste Treatment Facility
Annual Report for 2009 (February 2011)

LA-UR-11-01005

Approved for public release;
distribution is unlimited.

Title: Radioactive Liquid Waste Treatment Facility
Annual Report for 2009

Author(s): J.C. Del Signore
R.L. Watkins

Intended for: TA55 Radioactive Liquid Waste
February 2011



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Acronyms and Abbreviations

AE-Ci	americium-241-equivalent curie
Ci	curie (3.7×10^{10} disintegrations per second)
COD	chemical oxygen demand
CY	calendar year
DCG	derived concentration guidelines
DOE	United States Department of Energy
EPA	United States Environmental Protection Agency
IX	ion exchange
Kg	kilogram
L	liter
LANL	Los Alamos National Laboratory
MDL	method detection limit
meq/L	milliequivalents per liter
mg/L	milligram per liter
mrem	millirem (10^{-3} rem)
nCi/L	nanocuries per liter (10^{-9} curies per liter)
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
pCi/L	picocuries per liter (10^{-12} curies per liter)
RLW	radioactive liquid waste(s)
RLWCS	radioactive liquid waste collection system
RLWTF	radioactive liquid waste treatment facility
RO	reverse osmosis
SVOC	semi-volatile organic chemical(s)
TA	technical area
TDS	total dissolved solids
TSS	total suspended solids
TUF	tubular ultrafilter
VOC	volatile organic chemical(s)
$\mu\text{S/cm}$	microSiemens per centimeter
$\mu\text{g/L}$	microgram per liter

1. Overview of Facilities and Operations

There are two Radioactive Liquid Waste Treatment Facilities (RLWTF) at the Los Alamos National Laboratory, one each at TA53 and TA50. The RLW facility at TA50, however, contains two different treatment processes, each treating a different radioactive liquid waste (RLW) stream. These two processes are discussed separately in this report as though they were each a facility.

1.1 TA50 RLWTF for Low-Level RLW

The low-level RLW facility at TA50 receives and treats low-level RLW from more than 1000 generating points. RLW are sent from generator facilities to TA50 via truck or by underground pipe. The underground collection system has about four miles of double-walled pipes that are tied to 25 buildings at six Technical Areas at LANL.

The low-level RLW facility is the only facility that discharges treated water to the environment through an outfall in Mortandad Canyon. One state and two federal agencies monitor the quality of these treated waters.

Primary structures at the TA50 RLWTF for the treatment of low-level RLW are Building 50-01, 50-02, 50-90, 50-248, and a trailer-based evaporator. These structures, with a combined area of approximately 55,000 square feet, house process equipment, operations support areas, analytical laboratories, and offices. The facility has a main treatment process (MTP) with five unit operations, and a secondary treatment process consisting of two unit operations for the treatment of wastes generated by the MTP. The facility has been designated a Hazard Category 3 nuclear facility, and has Management Level 3 and Level 4 quality assurance requirements.

The TA50 RLWTF was constructed in 1963. Because of its age, and because of changing regulations, the facility has undergone significant modifications. The infusion of capital into the TA50 facility for repairs and upgrades has exceeded \$20 million since 1997, including projects for stack consolidation, repair of tanks and equipment, and the installation of new processes in 1999 and 2002 to address more stringent discharge standards.

1.2 TA50 RLWTF for Transuranic RLW

The transuranic facility receives and treats an acid waste stream and a caustic waste stream from the plutonium facility at TA55. These two streams are transferred to TA50 via two underground double-walled collection pipes. Treated transuranic waters are sent to the low-level evaporator for further treatment.

Structures for transuranic RLW consist of a valve station at Building 50-201, two influent storage tanks in Building 50-66, and the treatment process within Room 60 of Building 50-01. This facility is part of the Hazard Category 3 nuclear facility at TA50, and has Management Level 2 and Level 3 quality assurance requirements.

The transuranic RLW process was designed and installed in 1982, and brought online in 1983. The process has not been modified since installation, but equipment repairs and upgrades exceeding \$20 million have been necessary. Most recently, the caustic waste influent tank was replaced (2007), and piping and equipment in Room 60 were replaced. The latter project required more than four years, and was completed in late 2009.

1.3 TA53 Facility

The facility at TA53 treats RLW from accelerator research at the Los Alamos Neutron Science Center through water storage, to allow radioisotope decay, and solar evaporation. The TA53 facility started operation in December 1999, and is categorized as a radiological facility.

Water flows by gravity into lift stations adjacent to Experimental Area A and the Lujan center. The RLW is pumped from these lift stations through double-walled underground piping to one of three 30,000-gallon tanks inside Building 53-945 at the east end of TA53. The tanks allow decay of radioisotopes created by the LANSCE accelerator beam, most of which have short half-lives. After aging, the RLW is pumped to one of two evaporator basins, each with a capacity of 125,000 gallons.

2. Operations Summary for 2009

2.1 Flows

Table 2-1 summarizes influent and effluent volumes for the RLW facilities during 2009.

**Table 2-1
Radioactive Liquid Waste Flows During 2009**

Facility	Influent (liters)	Effluent (liters)
Low-level RLW	4,544,388	4,401,900
Transuranic RLW	2,916	7,535
TA-53	448,410	379,600

Low-level RLW: The TA50 RLWTF received 4,544,400 liters of influent during 2009, and discharged 4,401,900 liters to Mortandad Canyon. Influent included 59,600 liters of water transported from four generators via truck. Water flows were down 17% from the preceding year, but nearly the same as in 2007. Influent and effluent volumes are detailed by month in Table 2-2.

The influent brought with it 0.58 curie of alpha radioactivity and 0.07 curie of beta activity in 542 grams of radioactive material. Uranium-238 accounted for nearly all of the radioactive mass, while plutonium and americium accounted for nearly all of the radioactivity. Effluent contained just 0.06 curie in one gram of radioactive material. Approximately 99.7% of the radioactivity in the effluent was due to tritium, which cannot be removed by RLWTF processes.

Approximately 1050 kilograms of chemicals entered the plant with the influent in the form of suspended solids (49 kilograms) and dissolved solids (1,000 kilograms). After treatment, a total of 1050 kilograms of chemicals were discharged into Mortandad Canyon in the form of dissolved solids, of which 40% was sodium.

Transuranic RLW: Influent for the year consisted of 2916 liters of waste in three transfers from TA55. While no influent was treated, 7535 liters of effluent were sent to the tanks in Building 50-248. Effluent came from rinsing and flushing Room 60 piping and equipment, and from the calibration of tank level probes; effluent was not the result of treating of transuranic RLW.

TA53 RLWTF: The TA53 facility received 448,410 liters of influent during 2009, and discharged 379,600 liters to the evaporation basins. Influent included 158,130 liters trucked to TA53 from other locales, in addition to water from accelerator research. Because influent was so much larger than effluent volume, storage tanks were at 70% of capacity at year's end, versus 50% of capacity twelve months earlier.

**Table 2-2
TA50 Low-level RLW Flow Summary During 2009**

Date	Influent (Liters)	No. of Discharges	Discharged (Liters)
Jan-09	365,691	4	299,300
Feb-09	285,860	4	301,100
Mar-09	419,858	7	524,300
Apr-09	456,239	5	372,400
May-09	368,572	5	377,400
Jun-09	383,284	5	343,900
Jul-09	485,445	6	440,500
Aug-09	363,910	6	453,300
Sep-09	364,317	6	458,000
Oct-09	313,725	4	303,500
Nov-09	389,370	3	226,900
Dec-09	348,117	4	301,300
Total	4,544,388	59	4,401,900

2.2 Effluent Quality: Low-level RLW

Three agencies monitor the quality of treated waters discharged from the TA50 RLWTF into Mortandad Canyon. The United States Department of Energy (DOE) regulates discharges of radioactive materials via Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE, 01/17/93). The United States Environmental Protection Agency (USEPA) regulates 18 parameters via NPDES permit number NM0028355 (EPA, 06/08/07). LANL also has voluntary commitments (a) to the New Mexico Environment Department (NMED) to meet groundwater standards for fluoride, nitrate-nitrogen and total dissolved solids, (b) to the NMED to meet a proposed discharge standard for perchlorates, and (c) to the DOE to limit tritium to the drinking water standard.

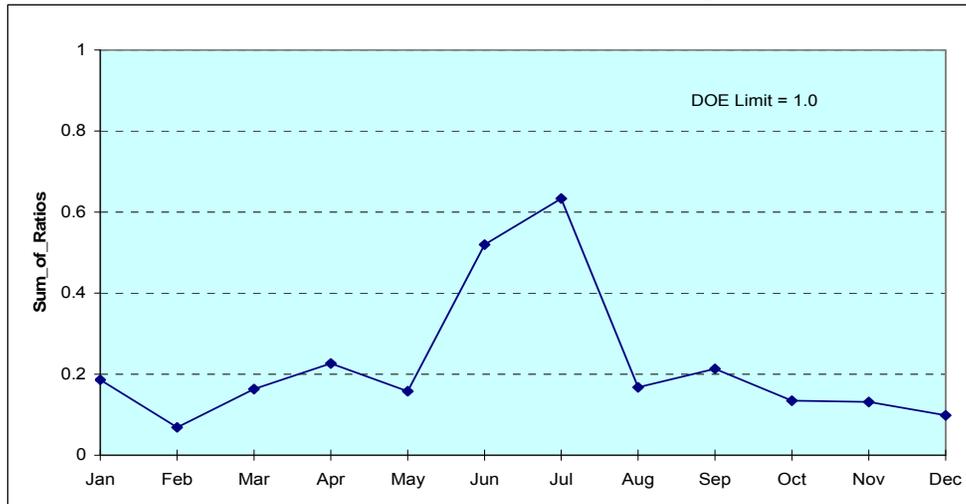
During calendar year 2009, TA50 RLWTF effluent:

- met all DOE standards set forth in Order 5400.5 for radiological discharges;
- met all NPDES discharge standards except for one analysis for pH.
- met all voluntary standards except for one weekly measurement for nitrate.

DOE: Effluent radiological quality during 2009 is illustrated in Figure 2-1, a plot of sum-of-ratios for each month. The average sum-of-ratios for the year was 0.24, or approximately one-fourth of the DOE discharge standard. RLWTF effluent has been compliant with the standard for 118 of the past 120 consecutive months¹.

¹ The monthly sum-of-ratios for discharge of radionuclides was 1.28 in January 2002 and 1.19 in February 2002, versus the DOE Guideline of 1.0.

**Figure 2-1
Sum-of-Ratios in RLWTF Effluent During 2009**



EPA: Table 2-3 summarizes effluent quality versus NPDES discharge limits. The table lists regulated parameters, their discharge standards, and the maximum and average concentration of each parameter in monthly composite samples of effluent during 2009. Although monthly composite sample results met discharge limits, a sample taken during a discharge on 02-04-2009 was measured with a pH value of 5.7 standard units, versus the acceptable range of 6.0-9.0 units. This discharge snapped a string of 109 consecutive months without an NPDES violation.

**Table 2-3
TA50 RLWTF Effluent During 2008 Compared To NPDES Standards**

Regulated Parameter	Frequency	Units	Standard	Max.	Avg.
Cadmium	Annual	µg/L	Report	0.24	0.06
Copper	Monthly	µg/L	Report	87	33
Mercury	Annual	µg/L	Report	0.04	0.004
Nickel	Annual	µg/L	Report	66	25
PCBs	Annual	µg/L	Report	*	*
Perchlorate	Annual	µg/L	Report	*	*
Selenium	Annual	µg/L	Report	8.0	1.6
WET	Quarterly	%	Report	100%	75%
Zinc	Monthly	µg/L	Report	25	13
Chromium	Annual	µg/L	1,340	4.7	0.8
COD	Monthly	mg/L	125	39	18
Lead	Annual	µg/L	423	5.5	1.9
pH	Weekly	s.u.	6 - 9	8.2	7.3
Radium	Annual	pCi/L	30	*	*
Residual Chlorine	Weekly	µg/L	11	*	*
Suspended Solids	Monthly	mg/L	30	*	*
Toxic Organics	Monthly	µg/L	1,000	18	1.5

Data is from 12 monthly composite samples, except for PCBs, residual chlorine, and WET.
WET = whole effluent toxicity * Less than detection limit.

Voluntary: Table 2-4 summarizes effluent quality versus voluntary discharge standards. The table lists the voluntary discharge standards, and the maximum and average concentration of each parameter in weekly composite samples of effluent during 2009. Voluntary discharge standards were met for all weekly composite samples for dissolved solids, fluoride, perchlorate, and tritium (180 total analyses). Weekly composite results for nitrate-nitrogen met the voluntary discharge standard of 10 mg/L for 43 of 45 weeks. Discharge concentrations of 12.9 and 12.8 mg/L were measured for the weeks ending 10-04-2009 and 11-22-2009, respectively.

**Table 2-4
TA50 RLWTF Effluent During 2009 Compared To Voluntary Standards**

	Agency	Units	Standard	#>Std.	Max.	Avg.
Dissolved Solids	NMED	mg/L	1,000	0	558	232
Fluoride	NMED	mg/L	1.6	0	0.55	0.17
Nitrate-Nitrogen	NMED	mg/L	10	2	12.9	6.2
Perchlorate	EPA	µg/L	4	0	1.95	0.05
Tritium	DOE	nCi/L	20	0	20	16

Data is from 45 weekly composite samples; no water was discharged during the other weeks of the year.

2.3 Production

Low-level RLW: Influent was received all 365 days of the year. The Main Treatment Plant operated on 140 days, and effluent was discharged on 59 occasions. Key process indicators for each of the unit operations were as follows:

- Clarifier sludge was not removed at any time during the year.
- The gravity filter was backwashed twice (107,050 liters).
- Perchlorate ion exchange vessels were not changed the entire year.
- RO membranes were changed on six occasions; TUF membranes were not changed.

In the Secondary Treatment Plant, the vacuum filter (sludge processing) was not operated. Bottoms were not shipped for off site treatment and disposal. It was necessary to continue to store evaporator bottoms in the 100K influent tank.

Three evaporator campaigns were conducted, one each in June, July, and August. A total of 134,410 gallons of reverse osmosis concentrate and bottoms were fed to the evaporator; 50,770 gallons of bottoms and chemical cleaning solutions were generated. Evaporator campaigns of July and August were used to concentrate evaporator bottoms in addition to reverse osmosis concentrate. The need to re-concentrate was created by the four-year drought in shipping bottoms for off-site treatment and disposal. Without this further concentration, there would have been no storage tanks available for either RO concentrate or evaporator bottoms, and RLW treatment would have had to be suspended. Re-concentration of evaporator bottoms came at a high cost. Higher downtime, increased filter bag changes, increased fouling, more frequent chemical cleaning, and increased pump wear and maintenance all resulted.

RLWCS: A total of 208 vault inspections were conducted during 2009, an average of three per vault. Water discovered in vaults was sampled and analyzed for radioactivity, then de-watered. Sampling confirmed that water found in the vaults was due to the infiltration of groundwater, not to collection system leakage. At the end of the year, ten vaults were suspected to contain water, and 16 alarms were in need of repair.

Transuranic RLW: Influent was received on just three occasions, and no treatment took place in Room 60. Despite this, the year 2009 was marked by a number of significant successes. The Room 60 Upgrades Project, started in 2004, drew to a close. Equipment installation and testing, and instrument calibration, were completed. The Contractor Readiness Assessment was successfully completed, and pre-start assessment findings were closed. On December 14, the DOE authorized the restart of Room 60 operations.

TA53 RLWTF: Influent volume was higher than normal, largely because 158,000 liters were trucked to the evaporation basins from other technical areas. Discharges were made to the evaporation basins in February, July (twice), and November.

2.4 Process and Facility Modifications

Process: There were no major process modifications during 2009.

Facility: Work was completed on upgrades to Room 60. Started in 2004, the Room 60 Upgrade Project has replaced corroded and leaking process pipes, the sludge storage tank, and a small pressure filter. Work also continued, albeit at low levels, on the installation of a new pump house and influent storage facility. Started in 2000 after the Cerro Grande wildfire, this project neared completion during 2009.

2.5 Wastes

The process waste backlog varied from 400 – 600 thousand liters during 2009. A small net reduction was achieved during the year: 494 thousand liters of process wastes at the end of the year, versus 519,000 liters on January 1st. At the end of the year, the backlog was comprised of 312,000 liters of bottoms, 135,000 liters of evaporator feed, 44,000 liters of low-level sludge, and 3100 liters of transuranic sludge.

A total of 55 cubic meters (13,880 kilograms) of packaged wastes were shipped from the TA50 RLWTF during 2009. Almost all of this was solid low-level radioactive waste. Shipments included 869 kilograms of chemical wastes generated during closeout of the Room 60 Upgrades Project, and during a plant-wide chemical cleanout campaign. Approximately 3500 kilograms of low-level waste were generated during two maintenance and construction projects, the Room 60 Upgrades Project and the influent storage project. Another 9500 kilograms of solid low-level waste were generated by RLWTF operations. No process wastes (e.g., sludge) were shipped during 2009.

3. Radiological Nature of Low-level RLW

RLWTF influent and effluent samples are analyzed for thirty-seven (37) radionuclides which, from past experience, are possible in LANL radioactive liquid wastes². These radionuclides are categorized by primary method of decay as either alpha-emitting or beta-emitting isotopes. Alpha-emitting radionuclides are of most concern because of quantities (both mass and radioactivity) and safety basis impacts.

3.1 Influent Characteristics

As shown in Tables 3-1 and 3-2, nineteen radionuclides were detected in the RLWTF influent: eight alpha-emitting isotopes and eleven beta-emitting isotopes.

Influent contained 0.58 curie of alpha-emitting radionuclides, and had an average concentration of 127 nCi/L. This concentration was about twice the historical average alpha concentration (Del Signore, December 2006, p.25). Am-241, Pu-238, and Pu-239 comprised 99.9% of the alpha radioactivity.

Beta-emitting radionuclides had an average concentration of 14.2 nCi/L, and brought 0.065 curie. More than 98% of beta radioactivity was from tritium.

3.2 Effluent Characteristics

As shown in Tables 3-1 and 3-2, nineteen radionuclides were detected in the RLWTF effluent: seven alpha-emitting isotopes and twelve beta-emitting isotopes. Alpha-emitting radionuclides had an average effluent concentration of 7.7 pCi/L, and beta-emitting radionuclides an average concentration of 14.6 nCi/L. Less than one-tenth of a millicurie of alpha radioactivity was discharged to Mortandad Canyon in the effluent.

3.3 Radionuclide Removal

Table 3-2 summarizes radioactivity (curies) into and out of the RLWTF for 2009 for all radioisotopes. In the table, “alpha gross” indicates direct analytical measurement of alpha activity by liquid scintillation counting, and “alpha sum” is the arithmetic sum of the concentrations of the nine alpha-emitting radionuclides by alpha spectroscopy. This double analysis of water samples provides an accuracy check for analytical results, and can indicate when re-analysis may be warranted.

² Non-routine isotopes are also detected during evaluation of spectrographic data.

**Table 3-1
Radionuclide Analyses of RLWTF Influent and Effluent in CY 2009**

Radionuclides Analyzed for in the RLWTF Influent and Effluent	Radionuclides Detected in RLWTF Influent	Radionuclides Detected in RLWTF Effluent
Alpha Particle Emitters (9)		
Am-241	X	X
Np-237		
Pu-238, 239	X, X	X, X
Ra-226	X	
Th-232	X	X
U-234, 235, 238	X, X, X	X, X, X
Beta Particle Emitters (28)		
As-74	X	X
Be-7		
Ce-141	X	
Co-56, 57, 58, 60	X	X
Cs-134, 137	X	X,X
Eu-152		
H-3	X	X
I-133		X
Mn-52, 54		
Na-22		X
Ra-228	X	X
Rb-83, 84	X	X,X
Sc-46, 48		
Se-75	X	
Sn-113		
Sr-85, 89, 90	X,X,X	X
V-48		
Y-88		
Zn-65		X
37 Total	19 Total	19 Total *

* Nb-95 was also detected in the effluent, in December 2009.

Table 3-3 shows the *mass* of alpha-emitting radionuclides in RLWTF influent and effluent during 2009. The table shows that 542 grams of alpha emitters were received in influent, and that 0.9 gram was discharged in treated water, a removal of 99.9%. The table also shows that uranium-238 comprised nearly all of the mass of these radionuclides in both influent and effluent.

A similar perspective is obtained by examining removal of alpha *radioactivity* during 2009 (Table 3-4). The RLWTF performed even better from this perspective, removing 99.994% of the radioactivity of the alpha emitters from the wastewater stream (0.58 curie in, versus 34 microcuries out).

**TABLE 3-2
TA-50 RLWTF Radionuclide Summary For 2009**

	RAW Avg (nCi/L)	Maximum (nCi/L)	Minimum (nCi/L)	Total (Ci)	FINAL Avg (pCi/L)	Maximum (pCi/L)	Minimum (pCi/L)	Total (Ci)
Alpha Gross	1.28E+02	4.80E+02	3.10E+01	5.79E-01	7.29E+00	1.90E+01	3.00E+00	3.21E-05
Alpha Sum	1.27E+02	4.49E+02	2.36E+01	5.78E-01	7.66E+00	1.96E+01	2.73E+00	3.37E-05
Am-241	2.06E+01	9.90E+01	4.80E+00	9.35E-02	2.72E+00	9.00E+00	*	1.20E-05
As-74	1.54E-02	7.90E-02	*	7.01E-05	7.12E+00	3.70E+01	*	3.13E-05
Be-7	*	*	*	*	*	*	*	*
Ce-141	9.63E-03	8.10E-02	*	4.38E-05	*	*	*	*
Co-56	*	*	*	*	*	*	*	*
Co-57	*	*	*	*	7.91E-02	7.60E-01	*	3.48E-07
Co-58	1.20E-03	1.40E-02	*	5.45E-06	*	*	*	*
Co-60	*	*	*	*	*	*	*	*
Cs-134	*	*	*	*	8.76E-02	1.70E+00	*	3.86E-07
Cs-137	6.44E-03	2.30E-02	*	2.92E-05	1.47E+00	8.10E+00	*	6.47E-06
Eu-152	*	*	*	*	*	*	*	*
H-3	*	*	*	*	1.46E+04	1.80E+04	1.10E+04	6.43E-02
I-133	*	*	*	*	3.34E-01	2.80E+00	*	1.47E-06
Mn-52	*	*	*	*	*	*	*	*
Mn-54	*	*	*	*	*	*	*	*
Na-22	*	*	*	*	1.87E-01	1.80E+00	*	8.24E-07
Nb-95	*	*	*	*	1.29E-01	2.50E+00	2.50E+00	5.67E-07
Np-237	*	*	*	*	*	*	*	*
Pu-238	4.63E+01	2.30E+02	2.80E+00	2.10E-01	1.81E+00	9.50E+00	*	7.98E-06
Pu-239	6.02E+01	1.50E+02	1.60E+01	2.74E-01	2.70E+00	7.50E+00	9.90E-01	1.19E-05
Ra-226	2.55E-03	3.70E-02	*	1.16E-05	*	*	*	*
Ra-228	5.16E-03	4.30E-02	*	2.34E-05	*	*	*	*
Rb-83	7.97E-03	9.90E-02	*	3.62E-05	6.11E+00	3.90E+01	*	2.69E-05
Rb-84	*	*	*	*	9.43E-01	4.20E+00	*	4.15E-06
Sc-46	*	*	*	*	*	*	*	*
Sc-48	*	*	*	*	*	*	*	*
Se-75	1.10E-03	1.10E-02	*	5.02E-06	*	*	*	*
Sn-113	*	*	*	*	*	*	*	*
Sr-85	2.91E-02	1.80E-01	*	1.32E-04	2.56E+00	7.80E+00	*	1.13E-05
Sr-89	1.84E-02	1.00E-01	*	8.35E-05	*	*	*	*
Sr-90	1.31E-02	1.30E-01	*	5.93E-05	*	*	*	*
Th-232	2.62E-04	1.10E-03	*	1.19E-06	2.50E-03	2.40E-02	*	1.10E-08
U-234	3.18E-02	9.00E-02	*	1.44E-04	3.54E-01	2.40E+00	*	1.56E-06
U-235	1.15E-03	3.00E-03	*	5.20E-06	5.83E-04	6.50E-03	*	2.57E-09
U-238	3.88E-02	1.30E-01	2.70E-03	1.76E-04	6.11E-02	2.60E-01	*	2.69E-07
V-48	*	*	*	*	*	*	*	*
Y-88	*	*	*	*	*	*	*	*
Zn-65	*	*	*	*	3.72E-01	4.40E+00	*	1.64E-06

Twelve influent samples and 12 effluent samples for each isotope.
 * Less than Detection Limit n.m.: Not measured

**Table 3-3
Mass of Alpha Emitting Radionuclides During 2009**

Radionuclide	Influent (grams)	Effluent (grams)
Am-241	<0.1	<0.001
Np-237	*	*
Ra-226	<0.1	*
Pu-238	<0.1	<0.001
Pu-239	4.4	<0.001
Th-232	10.8	0.100
U-234	<0.1	<0.001
U-235	2.4	0.001
U-238	524	0.800
Totals	542	0.902

* Less than Detection Limit

Removal of beta-emitting radioisotopes is also depicted in Table 3-4. Approximately 80% of non-tritium beta activity was removed during 2009 (0.42 millicurie in; 0.085 millicurie out). Tritium quantities entering and leaving the plant were the same (64 millicuries). This is because tritium is present as water, and the RLWTF is not equipped to treat or remove tritium.

**Table 3-4
Removal of Radioactivity From RLWTF Influent During 2009**

Month	Influent (mCi)	Effluent (mCi)	%Removed
Alpha radioactivity	578	0.034	99.994
Beta radioactivity*	0.42	0.085	79.6
Tritium (beta)	64	64	0

* Non-tritium beta

3.4 Regulatory Performance

In 1990 DOE issued Order 5400.5, "Radiation Protection of the Public and the Environment," which revised Derived Concentration Guidelines (DCGs) for all radionuclides discharged from DOE facilities. The concentration of each radionuclide divided by its particular DCG value results in a ratio. For waters containing more than one radionuclide, a ratio is to be found for each radionuclide, and these ratios are to be summed. To be in compliance with Order 5400.5, the sum of the ratios cannot exceed 1.0.

Table 3-5 provides flow-weighted sum-of-the-ratios for individual isotopes, and shows that the average for all of 2009 was 0.24. Americium, ²³⁸Pu, and ²³⁹Pu accounted for nearly all of the sum of the ratios in the RLWTF effluent; tritium accounted for about 1%.

**Table 3-5
TA-50 RLWTF Effluent During 2009 Compared With DOE Order 5400.5**

Radioactive Isotopes	Mean Concentration (picoCi/L)	DCG 5400.5 (picoCi/L)	Percent Of DCG
Am-241	2.7	30	9.1
As-74	7.1	40,000	<0.1
Co-57	0.1	100,000	<0.1
Cs-134	0.1	2,000	<0.1
Cs-137	1.5	3,000	<0.1
H-3	14,600	2,000,000	0.7
I-133	0.3	10,000	<0.1
Na-22	0.2	10,000	<0.1
Nb-95	0.1	65,000	<0.1
Pu-238	1.8	40	4.5
Pu-239	2.7	30	9.0
Rb-83	6.1	20,000	<0.1
Rb-84	0.9	10,000	<0.1
Sr-85	2.6	70,000	<0.1
Th-232	<0.1	50	<0.1
U-234	0.35	500	<0.1
U-235	<0.1	600	<0.1
U-238	0.1	600	<0.1
Zn-65	0.4	9,000	<0.1
Sum of Ratios = 0.236			

* Other isotopes were not detected in RLWTF effluent.

3.5 Graphs of Radiological Data

Figures 3-1 and 3-2 chart concentrations in RLWTF influent and effluent for each month of 2009 for alpha-emitting isotopes (i.e., sum of the concentration of the nine alpha radionuclides listed in Table 3-3). Note that the ordinate of Figure 3-1 is scaled in nanocuries per liter while Figure 3-2 is scaled in picocuries per liter, a factor of one thousand. Examination of these graphs shows the following:

- The decontamination factor for alpha radioisotopes was four orders of magnitude (i.e., 10,000) or more. This was also indicated in Table 3-4.
- Effluent concentrations averaged less than 15 pCi/L, the EPA drinking water standard, for ten months.

Figure 3-1
Alpha-Emitting Isotopes in RLWTF Influent During 2009

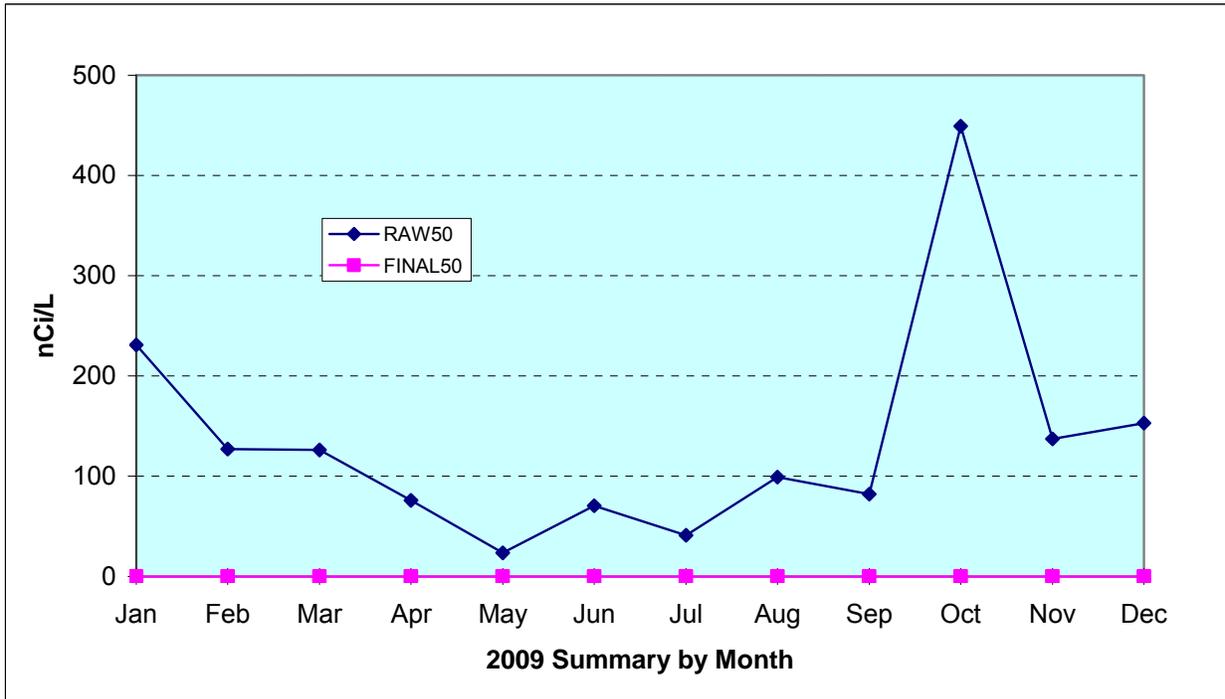
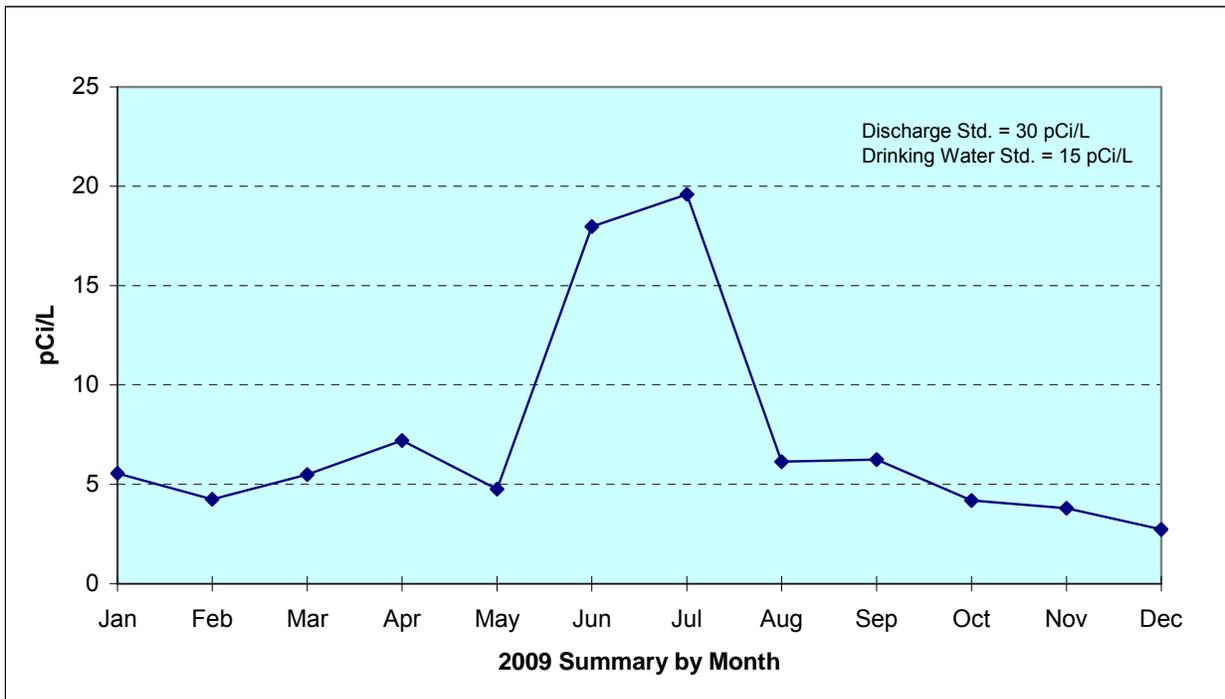


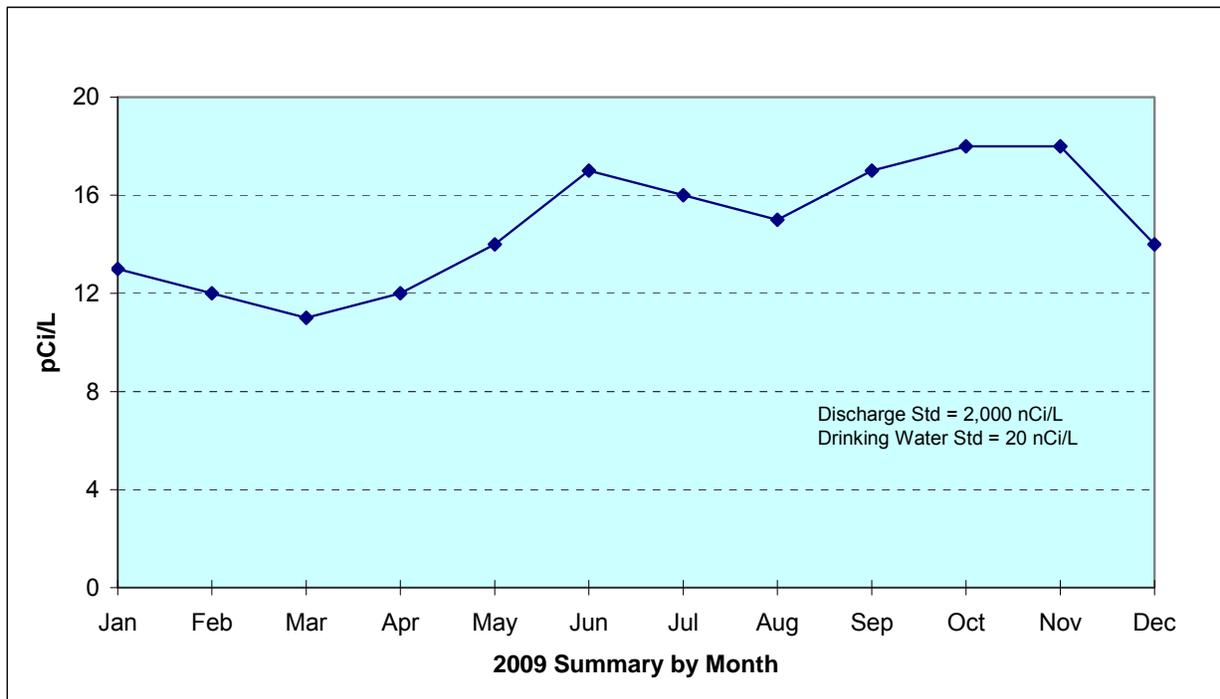
Figure 3-2
Alpha-Emitting Isotopes in RLWTF Effluent During 2009



- Influent concentrations surged in October 2009. No particular isotope was the cause, as ^{238}Pu , ^{239}Pu , and ^{241}Am concentration each increased from the annual average. No generator was identified as the source of the spike.
- Effluent concentrations were high, though safely within the discharge standard, during June and July 2009. Abnormal fouling of reverse osmosis membranes occurred during these two months. Membranes had to be changed on three occasions over a seven-week period.

Figure 3-3 charts average concentrations, in nanocuries per liter, of tritium by month in RLWTF effluent. Tritium was the only significant beta-emitting radionuclide in RLWTF effluent, accounting for 99.8% of the total beta activity discharged during 2009. All discharges to the environment were below the EPA drinking water standard.

Figure 3-3
Tritium in RLWTF Effluent During 2009



4. Non-Radiological Nature of Low-level RLW

RLWTF influent and effluent are analyzed for both inorganic and organic constituents, many of which are present in tap water. Influent samples are analyzed for 40 inorganic water quality parameters, and for 130 volatile and semi-volatile organic compounds. Effluent samples are analyzed for the same 40 inorganic parameters, and for 86 volatile and semi-volatile organic compounds.

Inorganic constituents included:

- seven conventional water quality measures, such as conductivity, hardness, and pH
- a total of 24 cation measurements (metals)
- five anions: chloride, fluoride, cyanide, sulfate, and perchlorate
- four nitrogen measurements – nitrogen as ammonia, nitrogen as nitrates, nitrogen as nitrites, and total Kjeldahl nitrogen.

Organic constituents are also analyzed via approved EPA analytical methods. Influent samples are analyzed via SW-846:8260B (69 volatile organic compounds) and SW-846:8270C (61 semi-volatile organic compounds). Effluent samples are analyzed via Method 624 for (32 volatile organic compounds) and Method 625 (54 semi-volatile organic compounds).

4.1 Influent Characteristics

Twelve monthly composite samples of influent were analyzed during 2009, each for 40 different inorganic parameters. As shown in Table 4-1, all 40 parameters were detected in the RLWTF influent in 2009. The table also shows, however, that sixteen of these were reported at less than the analytical detection limit for at least one month during the year. On average, in fact, seven inorganic parameters were reported each month at less than the analytical detection limit. Average influent concentration of all inorganic chemicals for the entire year was 232 mg/L.

As shown in Table 4-5, the total mass of inorganic chemicals entering the RLWTF was 1044 kilograms, of which nitrate totaled 220 kilograms (21%). This was quite different from radioactive contaminants, which had a combined influent mass of less than one kilogram.

Influent was also analyzed for volatile and semi-volatile organic compounds (Tables 4-2 and 4-3). Nine samples were collected during 2009, and each were analyzed for 130 organic compounds. Of these analyses, 46 (4%) were determined to exceed minimum detection level. Annual average influent concentration was 0.05 mg/L volatile organic compounds and 0.04 mg/L semi-volatile organic compounds. Total mass of organic compounds estimated to have been received with the influent for the year was 445 grams, 88% of which was comprised of three chemicals (acetone, Bis(2-Ethylhexyl)Phthalate, and methylene chloride).

**Table 4-1
TA50 RLWTF Inorganic Summary For 2009**

	RAW Average	Maximum	Minimum	Total In (Kg)	FINAL Average	Maximum	Minimum	Total Out (Kg)
ALKALINITY-MO**	3.93E+01	1.10E+02	*	1.78E+02	1.49E+02	2.70E+02	6.60E+01	6.55E+02
ALUMINUM	4.85E-01	8.10E-01	*	2.21E+00	6.30E-03	2.00E-02	*	2.77E-02
AMMONIA-N	9.62E+00	1.46E+01	5.90E+00	4.37E+01	5.46E+00	1.13E+01	1.50E+00	2.41E+01
ARSENIC	9.08E-04	5.50E-03	*	4.13E-03	1.95E-04	5.30E-04	*	8.58E-04
BARIUM	2.90E-02	6.00E-02	*	1.32E-01	1.41E-02	9.40E-02	*	6.20E-02
BERYLLIUM	1.21E-03	5.50E-03	*	5.52E-03	*	*	*	*
BORON	1.10E-01	4.50E-01	*	5.02E-01	8.31E-02	1.90E-01	*	3.66E-01
CADMIUM	6.49E-04	4.00E-03	*	2.95E-03	6.12E-05	2.40E-04	*	2.69E-04
CALCIUM	1.20E+01	2.70E+01	7.40E+00	5.44E+01	3.99E-01	1.00E+00	6.00E-02	1.76E+00
CHLORIDE	2.35E+01	3.40E+01	1.54E+01	1.07E+02	1.43E+01	2.80E+01	5.50E+00	6.31E+01
CHROMIUM	6.42E-02	3.00E-01	*	2.92E-01	8.22E-04	4.70E-03	*	3.62E-03
COBALT	9.69E-03	1.10E-01	*	4.40E-02	1.94E-01	2.80E+00	*	8.52E-01
COD	7.08E+01	2.23E+02	3.20E+01	3.22E+02	1.76E+01	3.90E+01	*	7.77E+01
CONDUCTIVITY**	3.42E+02	4.60E+02	2.80E+02	1.56E+03	4.38E+02	6.80E+02	1.90E+02	1.93E+03
COPPER	9.71E-01	4.30E+00	2.30E-01	4.41E+00	3.28E-02	8.70E-02	6.90E-03	1.45E-01
CYANIDE	6.44E-04	8.00E-03	*	2.93E-03	*	*	*	*
FLUORIDE	3.72E-01	8.40E-01	4.00E-02	1.69E+00	1.83E-01	1.10E+00	3.00E-02	8.04E-01
HARDNESS**	4.46E+01	8.72E+01	3.30E+01	2.03E+02	2.70E+00	1.21E+01	4.36E-01	1.19E+01
IRON	4.39E+00	1.20E+01	7.40E-01	2.00E+01	1.79E-02	6.10E-02	*	7.90E-02
LEAD	1.70E-01	3.00E-01	6.60E-02	7.73E-01	1.88E-03	5.50E-03	*	8.30E-03
MAGNESIUM	3.58E+00	4.80E+00	3.00E+00	1.63E+01	4.14E-01	2.90E+00	3.30E-02	1.82E+00
MERCURY	3.38E-03	7.90E-03	*	1.54E-02	4.37E-06	4.20E-05	*	1.92E-05
NICKEL	5.96E-01	3.90E+00	2.70E-02	2.71E+00	2.47E-02	6.60E-02	*	1.09E-01
NITRATE-N	1.09E+01	1.92E+01	5.50E+00	4.97E+01	6.69E+00	1.15E+01	2.70E+00	2.95E+01
NITRITE-N	3.59E-01	2.04E+00	*	1.63E+00	1.85E+00	5.30E+00	5.00E-02	8.15E+00
PERCHLORATE	2.12E-01	5.00E-01	8.00E-02	9.61E-01	*	*	*	*
PHOSPHORUS	1.77E+00	5.50E+00	6.40E-01	8.04E+00	1.15E-01	3.40E-01	3.00E-02	5.06E-01
POTASSIUM	4.53E+00	9.70E+00	3.00E-01	2.06E+01	2.97E+00	6.10E+00	2.60E-01	1.31E+01
SELENIUM	2.56E-02	2.10E-01	*	1.16E-01	1.60E-03	8.00E-03	4.00E-04	7.03E-03
SILICON	3.53E+01	7.20E+01	5.10E+00	1.60E+02	4.20E+00	2.90E+01	*	1.85E+01
SILVER	6.02E-04	5.20E-03	*	2.74E-03	4.14E-06	6.00E-05	*	1.82E-05
SODIUM	3.09E+01	4.70E+01	1.80E+01	1.40E+02	9.32E+01	1.90E+02	3.60E+01	4.10E+02
SULFATE	2.87E+01	8.60E+01	9.00E-01	1.30E+02	9.18E+00	2.10E+01	1.50E-01	4.04E+01
TDS	2.21E+02	2.72E+02	1.50E+02	1.00E+03	2.39E+02	3.63E+02	1.28E+02	1.05E+03
TKN	1.26E+01	1.90E+01	8.50E+00	5.73E+01	5.29E+00	8.80E+00	2.20E+00	2.33E+01
TOXIC ORGANICS	n.m.	n.m.	n.m.	n.m.	1.24E-03	1.81E-02	*	5.44E-03
TSS	10.8E+00	4.40E+01	*	4.89E+01	0.00E+00	1.70E+01	*	0.00E+00
URANIUM	1.17E-01	4.00E-01	8.00E-03	5.33E-01	1.82E-04	7.70E-04	*	8.02E-04
VANADIUM	7.14E-03	3.40E-02	*	3.24E-02	1.43E-04	2.10E-03	*	6.29E-04
ZINC	3.11E-01	5.00E-01	1.00E-01	1.41E+00	1.32E-02	2.50E-02	1.60E-03	5.82E-02
pH	5.95E+00	7.50E+00	3.40E+00	--	7.32E+00	8.15E+00	6.20E+00	--

Twelve influent composite samples and 12 effluent composite samples for each inorganic.

* Less than Detection Limit n.m.: Not measured

**Units: All figures in mg/L except:

Alkalinities and hardness as mg CaCO3/L; Conductivity as uS/cm; Total Cations as meq/L.

Table 4-2
VOC Detected in Samples of 2009 RLWTF Influent

Volatile Organic Compound	No. of Detects	Minimum (µg/L)	Maximum (µg/L)
4-Methyl-2-Pentanone	1	5.8	5.8
Acetone	5	7.0	230
Benzene	1	0.94	0.94
Bromomethane	3	2.5	17
Chloroform	5	0.13	3.6
Chloromethane	2	0.23	3.3
Iodomethane	1	6.9	6.9
Methylene Chloride	8	0.12	40
Toluene	1	0.04	0.04
Total Detects *	27		

* nine samples; 549 total analyses during 2009

Table 4-3
SVOC Detected in RLWTF Influent During 2009

Semi-Volatile Organic Compound	No. of Detects	Minimum (µg/L)	Maximum (µg/L)
2-Nitrophenol	1	1.4	1.4
3-Methylphenol & 4-Methylphenol	1	1.9	1.9
Benzoic Acid	3	5.7	14
Bis(2-Ethylhexyl)Phthalate	8	7.3	220
Diethylphthalate	3	1.2	2.0
Pyridine	3	6.7	11
Total Detects *	19		

* nine samples; 621 total analyses during 2009

4.2 Effluent Characteristics

Twelve monthly composite samples of effluent were analyzed during 2009, each for 40 different inorganic parameters. As shown in Table 4-1, 36 of the 40 inorganic parameters were detected in the RLWTF effluent; beryllium, cyanide, perchlorate, and suspended solids were not detected in any of the 12 monthly composite samples. Table 4-1 also shows that 20 parameters were reported at less than the analytical detection limit for at least one month during the year. On average, in fact, 11 inorganic parameters were reported each month at less than the analytical detection limit. Average effluent concentration of all inorganic chemicals for the entire year was 239 mg/L, nearly identical to the average influent concentration.

As shown in Table 4-5, the total mass of minerals leaving the RLWTF was 1050 kilograms, of which 410 kilograms (39%) was sodium. This, too, was quite different from radioactive contaminants, which had a combined effluent mass of less than one gram.

Effluent was also analyzed for volatile and semi-volatile organic compounds (Table 4-4). A total of 13 samples were collected during 2009, and each were analyzed for 86 organic compounds. Of these analyses, just 15 (1.3%) were found to exceed minimum detection level. Annual average effluent concentration was 0.0015 mg/L organic compounds. Total mass of organic compounds discharged with effluent was seven grams.

**Table 4-4
Organic Compounds Detected in RLWTF Effluent During 2009**

Compound	Suite	No. of Detects	Minimum (µg/L)	Maximum (µg/L)
Acenaphthene	SVOC	1	1.16	1.16
Acenaphthylene	SVOC	1	1.12	1.12
Anthracene	SVOC	1	1.19	1.19
Benzo(a)anthracene	SVOC	1	1.32	1.32
Benzo(a)pyrene	SVOC	1	1.26	1.26
Benzo(b)fluoranthene	SVOC	1	1.23	1.23
Benzo(g,h,i)perylene	SVOC	1	1.24	1.24
Benzo(k)fluoranthene	SVOC	1	1.28	1.28
Chloronaphthalene[2-]	SVOC	1	1.11	1.11
Chrysene	SVOC	1	1.25	1.25
Fluoranthene	SVOC	1	1.20	1.20
Fluorene	SVOC	1	1.18	1.18
Naphthalene	SVOC	1	0.99	0.99
Phenanthrene	SVOC	1	1.26	1.26
Pyrene	SVOC	1	1.27	1.27
Total Detects *		15		

* out of 1118 total analyses

4.3 Removal of Non-Radiological Constituents

Table 4-1 provides a summary of concentrations and quantities of inorganic chemicals received by (influent) and discharged from (effluent) the RLWTF during 2009. The information shows that 1050 kilograms of inorganic chemicals entered the facility in the form of suspended solids (49 kilograms) and dissolved solids (1000 kilograms). This quantity is similar to quantities received in recent years. As shown in the final column of Table 4-1, the total amount of inorganic chemicals leaving the facility with the effluent in 2009 was 1050 kilograms, all of it in the form of dissolved solids.

Eight inorganic chemicals comprised the majority (84%) of these non-radiological constituents; they are summarized in Table 4-5, along with percent removed from the RLWTF influent. The variation shown for removal percentages reflect whether the chemical is insoluble in water (e.g.,

**Table 4-5
Removal of Major Inorganic Minerals From RLWTF Influent During 2009**

Chemical	Mass in Influent (Kgs)	Mass in Effluent (Kgs)	Percent Removed
Nitrate	220	131	41
Silicon	160	19	88
Sodium	140	410	-193
Sulfate	130	40	69
Chloride	107	63	41
Calcium	54	2	97
Ammonia	53	2	97
Potassium	21	13	38
Subtotal	886	679	23
Total Solids *	1049	1050	--

* Total Dissolved Solids + Total Suspended Solids

97% removal of calcium), soluble (e.g., 41% removal of nitrate), or required in the treatment process³ (i.e., sodium, where effluent quantity exceeded influent quantity).

In contrast to these variable removal percentages, more than 98.5% of organic compounds were removed before treated water was discharged to Mortandad Canyon. Influent brought 445 grams of semi-volatile and volatile organic compounds to the RLWTF, but just seven grams were present in effluent.

4.4 Regulatory Performance

Eighteen parameters in the effluent from the RLWTF were regulated by the National Pollutant Discharge Elimination System in compliance with the Federal Clean Water Act (EPA, 06-08-2007). Reporting was required for all of these; eight have discharge standards. LANL also has a voluntary commitment with the New Mexico Environment Department to discharge effluent from the TA-50 RLWTF below groundwater standards set by the New Mexico Water Quality Control Commission (NMED, 04-20-2008) for three water quality parameters: fluoride, nitrogen-as-nitrate, and total dissolved solids. Table 4-6 identifies these regulated parameters. The table also shows sampling frequency required for each, and their regulatory limits.

During calendar year 2009, TA50 RLWTF effluent met all NPDES discharges standards except for one analysis for pH. The compliance sample taken on 02-04-2009 was measured with a pH of 5.7 standard units, versus the acceptable range of 6.0-9.0 units. The remaining sample results,

³ The RLWTF is a water treatment facility, and chemicals are added to several of the treatment steps. For example, lime can be added to soften the water, ferric sulfate to precipitate radionuclides, and sodium hydroxide to adjust pH. Other chemicals, such as sodium metabisulfite can be used to clean the ultrafiltration and reverse osmosis membranes.

133 analyses during 2009, were compliant with discharge standards. This discharge snapped a string of 109 consecutive months without an NPDES violation.

TA50 effluent also failed to meet one of the voluntary ground water standards. Combined nitrate-plus-nitrite concentration was measured at 12.9 mg/L for the week ending 10-04-2009, and at 12.8 mg/L for the week ending 11-22-2009. During 2009, the RLWTF met voluntary standards in 223 of 225 sample analyses.

Finally, although the RLWTF is not required to meet EPA drinking water standards, a comparison of average annual effluent concentrations shows that effluent would have met 17 of the 18 inorganic and radioactive national primary drinking water standards published at 40 CFR Part 141, and would have met all eleven secondary drinking water standards published at Part 143. Effluent exceeded the standard for nitrite-as-nitrogen, 1.76 vs. 1.0 mg/L.

**Table 4-6
NPDES and NMED Regulated Parameters**

Parameter	Sampling Frequency	Units	Average	Daily Max
NPDES Parameters (18)				
Chemical Oxygen Demand	M	mg/L	125	125
Flow	CR	----	Report	Report
Perchlorate	Y		Report	Report
pH	W	s.u.	6 – 9	6 – 9
Radium 226 + Radium 228	Y	pCi/L	30	30
Total Cadmium	Y	µg/L	Report	Report
Total Chromium	Y	µg/L	Report	Report
Total Copper	M	µg/L	Report	Report
Total Lead	Y	µg/L	423	524
Total Mercury	Y	µg/L	Report	Report
Total Nickel	Y	µg/L	Report	Report
Total PCBs	Y	µg/L	Report	Report
Total Residual Chlorine	W	µg/L	----	11
Total Selenium	Y	µg/L	Report	Report
Total Suspended Solids	M	mg/L	30	45
Total Toxic Organics	M	µg/L	1,000	1,000
Total Zinc	M	µg/L	Report	Report
Whole Effluent Toxicity	Q	%	Report	Report
NMED Parameters (4)				
Fluoride	WC	mg/L	1.6	
Nitrogen-as-Nitrate	WC	mg/L	10	
Perchlorate	WC	µg/L	4	
Total Dissolved Solids	WC	mg/L	1,000	

Sampling frequencies:

W: weekly grab sample
M: monthly grab sample
Q: quarterly grab sample

Y: yearly grab sample
CR: continuous record
WC: weekly composite sample

4.5 Graphs of Non-Radiological Data

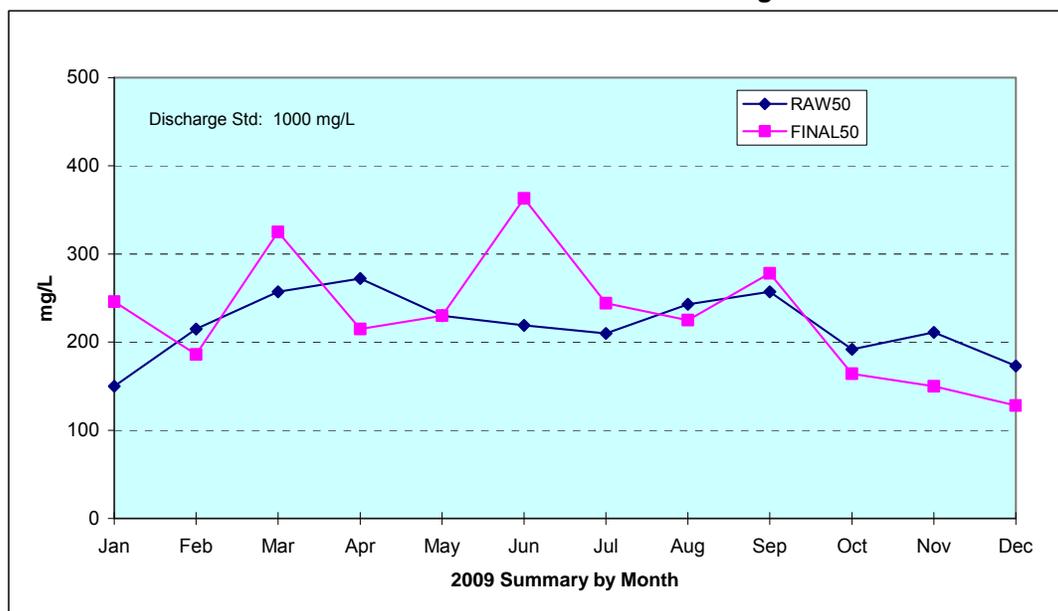
The following series of graphs highlight important information about non-radiological components of the TA50 RLWTF influent and effluent. Although influent and effluent are analyzed for 40 non-radioactive parameters, just six have been chosen for display in this report. Each figure plots concentration in RLWTF influent and effluent by month during 2009.

Figures 4-1 and 4-2 show total dissolved solids and total suspended solids in RLWTF influent and effluent during 2009. These two parameters provide summary information about water purity since they represent all contaminants present. Both parameters also have regulatory discharge limits – 1000 mg/L for TDS and 30 mg/L for TSS. In the RLWTF treatment process, the gravity filter and ultrafilter remove essentially all suspended solids. Reverse osmosis removes varying percentages of dissolved solids, depending upon particle mass and size.

The TDS graph shows that influent was generally received at concentrations below the discharge standard of 1000 mg/L. This did not guarantee compliance with the discharge standard, however, because chemicals were added in various treatment steps. The graph demonstrates, however that TDS influent and effluent concentrations fairly consistent throughout the year, and that the two concentrations did not greatly vary from one another.

The TSS graph provides three pieces of information: (a) that influent was also generally received at concentrations below the discharge standard, 30 mg/L in this case; (b) that influent water quality can vary greatly, as shown for September and October, and (c) that there were, once again, no suspended solids in RLWTF effluent.

**Figure 4-1
Dissolved Solids in RLWTF Waters During 2009**



**Figure 4-2
Suspended Solids in RLWTF Waters During 2009**

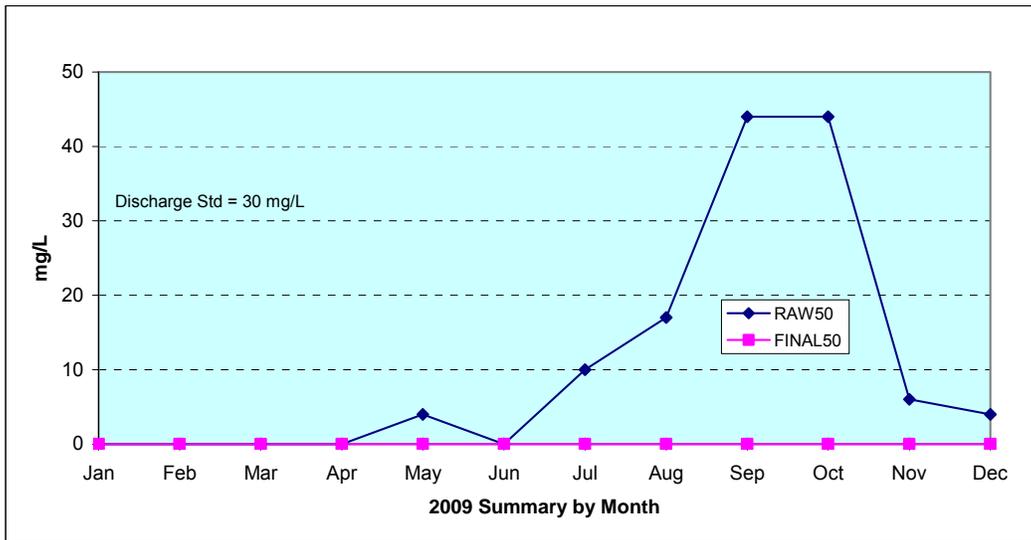


Figure 4-3 shows concentrations of calcium in RLWTF influent and effluent during 2009. Calcium, not a regulated parameter, is an insoluble element. Calcium was received in influent in concentrations ranging from 7 - 27 mg/L, but was nearly absent from plant effluent (97% removal). The graph illustrates the effect of the RLWTF treatment process on insoluble elements; few insoluble elements make it to the outfall.

**Figure 4-3
Calcium in RLWTF Waters During 2009**

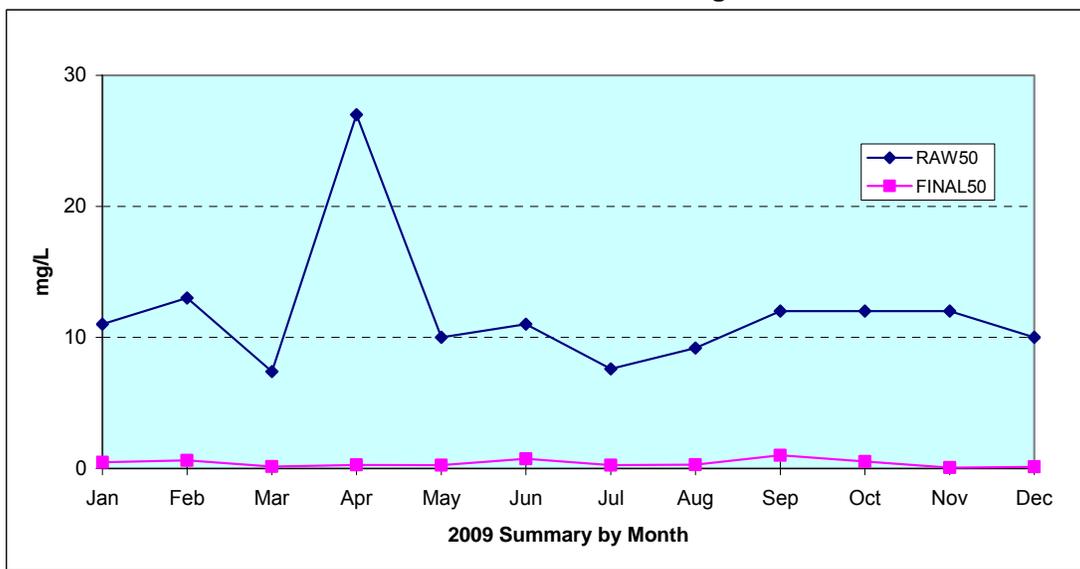
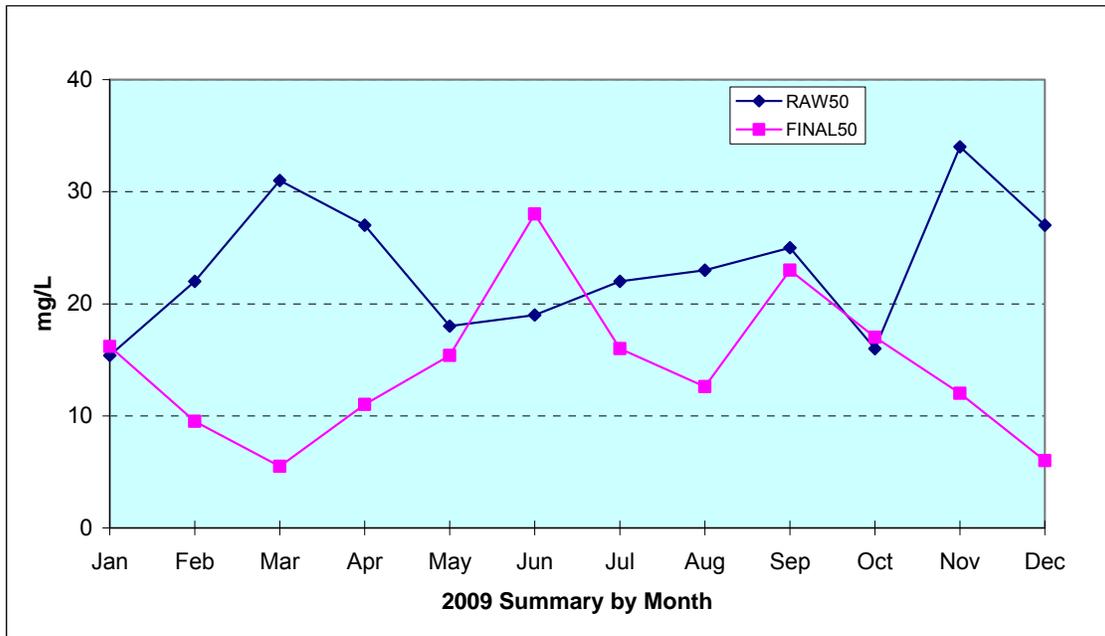


Figure 4-4 shows concentrations of chloride in RLWTF influent and effluent during 2009. Chloride, not a regulated parameter, is soluble in water. Chloride was received in influent in concentrations ranging from 15 - 34 mg/L, similar to calcium concentrations, but was also present in effluent, at concentrations ranging from 6 - 28 mg/L. The graph illustrates the effect of the RLWTF treatment process on soluble chemicals; only a percentage of the chemical is removed in the treatment process.

Figure 4-4
Chloride in RLWTF Waters During 2009



Nitrogen compounds behave similar to soluble compounds, as shown in Table 4-7. Table 4-7 presents average concentrations for nitrogen compounds for the year. In 2009, both influent and effluent concentrations were similar to historical concentrations.

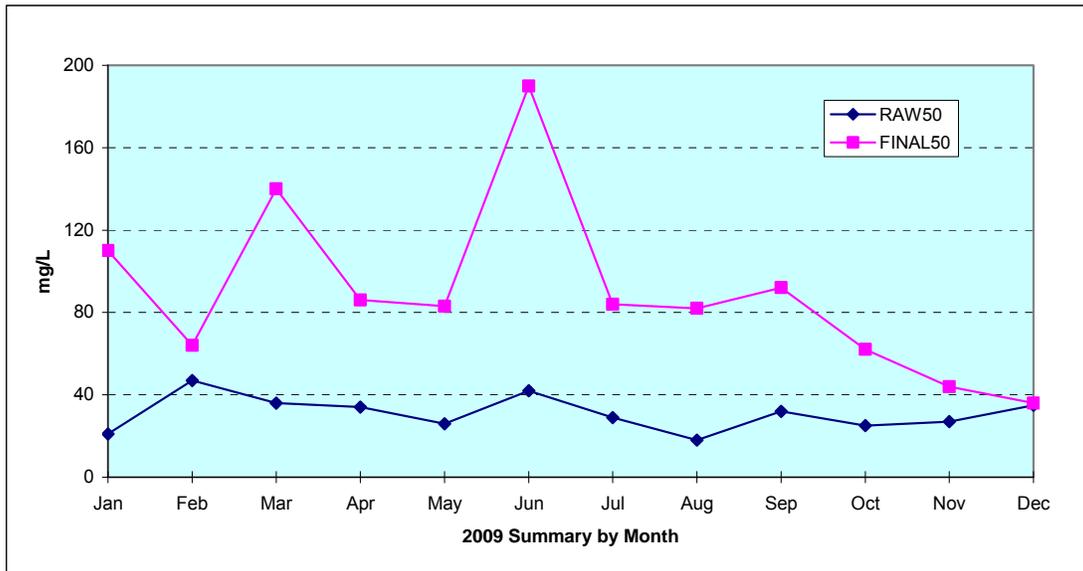
Table 4-7
Nitrogen Compounds in RLWTF Waters During 2009

	Influent*	Effluent*
Total Kjeldahl Nitrogen	12.6	5.3
Nitrogen-as-Ammonia	9.6	5.5
Nitrogen-as-Nitrate	10.9	6.7
Nitrogen-as-Nitrite	0.4	1.9
All Nitrogen	33.5	19.4

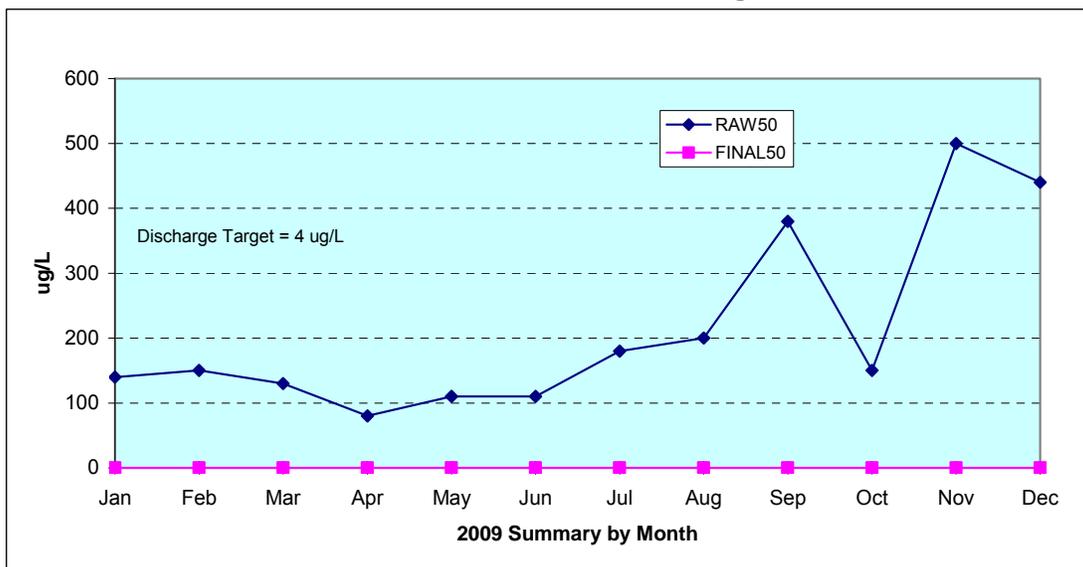
* Average concentration for 2009, in mg/L.

Figures 4-5 and 4-6 show sodium and perchlorate concentrations in RLWTF influent and effluent during 2009. The sodium graph shows effluent concentrations were higher than influent concentrations, which reflects the fact that sodium hydroxide is used to adjust pH of plant effluent. The perchlorate graph was selected to demonstrate that influent water quality can vary appreciably. The graph shows that perchlorate influent concentration, during three of the last four months, rose by a factor of three from typical concentrations received during the other nine months of the year. Such unanticipated influent perturbations can pose significant water treatment challenges.

**Figure 4-5
Sodium in RLWTF Waters During 2009**



**Figure 4-6
Perchlorate in RLWTF Waters During 2009**



5. Other RLW Operations in 2009

Chapters 2 through 4 of this annual report discussed the treatment of low-level radioactive liquid wastes at the TA50 RLWTF. This chapter discusses the other RLW operations.

5.1 Low-Level Influent Collection System

A system of underground piping connects generators of low-level radioactive liquid waste to the TA50 RLWTF. The system has about four miles of double-walled pipes that direct water flow, by gravity, from 25 buildings in six Technical Areas to the influent tanks in Building 50-02.

The system has 62 underground vaults installed at piping junctions and other strategic locations. Outer pipes terminate at each of these vaults to provide an indication of leaks in the inner piping; water from the annulus would collect in the vault sump. Each vault sump is equipped with an alarm to detect the presence of water in the sump.

A system of vault inspections and water sampling was instituted in the fourth quarter of 2007. This inspection program was expanded the following year to include alarm repairs and de-watering of vaults. During 2009, 208 total inspections were made, an average of three per vault, and all but two vaults were inspected at least once⁴.

Water discovered in vaults was sampled and analyzed for radioactivity, then de-watered. Sampling confirmed that water found in the vaults was due to the infiltration of groundwater, not to collection system leakage. Ten vaults were suspected to contain water at the end of the year, versus 13 at the start, and sixteen alarms were in need of repair. Table 5-1 summarizes these activities.

**Table 5-1
Low-Level RLW Collection System Activities During 2009**

	Q1	Q2	Q3	Q4	Totals
Inspections:					
No. vaults inspected during the quarter	63	37	20	31	151
No. vault inspections during the quarter	74	64	30	40	208
Water:					
No. of samples collected	50	48	31	19	148
No. vaults dewatered during the quarter	12	11	10	23	56
Status (end of quarter):					
No. vaults in alarm or inhibited	17	18	20	10	--
No. vaults with water	13	18	20	10	--
No. alarms needing repair	15	13	15	16	--

⁴ Vaults PF-102 and PF-103 are located behind the TA55 security fence, and were not inspected during 2009.

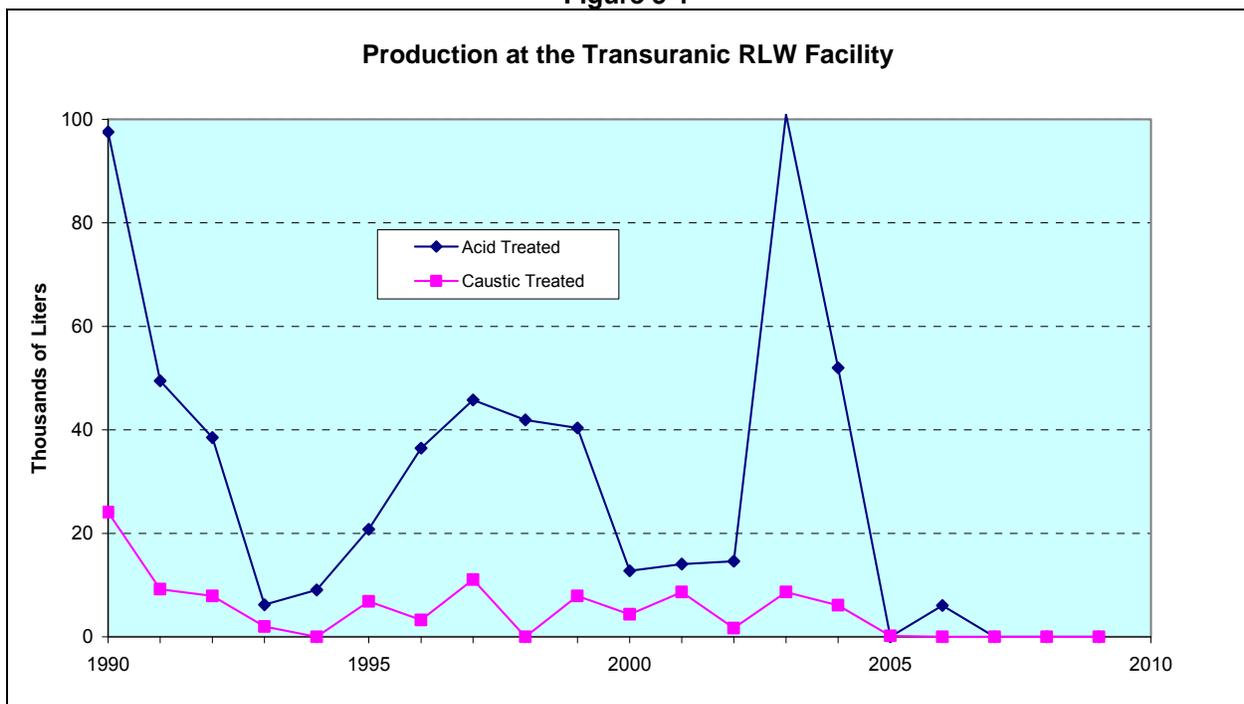
5.2 Transuranic RLW Process

The shutdown of Room 60 in July 2004 due to deteriorating equipment and vessels continued to impact transuranic RLW operations during 2009. The year was devoted to completion of the project to replace aging equipment and piping; the preparation of operating procedures; the calibration of tank level probes; personnel training; and the conduct of two readiness reviews in the latter half of the year.

As a result, transuranic production activities were limited in 2009. Waste were received from TA55 on just three occasions (2702 liters of acid waste and 214 liters of caustic waste), and no waste was treated in Room 60. There were four discharges of water from Rom 60 (7535 liters), but all of this effluent resulted from equipment flushes and tank calibration, not from the treatment of transuranic RLW. Figure 5-1 reflects the fact that no waste was treated during 2009, and also provides an historical perspective for volumes of transuranic RLW treated in Room 60.

The year culminated on a positive note, however. On December 14, following a successful Contractor Readiness Assessment and closure of pre-start findings, the DOE authorized the restart of Room 60 treatment operations. (DOE, 12-14-2009).

Figure 5-1

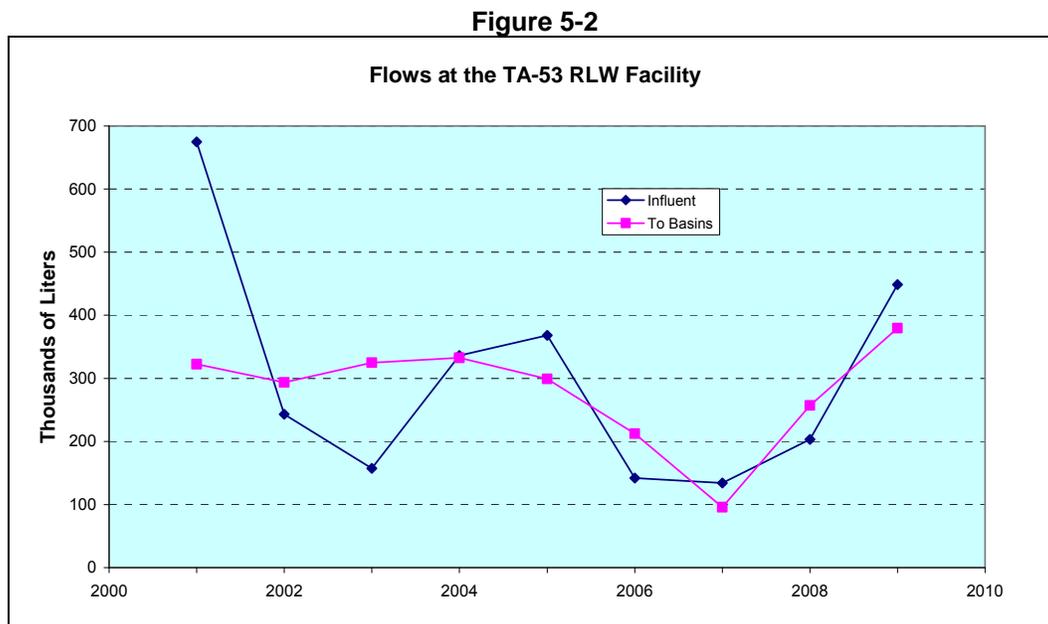


5.3 TA53 RLW Facility

The TA53 RLWTF treats radioactive liquid waste from accelerator research at the Los Alamos Neutron Science Center. The treatment process consists of wastewater storage to allow short-lived radioisotope decay, followed by solar evaporation. Three flows are of importance.

- Water flows by gravity into lift stations adjacent to Experimental Area A and the Lujan Center. The RLW is pumped from the lift stations through double-walled underground piping to one of three 30,000-gallon tanks inside Building 53-945. A total of 290,280 liters of RLW were transferred from the lift stations to the RLWTF during 2009.
- Tritiated waters are occasionally trucked to the TA53 influent tanks. A total of 158,130 liters were trucked to the basins from four technical areas. These trucked wastewaters met the waste acceptance criteria for the TA53 RLWTF. Most of the trucked water consisted of tritiated water from the TA50 RLWTF. The water had tritium concentrations of 21-22 nCi/L, versus the DOE discharge standard of 2,000 nanocuries per liter, and was not discharged at TA50 due to the desire to not discharge when tritium concentrations exceed the EPA drinking water standard of 20 nCi/L. This additional trucked quantity raised total influent volume for the year to 448,410 liters.
- After aging in the influent tanks, the RLW is pumped to the evaporator basins. During 2009, four discharges occurred, totaling 379,600 liters.

Figure 5-2 provides historical perspective for RLW flows at the TA53 facility. The graph shows that flows in 2009 were high, but not atypical of flows since the facility went into operation in December 1999. Flows remained well below the evaporative capacity of the basins (1.4 million liters per year).



6. Wastes and Secondary Liquids

RLW treatment processes generate process streams that require further processing and solid wastes that must be packaged and disposed. The disposition of both requires resources that include materials, labor, and dollars (e.g., disposal fees).

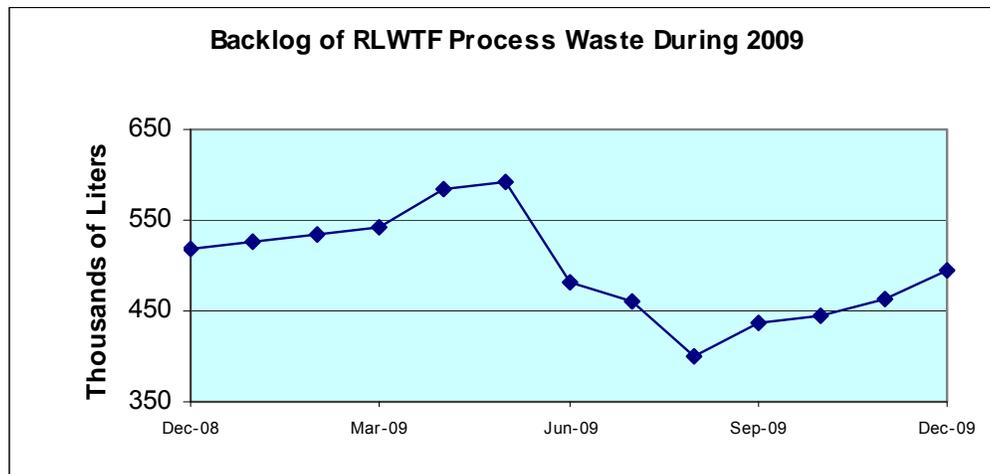
6.1 Process Wastes

The treatment of radioactive liquid wastes at TA50 generates four secondary process waste streams:

- Low-level sludge is de-watered, then packaged for disposal as a solid low-level radioactive waste.
- Transuranic sludge is solidified using cement, then packaged for disposal as a solid transuranic waste.
- Evaporator feed is evaporated to reduce its volume. Feed consists of reverse osmosis concentrate from the low-level treatment process, and treated water from the transuranic treatment process.
- Evaporator bottoms are solidified by a Subcontractor for disposal as a solid low-level radioactive waste.

The process waste backlog (i.e., volume), is an indicator of treatment status. Backlog, shown in Figure 6-1, varied from 400 – 600 thousand liters during 2009. The period of process waste volume reduction, from June through August, coincide with three evaporator campaigns.

Figure 6-1



The June evaporation campaign was a typical campaign that treated reverse osmosis concentrate, and reduced its volume by a factor of four. The July and August campaigns were required in order to further concentrate evaporator bottoms. Caused by a four-year drought in funding to treat and dispose of evaporator bottoms, this extraordinary re-evaporation step further concentrated bottoms volumes by a factor of two (i.e., total concentration of 8:1). Re-evaporation was not without consequences, however. Solids precipitated in all four tanks in Building 50-248.

The three evaporation campaigns during 2009 evaporated 83,400 gallons of reverse osmosis concentrate and re-evaporated 51,000 gallons of bottoms. The resultant volume of bottoms and chemical cleaning solutions totaled 50,800 gallons, a net volume reduction of 83,000 gallons.

6.2 Packaged Wastes

Wastes to be disposed are packaged in accordance with DOE, EPA, and DOT requirements, then transported to an authorized disposal site. During 2009, the TA50 RLWTF shipped 55 cubic meters (13,880 kilograms) of packaged wastes, as summarized in Table 6-1. These packaged wastes can be broadly grouped as wastes stemming from major construction projects, wastes from treatment operations, and process wastes.

Construction Wastes: During 2009, construction projects generated both chemical and low-level solid wastes. Construction chemical wastes totaled 0.6 cubic meter and 667 kilograms. These wastes were generated during closeout of the Room 60 Upgrades Project that led to the disposal

**Table 6-1
Packaged Wastes Shipped From the TA50 RLWTF During 2009**

	Chem	LLW	MLLW	TRU	Totals
No. Items:					
Construction debris	113	11	0	0	124
Operations waste	28	25	0	0	53
Process wastes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Totals	141	36	0	0	177
Volume (m³):					
Construction debris	0.6	14.9	0	0	15.5
Operations waste	0.8	38.9	0.0	0	39.7
Process wastes	<u>0</u>	<u>0.0</u>	<u>0</u>	<u>0</u>	<u>0.0</u>
Totals	1.4	53.8	0.0	0	55.2
Weight (Kg):					
Construction debris	667	3,545	0	0	4,211
Operations waste	202	9,466	0	0	9,668
Process wastes	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Totals	869	13,011	0	0	13,880

of 102 cans of epoxy, urethane, and paint (0.45 cubic meter / 470 kilograms) and 11 containers of sealant. Construction low-level wastes came from two construction projects. Four drums of contaminated soil (0.8 cubic meter, 1075 kgs) came from the tank farm project. The remainder came from the Room 60 Upgrades Project (14 cubic meters, 2470 kgs).

Operations Wastes: Operations wastes result from both day-to-day water treatment activities and from facility and equipment repairs and modifications. During 2009, operations generated 28 containers of chemical waste (0.8 cubic meter, 202 kgs) and 25 containers of low-level wastes. Most chemical wastes were generated during a plant-wide cleanout campaign that netted light bulbs, batteries, and spent chemicals. Low-level wastes included compactible and other trash generated in radiation control areas at the RLWTF (e.g., paper, discarded plastic sample vials and bottles, protective gloves) and spent ion exchange columns. The ion exchange columns, in fact, accounted for 4175 of the total 9466 kilograms of low-level waste.

Packaged Process Wastes: No process wastes were shipped for disposal during 2009.

7. References

Much of the information presented in this Annual Report come from the RLWTF process control system, RS View, which automatically records temperatures, flow rates, flow totals, pressures, tank levels, and similar readings of process conditions. Another large segment of the information presented in graphs and tables in this Annual Report comes from analytical data results for water samples. The below list of references points to a third major data source used in compiling the Annual Report – published reports that are cited within the text of the Annual Report.

Del Signore, J.C., December 2006. “Material-at-Risk Calculations for the Radioactive Liquid Waste Treatment Facility”, LA-UR-06-8731.

Department of Energy, 01-17-1993. “Radiation Protection of the Public and the Environment”, Order 5400.5, Change 1, Washington, DC.

Department of Energy, 12-14-2009. “Approval to Resume Room 60/60A Transuranic Liquid Waste Treatment Operations”, FO:19CK-219303, Los Alamos, NM.

Environmental Protection Agency, 01-30-1991. “National Secondary Drinking Water Regulations”. 40CFR Part 143.

Environmental Protection Agency, 01-22-2001. “National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels”. 40CFR Part 141, Subpart G.

Environmental Protection Agency, 06-08-2007. “Authorization to Discharge Under the National Pollution Discharge Elimination System”, NPDES Permit No. NM0028355, Dallas, TX.

New Mexico Environment Department, 04-26-2008. “New Mexico Water Quality Control Commission Regulations”, 20.6.2.3103 New Mexico Administrative Code.

Watkins, R.L. and Worland, V.P., March 2004. “RLWTF Annual Report for 2003”, LA-CP-04-0314, Los Alamos, NM.

APPENDIX L
Sanitary Effluent Reclamation Facility (SERF)

**APPENDIX L
Sanitary Effluent Reclamation Facility (SERF)**



Sanitary Effluent Reclamation Facility (SERF)

[DC – Steven Long 6-22-11]

Water Treatment Codes Applicable to SERF		
Treatment Code	Treatment Process	Description
2C	Chemical Precipitation	Ferric Chloride and Magnesium Chloride are used for chemical precipitation.
1G	Flocculation	Flocculate precipitates into larger particles for settling.
1U	Sedimentation (settling)	Concentration tank and sludge tanks are used to settle out sludge/precipitate from liquid.
2K	Neutralization	pH is adjusted prior to treated in the RO unit.
1S	Reverse Osmosis	RO is used to polish treated water.
1F	Evaporation	SERF uses evaporation basins for RO reject.
5R	Pressure Filtration	A filter press is used to dewater sludge.

Treatment Chemicals in Use at SERF		
Chemical Name	Reason for Use/Frequency	Hazardous Constituents from Table 2C-4
Ferric Chloride	37 – 45% Solution used to promote precipitation	Ferric chloride
Magnesium Chloride	25 – 35% solution used to promote precipitation	NA
Hydrochloric Acid 33%	33% solution for pH adjustment	Hydrochloric acid
Glycerine	Promote flocculation of Precipitate	NA
Caustic Soda (sodium hydroxide)	pH adjustment	Sodium hydroxide
Sodium Hypochlorite	5 – 35% solution used to clean RO unit	Sodium hypochlorite



SERF – Reaction Tanks
[DC – Steven Long 6-22-11]



SERF – Concentration Tank
[DC – Steven Long 6-22-11]



SERF – Microfilter
[DC – Steven Long 6-22-11]



SERF – Reverse Osmosis
[DC – Steven Long 6-22-11]



SERF – pH Adjustment Tanks
[DC – Steven Long 6-22-11]



SERF – Unblended Effluent Tank
[DC – Steven Long 6-22-11]



SERF – Blended Effluent Tanks and Sludge Tank
[DC – Steven Long 6-22-11]



SERF – Filter Press
[DC – Steven Long 6-22-11]



SERF – Evaporation Basins
[DC – Steven Long 6-22-11]

Univar USA Inc.
17425 NE Union Hill Road
Redmond, WA 98052
(425) 889-3400

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

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The Version Date and Number for this MSDS is : 12/22/2005 - #006

PRODUCT NAME: FERRIC CHLORIDE SOLUTION 37-45%

MSDS NUMBER: P21925VS

DATE ISSUED: 04/05/2004

SUPERSEDES: 01/02/2003

ISSUED BY: 008752

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: FERRIC CHLORIDE SOLUTION 37-45%

Chemical Name/Synonyms: Iron (III) Chloride Solution

Chemical Formula: FeCl3

Cas Number: 7705-08-0

HS Tariff Classification Number: data not available

Tax ID Number: data not available

Distribution:

UNIVAR USA

6100 Carillon Point

Kirkland, WA 98033

425-889-3400

FOR TRANSPORTATION EMERGENCY ONLY, 24 HOURS EVERYDAY, CALL CHEMTREC,
1-800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Registry #	% by weight
Ferric Chloride	7705-08-0	37 - 45
Water	7732-18-5	Balance

Hazardous Ingredients: Ferric Chloride

Exposure Limits (ppm):

Component	OSHA TLV	ACGIH TLV
NIOSH		
Ferric Chloride (as soluble iron salts)	1 mg/m ³ , 8-hr	1 mg/m ³ , 1
mg/m ³ ,		
	TWA	8-hr TWA 8-hr
TWA		

This Section Intentionally Blank

3. HAZARDS IDENTIFICATION

Emergency Overview

A reddish brown liquid with a slight odor of iron/acid. Avoid inhaling concentrated vapor or mist, may cause irritation of respiratory tract.

May

result in severe liver and/or kidney damage, if swallowed, and can be fatal.

Do not induce vomiting. Avoid contact with skin. Liquid, mist, or vapor can

cause irritation to all human tissue. Contact with eyes can result in visual

loss unless removed quickly by thorough irrigation with water. Caution:

May

release irritating and toxic gases of hydrogen chloride during fire.

Contain

spills and keep liquid out of water sources. See Sections 3, 4, 5, and 6.

Potential Health Effects (Acute and Chronic)

INHALATION: Inhalation of concentrated mist or vapor may cause irritation of the respiratory tract.

INGESTION: Ingestion may cause severe liver and/or kidney damage, and may be fatal. **DIRECT CONTACT:** The product is an irritant. Contact may include irritation with dryness, discomfort or rash. Ferric chloride has been infrequently associated with skin sensitization in humans. Extensive exposure could lead to skin sensation

DIRECT EYE CONTACT: Contact with eyes may cause irritation and tearing and eye tissue discoloration, and may result in permanent visual loss unless removed quickly by thorough irrigation with water.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

CARCINOGENS (NTP, IARC, or OSHA): No

4. FIRST AID MEASURES:

INHALATION: Remove victim to fresh air. If not breathing, perform artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

INGESTION: If swallowed, do NOT induce vomiting. Give victim water or milk.

Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

DIRECT CONTACT: Flush with water until material is removed. Remove contaminated clothing. Wash clothing before reuse.

DIRECT EYE CONTACT: Immediately flush with water for at least 15 minutes.

Hold eyelids apart to ensure complete irrigation of eye/lid tissue. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

Flammability: Product not flammable.

Flash Point: not applicable

Method used: TCC

OXIDIZING PROPERTIES: data not available

AUTOFLAMMABILITY: not applicable

AUTOIGNITION TEMPERATURE: not applicable

FLAMMABLE LIMITS, % BY VOLUME:

Lower flammable limit: not applicable

Upper flammable limit: not applicable

EXTINGUISHING MEDIA: Use water spray, fog, foam, dry chemical, CO2 or other agents as appropriate for surrounding fire.

FIRE FIGHTING INSTRUCTIONS: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. During fire, irritating and toxic gases of hydrogen chloride may be generated by thermal decomposition. Cool exterior of storage tanks.

FIRE AND EXPLOSION HAZARDS: None

SENSITIVITY TO MECHANICAL IMPACT/STATIC DISCHARGE: not applicable

6. ACCIDENTAL RELEASE MEASURES

Contain spill in order to prevent contamination of water way; neutralize with lime or soda ash. Flush with water in accordance with applicable regulations to waste treatment system. Avoid runoff into storm sewers and ditches which lead to waterways. Spills of 1000 pounds (454 kilograms) or more must be reported to the National Response Center, (800) 424-8802. If water pollution occurs, notify the appropriate authorities.

7. HANDLING AND STORAGE

Store away from heat, strong alkalis (such as caustic soda and alkali metals). Keep containers closed and dry. Protect container from physical damage. Use handling equipment (pumps, hoses, etc.) compatible with product, i.e., polyethylene, polypropylene, PVC, Teflon, rubber, FRP, and titanium. See Section 10 for types of packaging materials to avoid. Avoid contact with bare metals other than titanium. Avoid breathing vapors and/or mist. Avoid contact with eyes and skin. Wash thoroughly after handling. Follow all MSDS/label precautions even after container is emptied because they may retain vapor and product residues.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION: Good general ventilation should be sufficient to control airborne levels of vapor and mist.

RESPIRATORY PROTECTION: If airborne concentrations exceed the published exposure limits use NIOSH/MSHA approved, full face respirator as appropriate.

Consult respirator manufacturer to determine appropriate equipment.

PROTECTIVE GLOVES: Wear impervious rubber gloves.

EYE PROTECTION: Wear splash proof chemical safety goggles. Do not wear contact lenses.

OTHER PROTECTIVE EQUIPMENT: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

WORK/HYGIENIC PRACTICES: Avoid ingestion and breathing mist. Ferric Chloride will permanently stain clothing and temporarily stain skin. Avoid contact

with skin and clothing. Wash thoroughly after handling.

OTHER PRECAUTIONS: None.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	reddish brown
Odor:	slightly iron/acid
Odor Threshold:	data not available
Physical State:	liquid
Vapor Pressure (REID):	negligible
Specific Gravity: (water = 1)	40% solution = 1.432 at 17.5 deg C
Solubility in Water:	complete
pH:	<2.0
Boiling Point:	230 OF or 110 deg C
Vapor Density:	not applicable (Air = 1)
Evaporation Rate:	1 (Butyl Acetate = 1)
Freezing Point:	(-15 deg F @ 37% solution)
Coefficient of Water/Oil Distribution:	not applicable
Viscosity:	data not available
% Solids:	not applicable
% VOC:	not applicable

For information on FLASH POINT, FLAMMABILITY, OXIDIZING PROPERTIES AUTOFLAMMABILITY, and EXPLOSIVE PROPERTIES, please see Section 5.

10. STABILITY AND REACTIVITY

GENERAL: This product is stable and hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID: Material is stable when properly handled. Material is acidic and corrodes all common metals except titanium. Avoid contact with strong alkalis and alkali metals.

HAZARDOUS DECOMPOSITION PRODUCTS: May release hydrogen chloride gas at elevated temperatures.

11. TOXICOLOGICAL INFORMATION

Immediate Effects: Can cause severe liver and/or kidney damage if swallowed, and may even be fatal. See Section 3 for other immediate health hazards.

12. ECOLOGICAL INFORMATION

Fat Head Minnows LC50 > 1000 ppm ; Daphnia Magna LC50 > 1000 ppm

13. DISPOSAL CONSIDERATIONS

Dispose of spilled, neutralized, or waste product, contaminated soil and other contaminated materials in accordance with all local, state and federal

regulations.

14. TRANSPORT INFORMATION

DOT (Department of Transportation)
Proper Shipping Name: Ferric Chloride, Solution
Hazard Class: 8
Identification Number: UN2582
Packing Group: III
Label: Corrosive
Emergency Response Guide Book Number: 154
Corrosive: To metals only (not to skin)

15. REGULATORY INFORMATION

U.S. Federal Regulations:
OSHA: This product is hazardous by definition of Hazard Communication Standard (29CFR1910.1200).

SARA TITLE III (Superfund Amendments and Reauthorization Act of 1986)
Section

311/312 Hazard and Physical Hazards:

Immediate	yes
Delayed	yes
Fire:	no
Pressure:	no
Reactivity:	no

CERCLA/SUPERFUND (40 CFR 117, 302)

Ingredient	RQ (Reportable Quantity)
ferric chloride, solution	1000 pounds, anhydrous basis

RCRA:

If discarded in its purchased form, this product would be a hazardous waste by characteristic. Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. This product contains no Class I or Class II Ozone Depleting Chemicals

TSCA:

All compounds contained in this product are in the TSCA inventory

DOT:

Please see Section 14.

This product has been classified in accordance with the hazard criteria of

the CPR and the

MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

The following label hazard ratings are recommended for containers of Ferric

Chloride, Solution: (Hazard Index Key: 4 = severe; 3 = serious; 2 = moderate; 1 = slight; 0 = minimal)

NFPA		HMIS	
Health	not rated	Health	3
Flammability	not rated	Flammability	0
Reactivity	not rated	Reactivity	0

For Additional Information:

Contact: MSDS Coordinator - Univar USA

During business hours, Pacific Time - (425) 889-3400

NOTICE

Univar USA expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar USA Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar USA makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar USA's control. Therefore, users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes, and they assume all risks of their use, handling, and disposal of the product or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein and does not relate to its use in combination with any other material or in any other process.

END OF MSDS

REPORT NUMBER: 703
MSDS NO: DZ08439
EFFECTIVE DATE: 01/07/93

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 001

VERSION: 003

PRODUCT: GLYCERINE 99.7%, USP

ORDER NO: 157343
PROD NO : 272950

DAUGHTRIDGE SALES CO INC
501 S PINE ST

ROCKY MOUNT ,NC 27803

VAN WATERS & ROGERS INC. , SUBSIDIARY OF UNIVAR (206)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT NAME:
GLYCERINE 99.7%, USP

MSDS #: DZ08439

1. INGREDIENTS: (% w/w, unless otherwise noted)

Glycerine, minimum CAS# 000056-81-5 99.7%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

2. PHYSICAL DATA:

BOILING POINT: 554F, 290C
VAP PRESS: < 1.0 mmHg @ 20C
VAP DENSITY: 3.1
SOL. IN WATER: Miscible
SP. GRAVITY: 1.2607 @ 25/25 (min.)
APPEARANCE: Water white liquid.
ODOR: Odorless.

FIRE AND EXPLOSION HAZARD DATA:

1 of 5 pages

REPORT NUMBER: 703
MSDS NO: DZ08439
EFFECTIVE DATE: 01/07/93

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 002

VERSION: 003

PRODUCT: GLYCERINE 99.7%, USP

ORDER NO: 157343
PROD NO : 272950

FLASH POINT: 390F, 199C
METHOD USED: FMCC

FLAMMABLE LIMITS

LFL: Not deter.

UFL: Not deter.

EXTINGUISHING MEDIA: Water fog, alcohol-resistant foam, CO2,
dry chemical.

FIRE & EXPLOSION HAZARDS: Autoignition temperature 698F, 370C.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained
breathing apparatus.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid strong oxidizing agent
(such as sodium hypochlorite, hypochlorous acid).

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Oxidizing
material.

HAZARDOUS DECOMPOSITION PRODUCTS: Acrolein.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Small spills: Cover with
absorbent material, soak up and sweep into a drum. Large
spills: Dike around spill and pump into suitable containers.

DISPOSAL METHOD: Reprocess or incinerate in accordance with all
local, state, and federal requirements.

6. HEALTH HAZARD DATA:

EYE: May cause slight transient (temporary) eye irritation.
Corneal injury is unlikely.

SKIN CONTACT: Prolonged or repeated exposure not likely to
cause significant skin irritation.

SKIN ABSORPTION: A single prolonged exposure is not likely to
result in the material being absorbed through skin in harmful
amounts. The LD50 for skin absorption in rabbits is > 10,000

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VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 003

VERSION: 003

PRODUCT: GLYCERINE 99.7%, USP

ORDER NO: 157343
PROD NO : 272950

mg/kg.

INGESTION: Single dose oral toxicity is low. The oral LD50 for rats is 17,000 to 27,200 mg/kg. Amounts ingested incidental to industrial handling are not likely to cause injury; however ingestion of larger amounts may cause injury. Signs and symptoms of excessive exposure may be central nervous system effects and increased blood sugar levels.

INHALATION: At room temperature, exposures to vapors are unlikely due to physical properties; higher temperatures may generate vapor levels sufficient to cause irritation and other effects. The LC50 for 1 hour in rats was >0.57 mg/l.

SYSTEMIC & OTHER EFFECTS: Repeated excessive exposures may cause increased fat levels in blood. Observations in animals include kidney, liver, and gastrointestinal effects with very large oral doses. Did not cause cancer in long-term animal studies. Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus. Reproductive effects seen in female animals are believed to be due to altered nutritional states resulting from extremely high doses in their diets. Similar effects have been seen in animals fed synthetic diets.

7. FIRST AID:

EYES: Irrigate immediately with water for at least 5 minutes.

SKIN: Wash off in flowing water or shower.

INGESTION: Induce vomiting if large amounts are ingested. Consult medical personnel.

INHALATION: No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE: OSHA PEL is 10 mg/m³ total, 5 mg/m³ respirable and the ACGIH TLV is 10 mg/m³ for glycerine mist.

VENTILATION: Control airborne concentrations below the exposure guideline. Good general ventilation should be sufficient for

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VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

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PRODUCT: GLYCERINE 99.7%, USP

ORDER NO: 157343
PROD NO : 272950

most conditions. Local exhaust ventilation may be necessary for some operations.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

EYE PROTECTION: Use safety glasses.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Practice reasonable care and caution.

MSDS STATUS: Revised section 9 and regsheet.

REGULATORY INFORMATION: (Not meant to be all-inclusive--selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

U.S. REGULATIONS

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SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

REPORT NUMBER: 703
MSDS NO: DZ08439
EFFECTIVE DATE: 01/07/93

VAN WATERS & ROGERS INC.
MATERIAL SAFETY DATA SHEET

PAGE: 005
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PRODUCT: GLYCERINE 99.7%, USP

ORDER NO: 157343
PROD NO : 272950

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (206)889-3400

11/08/95 07:49 PRODUCT: 272950 CUST NO: 357961 ORDER NO: 157343

----- NOTICE -----

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IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE,

WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN, AND SHALL UNDER

NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE
MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS
BELIEVED TO BE ACCURATE, VW&R MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR
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THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN.
THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

* * * E N D O F M S D S * * *

SECTION I PRODUCT IDENTIFICATION

PRODUCT NAME: MAGNESIUM CHLORIDE 25-35%

MSDS #: P16583V

DATE ISSUED: 12/15/95

SUPERSEDES: 5/1/96

ISSUED BY: 008544

SECTION II HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

NONE

SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 225 Degrees

MELTING POINT: N/A

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

EVAPORATION RATE: 1

SOLUBILITY IN WATER: 100%

SPECIFIC GRAVITY (H2O=1): 1.32

COLOR AND ODOR: Liquid - slight yellow to colorless

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: None

Extinguishing Media: None, Non-Flammable

Flammable limits: STP in air

LEL: N/A

UEL: N/A

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards: None

National Fire Protection Association (NFPA) Classification:

4 = severe, 3 = serious, 2 = moderate, 1 = slight, 0 = minimal

Health: 1

Flammability: 0

Reactivity: 0

Hazardous Materials Information System (HMIS):

4 = extreme, 3 = high, 2 = moderate, 1 = slight, 0 = insignificant

Blue: (acute health) 1

Red (flammability) 0

Yellow (reactivity) 0

SECTION V REACTIVITY DATA

Stability: Stable

Incompatibility (Materials to Avoid): none

Hazardous Decomposition Byproducts: none

Hazardous Polymerization: Will not occur

Signs and Symptoms of Exposure:

Ingestion: Oral ingestion of large doses may cause GI irritation.

Agency and First Aid Procedures:

Flush with water

SECTION VII PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled:

Flush with water

Waste Disposal Method: Soluble in water-neutral or slightly basic solution occurs

Precautions to be Taken in Handling and Storing: No special requirements

Other Precautions: Normal standard practice for good hygiene.

SECTION VIII CONTROL MEASURES

Respiratory Protection (Specify Type): None

Ventilation: Local Exhaust: N/A

Mechanical (General): N/A

Special (Other): N/A

Protective Gloves: N/A

Eye Protection: Safety goggles with splash shields

Other Protective Clothing or Equipment: None

Work Hygienic Practices: N/A

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

----- NOTICE -----

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HYDROCHLORIC ACID 33%

Chemwatch Material Safety Data Sheet
Issue Date: 17-Aug-2005

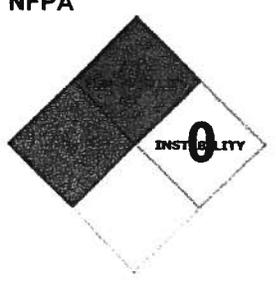
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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: HYDROCHLORIC ACID 33%
STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.
NFPA



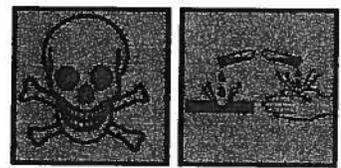
SUPPLIER

ChemWatch Pty Ltd
+61 3 9573 3112 or Toll Free +800 2436 2255
Email chemwatch@chemwatch.net

HAZARD RATINGS

	Min	Max	
Flammability:	0		
Toxicity:	3		
Body Contact:	4		
Reactivity:	0		
Chronic:	0		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



PRODUCT USE

pH control compound. Used as per manufacturers directions.

Section 2 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
hydrochloric acid	7647-01-0	33
water	7732-18-5	>60

Section 3 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Toxic by inhalation.
Causes burns.
Risk of serious damage to eyes.
Skin contact may produce health damage*.
Cumulative effects may result following exposure*.
Exposure may produce irreversible effects*.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Considered an unlikely route of entry in commercial/industrial environments.

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EYE

The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating. If applied to the eyes, this material causes severe eye damage.

Eye contact is extremely painful and may cause rapid corneal damage.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

Bare unprotected skin should not be exposed to this material.

The material may accentuate any pre-existing skin condition.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

INHALED

If inhaled, this material can irritate the throat and lungs of some persons.

Inhalation hazard is increased at higher temperatures.

The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

CHRONIC HEALTH EFFECTS

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Highly corrosive, and Considered toxic by all exposure routes.

Principal routes of exposure are usually by skin contact / eye contact with the liquid and inhalation of vapour.

As with any chemical product, contact with unprotected bare skin; inhalation of vapor, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

Chronic exposure may result in dental discolouration and erosion and ulceration of nose and mouth.

Section 4 - FIRST AID MEASURES

SWALLOWED

Rinse mouth out with plenty of water. If poisoning occurs, contact a doctor or Poisons Information Center.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.

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- DO NOT attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralizing agents or any other additives. Several liters of saline are required.
 - Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
 - Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).
- [Ellenhorn and Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

Flash Point (°F):	Not available
Lower Explosive Limit (%):	Not applicable
Upper Explosive Limit (%):	Not applicable.
Autoignition Temp (°F):	Not available.

EXTINGUISHING MEDIA

Water spray or fog.

Foam.

Bromochlorodifluoromethane (BCF) (where regulations permit).

Dry agent.

Carbon dioxide.

FIRE FIGHTING

Alert Emergency Responders and tell them location and nature of hazard.

- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water courses.

Use fire fighting procedures suitable for surrounding area.

Cool fire exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

Non combustible liquid.

Will not burn, but heat produces highly toxic fumes/vapors.

Heating may cause expansion or decomposition leading to violent rupture of containers.

Decomposes on heating and produces toxic fumes of: hydrogen chloride.

Decomposition may produce toxic fumes of: chlorine.

Reacts with metals producing flammable / explosive hydrogen gas.

FIRE INCOMPATIBILITY

Reacts with metals producing flammable / explosive hydrogen gas.

PERSONAL PROTECTION

Glasses:

Safety Glasses.

Chemical goggles.

Full face- shield.

Gloves:

Nitrile.

Neoprene.

PE/EVAL/PE Gloves.

Respirator:

Type B- P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

DO NOT touch the spill material Clean up all spills immediately.

Wear fully protective PVC clothing and breathing apparatus.

Contain and absorb spill with sand, earth, inert material or vermiculite.

Use soda ash or slaked lime to neutralize.

Collect residues and place in labelled plastic containers with vented lids.

MAJOR SPILLS

DO NOT touch the spill material Clear area of personnel and move upwind.

Alert Emergency Responders and tell them location and nature of hazard.

Shut off all possible sources of ignition and increase ventilation.

- Wear full body protective clothing with breathing apparatus.

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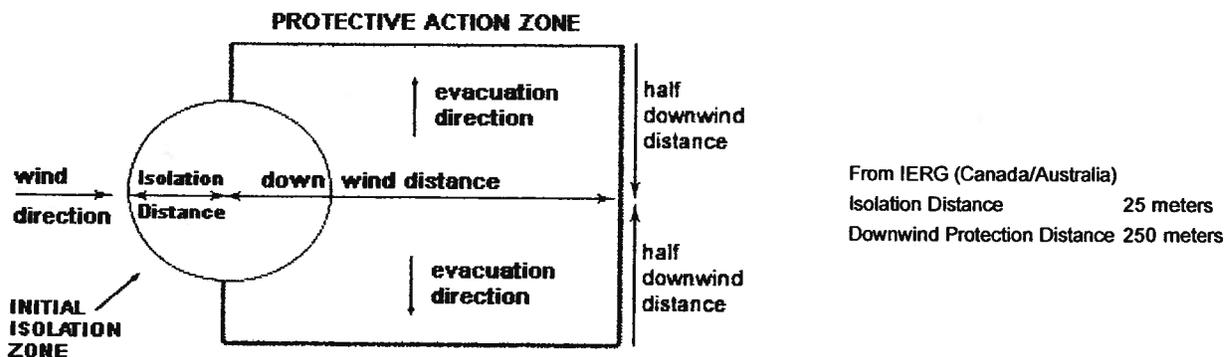
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- Prevent, by any means available, spillage from entering drains or water courses.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
Use soda ash or slaked lime, mixed and sprayed with water, to neutralize.
DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.
If contamination of drains or waterways occurs, advise emergency services.
Collect residues and place in labelled plastic containers with vented lids.
Water spray or fog may be used to disperse vapor.
Collect recoverable product into labelled containers for recycling.

PROTECTIVE ACTIONS FOR SPILL



FOOTNOTES

- 1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
- 2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
- 3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
- 4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
- 5 Guide 157 is taken from the US DOT emergency response guide book.
- 6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

hydrochloric acid	150 ppm
water	500 mg/m ³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

hydrochloric acid	20 ppm
water	500 mg/m ³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

hydrochloric acid	3 ppm
water	500 mg/m ³

The threshold concentration below which most people will experience no appreciable risk of health effects:

hydrochloric acid	0.5 ppm
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water 500 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according exceed the following cutoffs
 Very Toxic (T+) >= 0.1% Toxic (T) >= 3.0%
 R50 >= 0.25% Toxic (T) >= 3.0%
 R51 >= 2.5% Corrosive (C) >= 5.0%
 else >= 10%

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together
 O: May be stored together with specific preventions
 +: May be stored together

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Avoid generating and breathing mist and vapor. Avoid breathing vapors and contact with skin and eyes. Avoid physical damage to containers. Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open container with care. **WARNING:** To avoid violent reaction, ALWAYS add material to water and NEVER water to material. When handling, DO NOT eat, drink or smoke. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practice. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

RECOMMENDED STORAGE METHODS

Packaging as recommended by manufacturer.

- Check that containers are clearly labeled
- Packs of 2.5 litres or less require a child-resistant closure.
- Glass container or Plastic carboy or Polylined drum.

STORAGE REQUIREMENTS

Floors should be covered or coated with acid resistant material.

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC
Canada - Quebec Occupational Exposure Limits (French)	hydrochloric acid (Chlorure d'hydrogène)					5	7,5	
US - Minnesota Permissible Exposure Limits (PELs)	hydrochloric acid (Hydrogen chloride)					5	7	
US - California Permissible Exposure Limits for Chemical Contaminants	hydrochloric acid (Hydrogen chloride; muriatic acid)					5	7	
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	hydrochloric acid (Hydrogen chloride)	(C)5	(C)7					
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	hydrochloric acid (Hydrogen chloride)					5	7	
US - Idaho - Limits for Air Contaminants	hydrochloric acid (Hydrogen chloride)					5	7	
US - Tennessee Occupational Exposure Limits For Air Contaminants	hydrochloric acid (Hydrogen chloride)					5	7	
Canada - Saskatchewan Occupational Health	hydrochloric acid (Hydrogen							

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and Safety Regulations - Contamination Limits	chloride)								7.50000
US OSHA Permissible Exposure Levels (PELs) - Table Z1	hydrochloric acid (Hydrogen chloride)					5		7	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	hydrochloric acid (Hydrogen chloride)	5	7	-	-				
US - Washington Permissible exposure limits of air contaminants	hydrochloric acid (Hydrogen chloride)								5.0
US ACGIH Threshold Limit Values (TLV)	hydrochloric acid (Hydrogen chloride)								2
Canada - British Columbia Occupational Exposure Limits	hydrochloric acid (Hydrogen chloride (Revised 2003))								2
Canada - Ontario Occupational Exposure Limits	hydrochloric acid (Hydrogen chloride)								2
US NIOSH Recommended Exposure Limits (RELs)	hydrochloric acid (Hydrogen chloride)								5
Canada - Alberta Occupational Exposure Limits	hydrochloric acid (Hydrogen chloride)							5	7.5

The following materials had no OELs on our records
• water: CAS:7732-18-5

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
hydrochloric acid		50

ODOR SAFETY FACTOR (OSF)

OSF=1.3 (hydrochloric acid)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odor Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odor Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odor Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV-TWA for example) is being reached, even when distracted by working activities
B	26-550	Idem for 50-90% of persons being distracted
C	1-26	Idem for less than 50% of persons being distracted
D	0.18-1	0-50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	Idem for less than 10% of persons aware of being tested

Amoore and Hautala * have determined that it is only at an OSF value of 26 that 50% of distracted persons can detect the substance at the Exposure Standard value. In the case of alerted persons, an OSF of 26 means that 99% of them can detect the odor at the Exposure Standard value. It is ONLY for substances belonging to Class A and B that there is a reasonable chance of being warned in time, that the Exposure Standard is being exceeded. * Journal Applied Toxicology: Vol 3, 1983, p272

NOTE: The use of the OSF may be inappropriate for mixtures where substances mask the odor of others.

MATERIAL DATA

Not available. Refer to individual constituents.

INGREDIENT DATA

HYDROCHLORIC ACID:

Odour Threshold Value: 0.262 ppm (detection), 10.06 ppm (recognition)

NOTE: Detector tubes for hydrochloric acid, measuring in excess of 1 ppm, are available commercially.

Hydrogen chloride is a strong irritant to the eyes, mucous membranes and skin. Chronic exposure produces a corrosive action on the teeth. Reports of respiratory irritation following short-term exposure at 5 ppm have lead to the recommended TLV-C. There is no indication that skin contact with hydrogen chloride elicits systemic poisoning and a skin designation has not been applied.

Exposure of humans to hydrogen chloride at 50 to 100 ppm for 1 hour is reported to be barely tolerable; 35 ppm caused irritation of the throat on short exposure and 10 ppm was the maximal concentration for prolonged exposure. It has been stated that hydrogen chloride at concentrations of 5 ppm is immediately irritating.

Toxic effects of hydrochloric acid

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Concentration Clinical effects

0.067 - 0.267 ppm Reported range of odour thresholds and changes in respiratory pattern
5 ppm No organic damage
10 ppm Irritation; work undisturbed
10-50 ppm Work difficult but possible
35 ppm Short exposure irritation of the throat
50-100 ppm Exposure for 1 h barely tolerable
1000-2000 ppm Brief exposure dangerous; laryngospasm
1300-2000 ppm Lethal after a few minutes

WATER:

No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

- Chemical goggles
- Full face shield
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59]

HANDS/FEET

- Barrier cream and Neoprene gloves or Elbow length PVC gloves. Nitrile gloves. PVC boots or PVC safety gumboots.

OTHER

Operators should be trained in procedures for safe use of this material. Acid-resistant overalls or PVC apron or

- PVC protective clothing
- Eyewash unit.

Ensure there is ready access to an emergency shower.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half-face Respirator	Full-Face Respirator
1000	10	B-1 P	-
1000	50	-	B-1 P
5000	50	Airline*	-
5000	100	-	B-2 P
10000	100	-	B-3 P
	100+		Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

Use in a well-ventilated area and Local exhaust ventilation may be required for safe working, i.e. to keep exposures below required standards, otherwise PPE is required.

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If risk of inhalation or overexposure exists, wear SAA approved respirator or work in fume hood.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Acid.

Toxic or noxious vapors/ gas.

Molecular Weight: Not applicable.

Melting Range (°F): Not available

Solubility in water (g/L): Miscible

pH (1% solution): Not available

Volatile Component (%vol): 100

Relative Vapor Density (air=1): Not available

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°F): Not available.

State: Liquid

Boiling Range (°F): 107.96

Specific Gravity (water=1): 1.190-1.260

pH (as supplied): 1.0

Vapor Pressure (mmHg): 54.905 @ 25 deg C

Evaporation Rate: 2.0 BuAc=1

Flash Point (°F): Not available

Upper Explosive Limit (%): Not applicable.

Decomposition Temp (°F): Not available

Viscosity: Not available

APPEARANCE

Clear colourless to slightly yellow fuming acidic liquid with pungent odour; mixes with water.

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Contact with alkaline material liberates heat.

Presence of incompatible materials.

Product is considered stable under normal handling conditions.

Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

Segregate from alkalis, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

Section 11 - TOXICOLOGICAL INFORMATION

Hydrochloric Acid 33%

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

TOXICITY

HYDROCHLORIC ACID:

Unreported (man) LDLo: 81 mg/kg

Inhalation (human) LCLo: 1300 ppm/30 min

Inhalation (human) LCLo: 3000 ppm/5 min

Inhalation (rat) LC50: 3124 ppm/1h

Oral (rat) LD50: 900 mg/kg

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

WATER:

No significant acute toxicological data identified in literature search.

MATERIAL	CARCINOGEN	SENSITIZER	SKIN	MUTAGEN	REPROTOXIN
----------	------------	------------	------	---------	------------

hydrochloric acid	ACGIH:A4				
-------------------	----------	--	--	--	--

CARCINOGEN

ACGIH: hydrochloric acid: A4

IRRITATION

Eye (rabbit): 5mg/30s - Mild

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

HYDROCHLORIC ACID:

Hazardous Air Pollutant:

Fish LC50 (96hr.) (mg/l):

Prevent, by any means available, spillage from entering drains or water courses.

Yes

0.282

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DO NOT discharge into sewer or waterways.

Ecotoxicity

Fish LC100 (24 h): trout 10 mg/l

TLm (96 h): mosquito fish 282 ppm (fresh water)

LC50: goldfish 178 mg/l

Shrimp LC50 (48 h): 100 - 330 ppm (salt water)

Starfish LC50 (48 h): 100 - 330 mg/l

Cockle LC50 (48 h): 330 - 1000 mg/l

[Hach]

Hydrogen chloride in water dissociates almost completely, releasing hydrogen and chloride ions; the hydrogen ions are captured by water to produce hydronium ions.

Hydrochloric acid infiltrates soil, the rate dependent on moisture content. During soil transport, hydrochloric acid dissolves soil components.

Drinking water standard:

chloride: 400 mg/l (UK max.)

250 mg/l (WHO guideline)

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Recycle wherever possible. Consult manufacturer for recycling options.

Consult Waste Management Authority for disposal.

Treat and neutralize at an effluent treatment plant.

Bury residue in an authorized landfill.

Decontaminate empty containers with a lime slurry.

Return empty containers to supplier or bury empty containers at an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE

DOT Information:

Dangerous Goods Class: 8

UN Number: 1789

Shipping Name: HYDROCHLORIC ACID

Air Transport IATA:

ICAO/IATA Class: 8

UN/ID Number: 1789

ERG Code: 8L

Shipping Name: Hydrochloric acid

Maritime Transport IMDG:

IMDG Class: 8

UN Number: 1789

EMS Number: F-A,S-B

Shipping Name: HYDROCHLORIC ACID

Subrisk: None

Packing Group: II

ICAO/IATA Subrisk: None

Packing Group: II

IMDG Subrisk: None

Packing Group: II

Section 15 - REGULATORY INFORMATION

HYDROCHLORIC ACID 33%

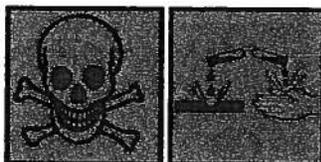
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RISK

Risk Codes	Risk Phrases
R23	Toxic by inhalation.
R34	Causes burns.
R41	Risk of serious damage to eyes.

REGULATIONS

US EPCRA Section 313 Chemical List For Reporting Year 2004

Ingredient	CAS	% de minimus concentration
hydrochloric acid	7647-01-0	1.0

US CERCLA List of Hazardous Substances and Reportable Quantities

Ingredient	CAS	RQ (Pounds)	RQ (KG)
hydrochloric acid	7647-01-0	5000	2270

hydrochloric acid (CAS: 7647-01-0) is found on the following regulatory lists;

- Canada - Alberta Occupational Exposure Limits
- Canada - British Columbia Occupational Exposure Limits
- Canada - Ontario Occupational Exposure Limits
- Canada - Quebec Occupational Exposure Limits (French)
- Canada - Saskatchewan Industrial Hazardous Substances
- Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
- Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances
- Canada Controlled Drugs and Substances Act Schedule VI
- Canada Domestic Substances List (DSL)
- Canada Environmental Quality Guidelines (EQGs) Water: Community
- Canada Ingredient Disclosure List (SOR/88-64)
- Canada National Pollutant Release Inventory (NPRI)
- Canada Prohibited Toxic Substances - Schedule 2: Concentration Limits (French)
- Canada Prohibited Toxic Substances, Schedule 2, Concentration Limits (English)
- CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP
- IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
- International Agency for Research on Cancer (IARC) Carcinogens
- International Council of Chemical Associations (ICCA) - High Production Volume List
- International Maritime Dangerous Goods Requirements (IMDG Code) - Goods Forbidden for Transport
- OECD Representative List of High Production Volume (HPV) Chemicals
- United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control - Table II (English)
- US - Arizona Ambient Air Quality Guidelines
- US - California Air Toxics "Hot Spots" List (Assembly Bill 2588) Substances for which emissions must be quantified
- US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List
- US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
- US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
- US - California Permissible Exposure Limits for Chemical Contaminants
- US - California Toxic Air Contaminant List Category II
- US - Connecticut Hazardous Air Pollutants
- US - Idaho - Limits for Air Contaminants
- US - Minnesota Hazardous Substance List
- US - Minnesota Permissible Exposure Limits (PELs)
- US - New Jersey Right to Know Hazardous Substances
- US - New Jersey Right to Know Hazardous Substances (Spanish)
- US - Oregon Hazardous Materials
- US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
- US - Vermont Permissible Exposure Limits Table Z- 1- A Final Rule Limits for Air Contaminants
- US - Vermont Permissible Exposure Limits Table Z- 1- A Transitional Limits for Air Contaminants
- US - Washington Permissible exposure limits of air contaminants

HYDROCHLORIC ACID 33%

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US - Wisconsin Hazardous Air Contaminants With Acceptable Ambient Concentrations
US ACGIH Carcinogens Listing
US ACGIH Threshold Limit Values (TLV)
US AIHA Emergency Response Planning Guides (ERPGs)
US CAA (Clean Air Act) 112 (r) List of Regulated Toxic & Flammable Substances and Threshold Quantities for Accidental Release Prevention
US CERCLA List of Hazardous Substances and Reportable Quantities
US Clean Air Act - Hazardous Air Pollutants
US CWA (Clean Water Act) - List of Hazardous Substances
US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances
US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides
US DOE Temporary Emergency Exposure Limits (TEELs)
US Drug Enforcement Administration (DEA) List II or Essential Chemicals
US Drug Enforcement Administration (DEA) Thresholds for Regulated Transactions in List II Chemicals
US EPA Acute Exposure Guideline Levels (AEGs) - Final
US EPA Hazardous Substances
US EPA High Production Volume Chemicals Additional List
US EPA List of Regulated Toxic Substances and Threshold Quantities for Accidental Release Prevention
US EPCRA Section 313 Chemical List For Reporting Year 2004
US Food Additive Database
US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases
US NIOSH Recommended Exposure Limits (RELs)
US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Inventory
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established
water (CAS: 7732- 18- 5) is found on the following regulatory lists:
Canada Domestic Substances List (DSL)
OECD Representative List of High Production Volume (HPV) Chemicals
US DOE Temporary Emergency Exposure Limits (TEELs)
US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of Combustion
US Toxic Substances Control Act (TSCA) - Inventory

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

Skin contact may produce health damage*.

Cumulative effects may result following exposure*.

Limited evidence of a carcinogenic effect*.

* (limited evidence).

EXPOSURE STANDARD FOR MIXTURES

"Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration: Composite Exposure Standard for Mixture (TWA) :100 mg/m³.

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SODIUM HYPOCHLORITE SOLUTION

Hazard Alert Code:
HIGH

Chemwatch Material Safety Data Sheet (REVIEW)

Revision No: 2

Chemwatch 1791-1

Issue Date: 29-Sep-2006

CD 2006/4

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SODIUM HYPOCHLORITE SOLUTION

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



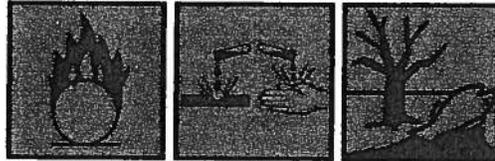
SUPPLIER

ChemWatch Pty Ltd
+61 3 9573 3112 or Toll Free +800 2436 2255
Email chemwatch@chemwatch.net

HAZARD RATINGS

	Min	Max
Flammability:	0	█
Toxicity:	2	███
Body Contact:	3	█████
Reactivity:	2	█████
Chronic:	1	███

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



PRODUCT USE

The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation. In the bleaching of paper pulp and textiles, for the purification of water. Sterilising disinfectant and as fungicide, microbicide in laundry. An oxidising agent used in the manufacture of organic chemicals and as a chemical intermediate.

SYNONYMS

Na-O-Cl, "Carrel-Darkin solution Chlorox Chlorox Dakin's solution bleach", "hypochlorous acid, sodium salt Antiformin B-K liquid Chloro", "Hypochlorite Milton Surchlor household bleach", "Soda bleach liquor Liquid pool chlorine", "Newland sodium hypochlorite", "Ikon sodium hypochlorite solution 13.0%"

Section 2 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
sodium hypochlorite	7681-52-9	5-30
@ 136.4 gram / Litre = 11.3 % hypochlorite or as 13% available chlorine		
water	7732-18-5	>60
contains more than 5% available chlorine		

Section 3 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Contact with combustible material may cause fire.

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Contact with acids liberates toxic gas.
Causes burns.
Risk of serious damage to eyes.
Very toxic to aquatic organisms.
Ingestion may produce health damage*.
Exposure may produce irreversible effects*.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be damaging to the health of the individual.
The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
Considered an unlikely route of entry in commercial/industrial environments.

EYE

The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
If applied to the eyes, this material causes severe eye damage.
if contact is prolonged.
The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

The material can produce chemical burns following direct contact with the skin.
if exposure is prolonged.
Skin contact will result in rapid drying, bleaching, leading to chemical burns on prolonged contact.
The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

INHALED

If inhaled, this material can irritate the throat and lungs of some persons.
The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

CHRONIC HEALTH EFFECTS

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
Principal routes of exposure are usually by skin contact / eye contact and inhalation of vapour.
Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.
Necrosis and haemorrhage of the upper digestive tract, oedema and pulmonary emphysema were found on autopsy after suicidal ingestion, and methaemoglobinaemia was also reported in another fatal case.

Section 4 - FIRST AID MEASURES

SWALLOWED

If poisoning occurs, contact a doctor or Poisons Information Center.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.

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- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

For acute or repeated exposures to hypochlorite solutions:

- Release of small amounts of hypochlorous acid and acid gases from the stomach following ingestion, is usually too low to cause damage but may be irritating to mucous membranes. Buffering with antacid may be helpful if discomfort is evident.
- Evaluate as potential caustic exposure.
- Decontaminate skin and eyes with copious saline irrigation. Check exposed eyes for corneal abrasions with fluorescein staining.
- Emesis or lavage and catharsis may be indicated for mild caustic exposure.
- Chlorine exposures require evaluation of acid/base and respiratory status.
- Inhalation of vapors or mists may result in pulmonary edema.

ELLENHORN and BARCELOUX: Medical Toxicology.

Section 5 - FIRE FIGHTING MEASURES

Flash Point (°F):	Not applicable
Lower Explosive Limit (%):	Not applicable
Upper Explosive Limit (%):	Not applicable
Autoignition Temp (°F):	Not applicable

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

Non combustible liquid.

Heating may cause expansion or decomposition leading to violent rupture of containers.

Decomposes on heating and produces toxic fumes of:
chlorine.

caustic compounds.

FIRE INCOMPATIBILITY

Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

Avoid storage with reducing agents.

amines acids.

copper peroxides.

ammonium salts and combustible materials.

PERSONAL PROTECTION

Glasses:

Safety Glasses.

Full face- shield.

Gloves:

PVC chemical resistant type.

Respirator:

Type B- P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

DO NOT touch the spill material.

Clean up all spills immediately.

Avoid breathing vapors and contact with skin and eyes.

Wear protective clothing, impervious gloves and safety glasses.

Neutralise with sodium metabisulfite or sodium thiosulfate.

MAJOR SPILLS

Clear area of personnel and move upwind.

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DO NOT touch the spill material.

Alert Emergency Responders and tell them location and nature of hazard.

■ Wear full body protective clothing with breathing apparatus.

■ Prevent, by any means available, spillage from entering drains or water courses.

Increase ventilation.

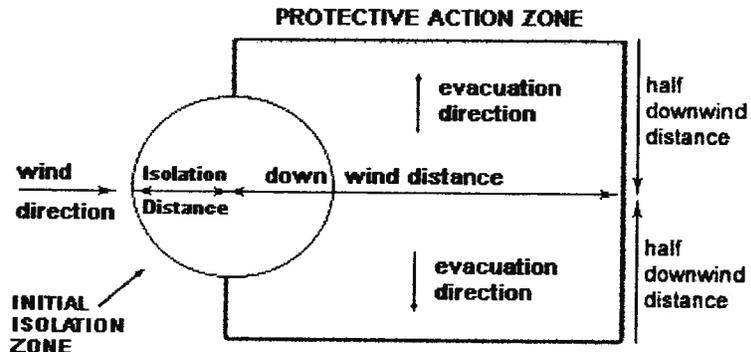
Stop leak if safe to do so.

Contain spill with sand, earth or vermiculite.

Collect recoverable product into labelled containers for recycling.

Neutralise with sodium metabisulfite or sodium thiosulfate.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance 25 meters

Downwind Protection Distance 250 meters

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 154 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

sodium hypochlorite	500 mg/m ³
water	500 mg/m ³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

sodium hypochlorite	1.5 mg/m ³
water	500 mg/m ³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

sodium hypochlorite	0.2 mg/m ³
water	500 mg/m ³

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The threshold concentration below which most people will experience no appreciable risk of health effects:

sodium hypochlorite 0.075 mg/m³
water 500 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according exceed the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Toxic (T)	>= 3.0%
R51	>= 2.5%	Corrosive (C)	>= 5.0%
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together

O: May be stored together with specific precautions

+: May be stored together

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Avoid generating and breathing mist. DO NOT allow clothing wet with material to stay in contact with skin.

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

RECOMMENDED STORAGE METHODS

Glass container and Container to have vented cap.

- Polyethylene or polypropylene container.
- Packing as recommended by manufacturer
- Check all containers are clearly labeled and free from leaks.

STORAGE REQUIREMENTS

Store in original containers. and Store in an upright position.

Store away from incompatible materials.

DO NOT store near acids.

DO NOT store on wooden floors.

Store in a well-ventilated area.

Keep containers securely sealed.

Protect from light.

Protect containers against physical damage.

Check regularly for spills and leaks.

Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC
US AIHA Workplace Environmental	sodium hypochlorite (Sodium							

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Exposure Levels (WEELs) Hypochlorite) 2

The following materials had no OELs on our records

• water: CAS:7732-18-5

MATERIAL DATA

Not available. Refer to individual constituents.

INGREDIENT DATA

SODIUM HYPOCHLORITE:

available chlorine, as chlorine

TLV TWA: 0.5 ppm, 1.5 mg/m3: STEL: 1 ppm, 2.9 mg/m3

ES Peak: 1 ppm, 3 mg/m3

CEL TWA: 2 mg/m3 (compare WEEL TWA)

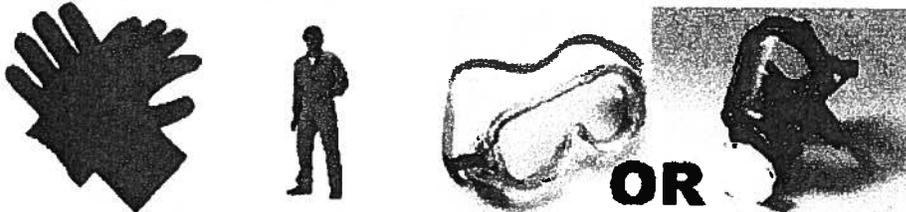
The odour threshold is likely to be similar to that of chlorine, 0.3 ppm.

Acute, subchronic, and chronic toxicity studies have shown no significant treatment related effects. High concentrations may produce moderate to severe eye irritation, but not permanent injury. High doses also appear to be embryotoxic. Since nearly all sodium hypochlorite is handled as aqueous solution, airborne exposure is likely to be as an aerosol, or mist. Sodium hypochlorite dissociates in water to form free hypochlorous acid in equilibrium. The toxic effects are likely to be similar to those of chlorine or sodium hydroxide.

WATER:

No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

- Chemical goggles.
- Full face shield.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

Wear chemical protective gloves. eg. PVC gloves with barrier cream

Wear safety footwear. or PVC safety gumboots.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

RESPIRATOR

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the OSHA Permissible Exposure Limit (or PEL), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	B-1 P	-	B-PAPR-1 P
50 x PEL	-	B-1 P	-
100 x PEL	-	B-2 P	B-PAPR-2 P [^]

[^] - Full-face

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

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The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.

Use in a well-ventilated area.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:

Air Speed:

solvent, vapors, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

Upper end of the range

- 1: Room air currents minimal or favorable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Avoid contact with eyes.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Contact with acids liberates toxic gas.

Molecular Weight: Not applicable.

Melting Range (°F): < 0

Solubility in water (g/L): Miscible

pH (1% solution): 9.5-10.5

Volatile Component (%vol): Not available

Relative Vapor Density (air=1): Not available

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°F): Not applicable

State: Liquid

Boiling Range (°F): 212 - 230

Specific Gravity (water=1): 1.15-1.2

pH (as supplied): 10-11

Vapor Pressure (mmHg): 18.001 @ 20 C

Evaporation Rate: Not available

Flash Point (°F): Not applicable

Upper Explosive Limit (%): Not applicable

Decomposition Temp (°F): Not available

Viscosity: Not available

APPEARANCE

CORROSIVE and Oxidising Agent. Pale yellow or greenish liquid with chlorine odour; mixes with water. Freezing point 12% approx minus 25 deg.C. Evolves very poisonous and corrosive chlorine gas on contact with acids and is mildly corrosive to most metals. Evolves oxygen and chlorine on heating. Commercial grades have 3-14% available chlorine. All grades over 5% available chlorine are Dangerous Goods, with 5-16% available chlorine as Packing Group III; and more than 16% available chlorine - packing group II. Items with 4% or less are not a scheduled poison.

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

SODIUM HYPOCHLORITE SOLUTION

Chemwatch Material Safety Data Sheet (REVIEW)

Revision No: 2

Hazard Alert Code:

HIGH

Chemwatch 1791-1

Issue Date: 29-Sep-2006

CD 2006/4

Contact with acids produces toxic fumes of chlorine.

STORAGE INCOMPATIBILITY

Avoid storage with reducing agents.

amines.

methanol acids.

copper peroxides.

ammonium salts and combustible materials.

Contact with acids liberates toxic gases i.e. chlorine.

Section 11 - TOXICOLOGICAL INFORMATION

SODIUM HYPOCHLORITE SOLUTION

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances

TOXICITY

SODIUM HYPOCHLORITE:

Oral (mouse) LD50: 5800 mg/kg

Oral (woman) TDLo: 1000 mg/kg

Oral (rat) LD50: 8910 mg/kg

as sodium hypochlorite pentahydrate

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

WATER:

No significant acute toxicological data identified in literature search.

IRRITATION

Eye (rabbit): 10 mg - Moderate

Skin (rabbit): 500 mg/24h - Moderate

Eye (rabbit): 100 mg - Moderate

Section 12 - ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.

Refer to data for ingredients, which follows:

SODIUM HYPOCHLORITE:

The material is classified as an ecotoxin* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Recycle wherever possible.

Consult manufacturer for recycling options.

Consult Waste Management Authority for disposal.

Treat and neutralize at an effluent treatment plant.

Bury residue in an authorized landfill.

Puncture containers to prevent re-use.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE

DOT Information:

Dangerous Goods Class:

8

Subrisk:

None

UN Number:

1791

Packing Group:

III

Shipping Name:HYPOCHLORITE SOLUTION

SODIUM HYPOCHLORITE SOLUTION

Chemwatch Material Safety Data Sheet (REVIEW)

Revision No: 2

Hazard Alert Code:

HIGH

Chemwatch 1791-1

Issue Date: 29-Sep-2006

CD 2006/4

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	1791	Packing Group:	III
ERG Code:	8L		

Shipping Name: Hypochlorite solution †

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	1791	Packing Group:	III
EMS Number:	F-A,S-B		

Shipping Name: HYPOCHLORITE SOLUTION

Section 15 - REGULATORY INFORMATION



RISK

Risk Codes	Risk Phrases
R08	Contact with combustible material may cause fire.
R31	Contact with acids liberates toxic gas.
R34	Causes burns.
R41	Risk of serious damage to eyes.
R50	Very toxic to aquatic organisms.

REGULATIONS

US CERCLA List of Hazardous Substances and Reportable Quantities

Ingredient	CAS	RQ (Pounds)	RQ (KG)
sodium hypochlorite (CAS: 7681- 52- 9) is found on the following regulatory lists;			
Canada - Saskatchewan Industrial Hazardous Substances			
Canada Domestic Substances List (DSL)			
Canada Ingredient Disclosure List (SOR/88- 64)			
International Agency for Research on Cancer (IARC) Carcinogens			
International Council of Chemical Associations (ICCA) - High Production Volume List			
OECD Representative List of High Production Volume (HPV) Chemicals			
US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List			
US - Minnesota Hazardous Substance List			
US - New Jersey Right to Know Hazardous Substances			
US AIHA Workplace Environmental Exposure Levels (WEELs)			
US CWA (Clean Water Act) - List of Hazardous Substances			
US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances			
US DOE Temporary Emergency Exposure Limits (TEELs)			
US EPA Hazardous Substances			
US Food Additive Database			
US Toxic Substances Control Act (TSCA) - Inventory			
sodium hypochlorite (CAS: 10022- 70- 5) is found on the following regulatory lists;			
Canada - Saskatchewan Industrial Hazardous Substances			
Canada Domestic Substances List (DSL)			
Canada Ingredient Disclosure List (SOR/88- 64)			
International Agency for Research on Cancer (IARC) Carcinogens			
International Council of Chemical Associations (ICCA) - High Production Volume List			
OECD Representative List of High Production Volume (HPV) Chemicals			
US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List			
US - Minnesota Hazardous Substance List			
US - New Jersey Right to Know Hazardous Substances			
US AIHA Workplace Environmental Exposure Levels (WEELs)			
US CWA (Clean Water Act) - List of Hazardous Substances			
US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances			
US DOE Temporary Emergency Exposure Limits (TEELs)			

SODIUM HYPOCHLORITE SOLUTION

Chemwatch Material Safety Data Sheet (REVIEW)

Revision No: 2

Hazard Alert Code:

HIGH

Chemwatch 1791-1

Issue Date: 29-Sep-2006

CD 2006/4

US EPA Hazardous Substances
US Food Additive Database
US Toxic Substances Control Act (TSCA) - Inventory
water (CAS: 7732- 18- 5) is found on the following regulatory lists;
Canada Domestic Substances List (DSL)
OECD Representative List of High Production Volume (HPV) Chemicals
US DOE Temporary Emergency Exposure Limits (TEELs)
US NFPA 30B Manufacture and Storage of Aerosol Products - Chemical Heat of
Combustion
US Toxic Substances Control Act (TSCA) - Inventory

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

Ingestion may produce health damage*.
Limited evidence of a carcinogenic effect*.
* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name	CAS
sodium hypochlorite	7681-52-9, 10022-70-5

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Issue Date: Sep-29-2006

Print Date: Jan-31-2007

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ORT NUMBER: 703

UNIVAR USA INC.

PAGE: 001

IS NO: 0Z32415

MATERIAL SAFETY DATA SHEET

NFRAME UPLOAD DATE: 02/27/09

VERSION: 021

CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

FISHER SCIENTIFIC
C/O LOS ALAMOS NATIONAL
TA-66 BUILDING 2
381 ENIWETOK
LOS ALAMOS ,NM 87544

UNIVAR USA INC.

(425)889-3400

25 NE UNION HILL RD , REDMOND

, WA 98052

----- EMERGENCY ASSISTANCE -----

OR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC

(800)424-9300

PL
1 07

DUCT NAME: CAUSTIC SODA LIQUID (ALL GRADES)
S NUMBER: 0Z32415
E ISSUED: 01/07/2009
ERSEDES: 11/12/2008
UED BY: 008730

MATERIAL SAFETY DATA SHEET

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Contributed by:
Univar USA Inc.
25 NE Union Hill Rd.
Redmond, WA 98052
-889-3400

Product Name:
Soda Disphragm Grade 10%, 15%, 18%, 20%, 25%, 30%, 35%, 40%, 50%,
Caustic Soda Rayon Grade 18%, 20%, 25%, 30%, 50%, 50% Caustic Soda Rayon

CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorders

Section 11: TOXICOLOGICAL INFORMATION

COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component	Concentration (by weight %)	CAS - No.
Water	48.5 - 94.5	7732-18-5
Sodium hydroxide	5.5 - 51.5	1310-73-2
Sodium chloride (NaCl)	1 - 5	7647-14-5

FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

Eye Contact: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods. GET MEDICAL ATTENTION IMMEDIATELY.

Eye Contact: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

Ingestion: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. GET MEDICAL ATTENTION IMMEDIATELY.

First Aid - Call Physician: The absence of visible signs or symptoms of burns does not reliably exclude the presence of actual tissue damage. Probable mucosal damage may contraindicate the use of gastric lavage.

FIRE-FIGHTING MEASURES

Hazard: Negligible fire hazard.

Extinguishing Media: Use media appropriate for surrounding fire

PRODUCT: CAUSTIC SODA LIQUID (ALL GRADES)

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Fire Fighting: Move container from fire area if it can be done without risk. Do not use water on containers with water. Avoid contact with skin.

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Flash point: Not flammable

ACCIDENTAL RELEASE MEASURES

Occupational Release:

Use appropriate personal protective equipment recommended in Section 8 of this MSDS. Completely contain spilled material with dikes, sandbags, etc. Sweep dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid, then absorbed and collected. Flush spill area with water, if appropriate. Keep product and flush water out of water courses and sewers. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

HANDLING AND STORAGE

Storage Conditions: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated from incompatible substances.

Handling Procedures: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add water to minimize heat generation and spattering.

EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure limit(s):

Component	CAS-No.	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Sodium hydroxide	1310-73-2	2 mg/m3		

Regulatory Exposure Limit(s):

Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (as vacated by 58 FR 35338, June 30, 1993).

CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

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Hazardous Component	CAS-No.	ACGIH	ACGIH	ACGIH	OSHA	OSHA	OSHA Ceiling
		TWA	STEL	Ceiling	TWA	STEL	(Vacated)
Lithium hydroxide	1310-73-2			2 mg/m3	(Vacated)	(Vacated)	2 mg/m3

ENGINEERING CONTROLS: Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash station and quick drench shower in the immediate work area.

Hand and Body Protection: Wear chemical resistant clothing and rubber boots whenever potential for contact with the material exists. Contaminated clothing should be removed, then discarded or laundered.

Glove Protection: Wear appropriate chemical resistant gloves Protective Material Types: Natural rubber, Neoprene, Nitrile

Hazardous Component	Immediately Dangerous to Life/ Health (IDLH)
Lithium hydroxide	10 mg/m3 IDLH

Respiratory Protection: A NIOSH approved respirator with N95 (dust, fume, mist) cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. If eye irritation occurs, a full face style mask should be used. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Clear to opaque
Color:	Colorless to slightly colored
Odor:	Odorless
Melting Point/Range:	230 - 291 F (110 - 144 C)
Boiling Point/Range:	-26 to 59 F (-32 to 15 C)
Vapor Pressure:	13 - 135 mmHg @ 60 C
Density (air=1):	No data available
Specific Gravity (water=1):	1.11 - 1.53 @ 15.6 C
Air Solubility:	100%

CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

14.0 (7.5% solution)

Volatility: No data available

Evaporation Rate (ether=1): No data available

Partition Coefficient (n-octanol/water): No data available

STABILITY AND REACTIVITY

Stability/Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Mixing with water, acid or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces.

Incompatibilities/Materials to Avoid: Acids, Halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys

Decomposition Products: Toxic fumes of sodium oxide

Exothermic Polymerization: Will not occur

TOXICOLOGICAL INFORMATION

TOXICITY DATA:

Corrosive Component	LD50 Oral	LC50 Inhalation	LD50 Dermal
Sodium hydroxide	Not listed	Not listed	1350 mg/kg (Rabbit)
Sodium chloride (NaCl)	3 g/kg (Rat)	42 g/m3 (1 hr-Rat)	10 g/kg (Rabbit)

TOXICITY:

The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucous membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact. Inhalation will cause severe irritation and possible burns with pulmonary edema, which may lead to bronchitis. Skin contact with this material may cause severe irritation and corrosion of tissue. Eye contact can cause severe irritation, corrosion with possible corneal damage and blindness. Ingestion may cause irritation, corrosion/ulceration, nausea, and vomiting. In general, chronic effects are limited to long-term irritation. This material may cause dermatitis. In rare cases reports have noted long-term inhalation causes bronchial inflammatory disease or obstructive airway dysfunction.

MUTAGENICITY: This product is not classified as a carcinogen by NTP, IARC or OSHA.

PRODUCT: CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

ECOLOGICAL INFORMATION

AQUATIC TOXICITY: This material has exhibited moderate toxicity to aquatic organisms. Data provided are for sodium hydroxide.

Freshwater Fish Data:

10 brook trout: 25 ppm/24 hr

10 king salmon: 48 ppm

Vertebrate Toxicity Data:

10 daphnia magna: 100 ppm

10 shrimp: 33 100 ppm/48 hr

10 cackle: 330 1000 ppm/48 hr

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the dissolved state in the environment.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms.

DISPOSAL CONSIDERATIONS

Recycle or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): 0002

TRANSPORT INFORMATION

DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Sodium Hydroxide Solution
 UN NUMBER: UN1824
 HAZARD CLASS/ DIVISION: 8
 PACKING GROUP: II
 SPECIAL REQUIREMENTS: 8
 NET WT (lbs): 1000 lbs. (Sodium Hydroxide)

ADDITIONAL TRANSPORTATION OF DANGEROUS GOODS:

PROPER NAME: Sodium hydroxide solution
 UN NUMBER: UN1824
 HAZARD CLASS/ DIVISION: 8
 PACKING GROUP: II

PRODUCT: CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

REGULATORY INFORMATION

1. REGULATIONS

1A REGULATORY STATUS:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

CERCLA SECTIONS 102/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 267-5267.

Hazardous Component

CERCLA Reportable Quantities:

Sodium hydroxide

1000 lb (final RQ)

1B EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): No components are listed.

1C RCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):

Not a Health Hazard

1D RCRA SECTION 313 (40 CFR 372.65): No components are listed.

1E OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated

2. TSCA INVENTORY STATUS

2A INVENTORY STATUS (TSCA): All components are listed or exempt

2B EPCRA 12(b): This product is not subject to export notification

2C TSCA ADJACENT DOMESTIC SUBSTANCE LIST (ADSL/NDL): All components are listed.

3. STATE REGULATIONS

3A California Proposition 65: This product is not listed

Hazardous Component

Sodium hydroxide

3B California Proposition 65 Cancer WARNING:

Not Listed

3C California Proposition 65 CRT List - Male

Not Listed

3D California Proposition 65 CRT List - Female reproductive toxin:

Not Listed

3E New Jersey Right to Know Hazardous Substance List

Listed

3F New York Right to Know Hazardous Substance List

Listed

3G New Jersey Special Health Hazards Substance List

Listed

PORT NUMBER: 705

UNIVAR USA INC.

PAGE: 009

IS NO: 0292415

MATERIAL SAFETY DATA SHEET

MSDS UPLOAD DATE: 02/27/09

VERSION: 021

IDENT: CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

Pennsylvania Right to Know Hazardous Substance List	Listed
Pennsylvania Right to Know Environmental Hazard List	Listed
Rhode Island Right to Know Hazardous Substance List	Listed

HAZARD REGULATIONS:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

HS Classification:

E

OTHER INFORMATION

OSHA (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: 2004 Edition)

Health: 3 Flammability: 0 Reactivity: 1

MSHA 704 - Hazard Identification Ratings (SCALE 0-4)

Health: 3 Flammability: 0 Reactivity: 1

PORT NUMBER: 703

UNIVAR USA INC.

PAGE: 010

IS NO: 0232415

MATERIAL SAFETY DATA SHEET

FRAME UPLOAD DATE: 02/27/09

VERSION: 021

PRODUCT: CAUSTIC SODA LIQUID (ALL GRADES)

ORDER NO: 269536

PROD NO : 237641

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

09/28/09 09:00

PRODUCT: 237641

CUST NO: 238921

ORDER NO: 269536

----- NOTICE -----

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SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM
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CIRCUMSTANCES.

*** END OF MSDS ***

△ SURVEY CONTROL POINTS:

- CP-1 = LANL MONUMENT CALIBRATED A0308
N=1772653.20
E=1620942.17
Z=7368.00
- CP-2 = LANL MONUMENT A0306
N=1771637.23
E=1619555.72
Z=7400.98
- CP-3 = LANL MONUMENT A4801-CHECK
N=1770252.42
E=1623423.63
Z=7326.61
- CP-4 = BENCHMARK SET NO. 4 REBAR
N=1771356.60
E=1626380.43
Z=7276.01
- CP-5 = BENCHMARK NO. 4FD
N=1773752.20
E=1620260.89
Z=7308.25

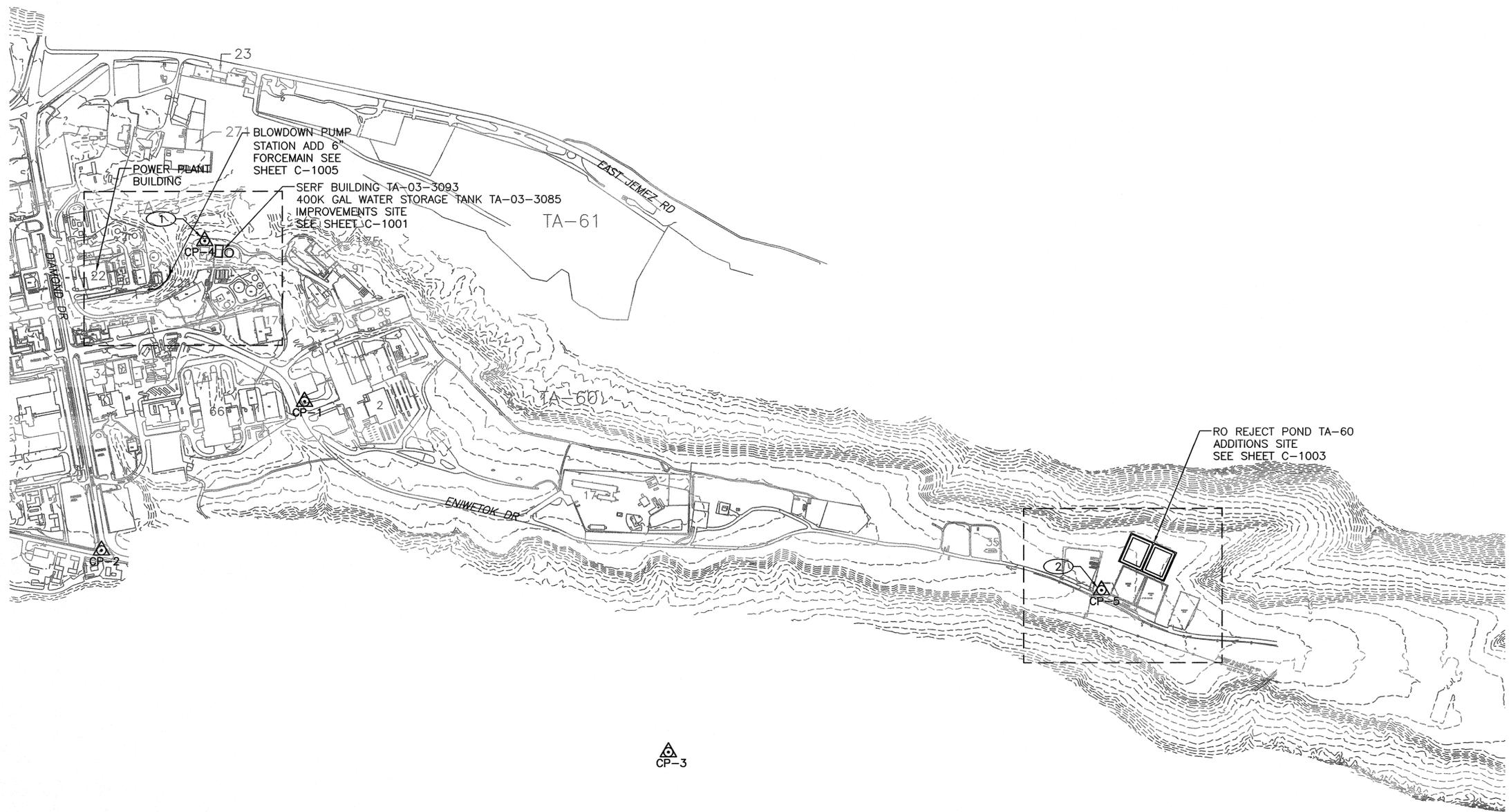
GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"x36" THEN IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
2. HORIZONTAL CONTROL IS BASED ON NAD83 CENTRAL ZONE NEW MEXICO STATE PLANE COORDINATES. ELEVATION IS BASED ON LANL MONUMENT A0308. ELEVATION MEASURED 7367.82' CALIBRATED FROM EXISTING LANL CONTROL:

A0308 COORDINATE - N=1772653.1990, E=1620942.1730, CSF=0.99956 GRID
3. SURVEY CONTROL PROVIDED BY:
SALVADOR I. VIGIL, RLS
LAND SURVEYING COMPANY, LLC
PO BOX 4384
SANTA FE, NM 87502
4. EXISTING TOPOGRAPHY, FACILITIES, AND UTILITIES SHOWN ARE BASED ON MAPPING PROVIDED BY LANL. VERIFY EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES FOR COORDINATION AND FIELD ADJUSTMENTS AS REQUIRED.

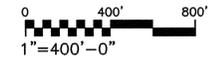
KEYED NOTES:

- ① ELEVATION DATUM BASED ON LANL MONUMENT A0308 ELEVATION = 7367.82'.
- ② ELEVATION DATUM BASED ON BENCHMARK AT THE SOUTHWEST CORNER OF PROPERTY AS DEPICTED. ELEVATION = 7276.01' TOP OF REBAR.



△ CP-3

SITE AND SURVEY CONTROL PLAN



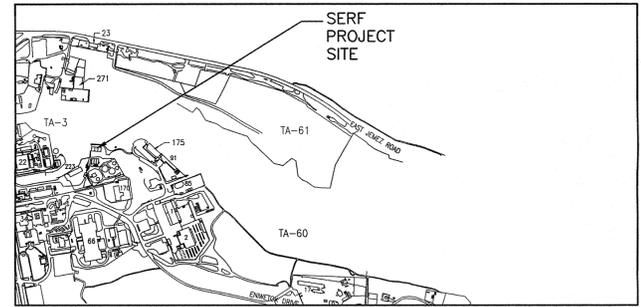
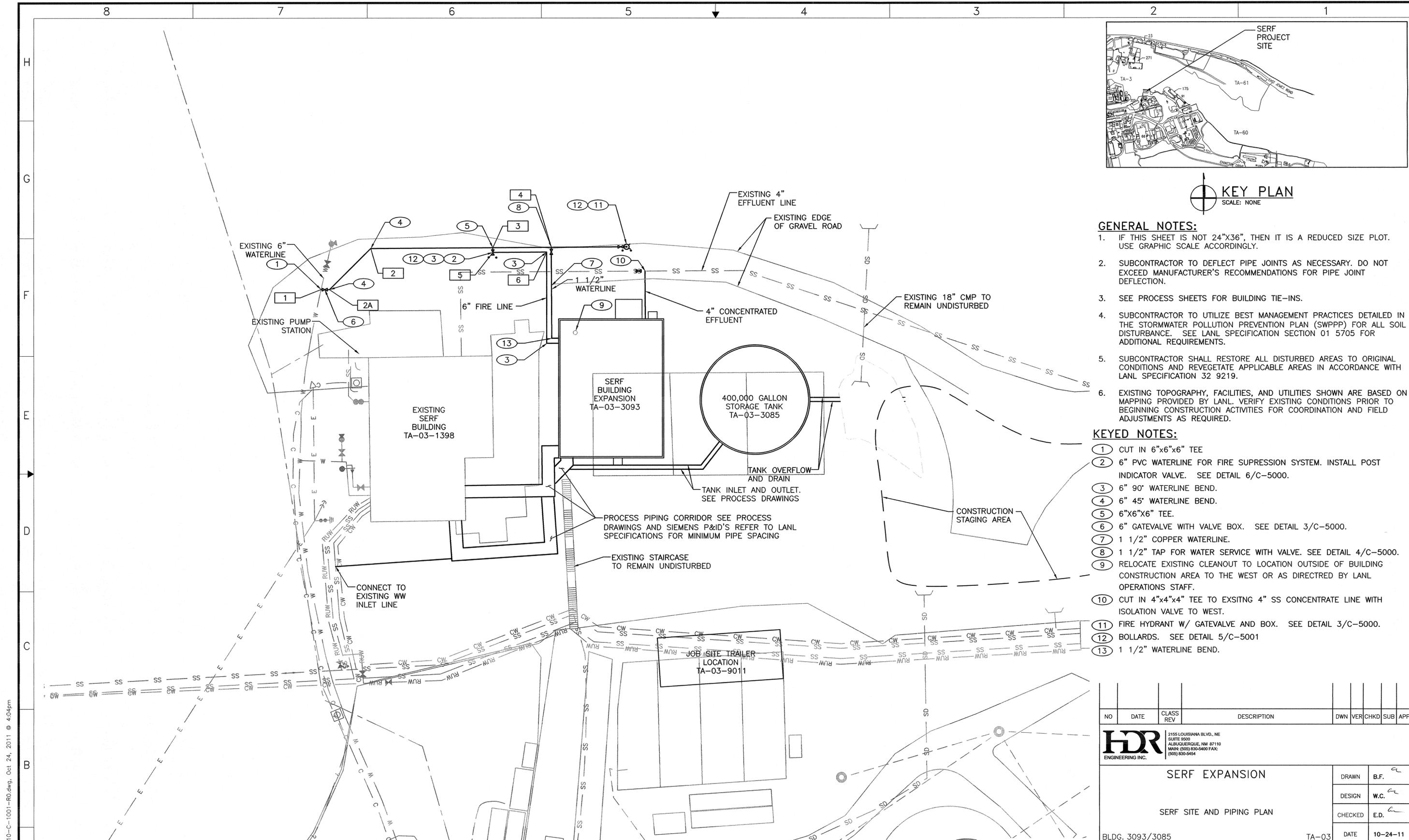
NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP



2155 LOUISIANA BLVD., NE
SUITE 9500
ALBUQUERQUE, NM 87110
MAIN: (505) 830-5400 FAX:
(505) 830-5454



SERF EXPANSION		DRAWN	B.F.
		DESIGN	W.C.
		CHECKED	E.D.
BLDG. TA-		DATE	10-24-11
SUBMITTED FOR RELEASE		APPROVED FOR RELEASE	
		SHEET C-1000	
CLASSIFICATION UNCLASSIFIED		REVIEWER	DATE 11/2/11
PROJECT ID	102310	DRAWING NO	C-55752
			REV 0

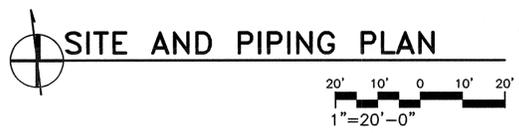


- GENERAL NOTES:**
- IF THIS SHEET IS NOT 24"x36", THEN IT IS A REDUCED SIZE PLOT. USE GRAPHIC SCALE ACCORDINGLY.
 - SUBCONTRACTOR TO DEFLECT PIPE JOINTS AS NECESSARY. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS FOR PIPE JOINT DEFLECTION.
 - SEE PROCESS SHEETS FOR BUILDING TIE-INS.
 - SUBCONTRACTOR TO UTILIZE BEST MANAGEMENT PRACTICES DETAILED IN THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR ALL SOIL DISTURBANCE. SEE LANL SPECIFICATION SECTION 01 5705 FOR ADDITIONAL REQUIREMENTS.
 - SUBCONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO ORIGINAL CONDITIONS AND REVEGETATE APPLICABLE AREAS IN ACCORDANCE WITH LANL SPECIFICATION 32 9219.
 - EXISTING TOPOGRAPHY, FACILITIES, AND UTILITIES SHOWN ARE BASED ON MAPPING PROVIDED BY LANL. VERIFY EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES FOR COORDINATION AND FIELD ADJUSTMENTS AS REQUIRED.

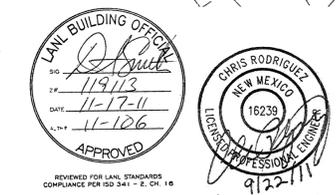
- KEYED NOTES:**
- CUT IN 6"x6"x6" TEE
 - 6" PVC WATERLINE FOR FIRE SUPPRESSION SYSTEM. INSTALL POST INDICATOR VALVE. SEE DETAIL 6/C-5000.
 - 6" 90° WATERLINE BEND.
 - 6" 45° WATERLINE BEND.
 - 6"x6"x6" TEE.
 - 6" GATEVALVE WITH VALVE BOX. SEE DETAIL 3/C-5000.
 - 1 1/2" COPPER WATERLINE.
 - 1 1/2" TAP FOR WATER SERVICE WITH VALVE. SEE DETAIL 4/C-5000.
 - RELOCATE EXISTING CLEANOUT TO LOCATION OUTSIDE OF BUILDING CONSTRUCTION AREA TO THE WEST OR AS DIRECTED BY LANL OPERATIONS STAFF.
 - CUT IN 4"x4"x4" TEE TO EXISTING 4" SS CONCENTRATE LINE WITH ISOLATION VALVE TO WEST.
 - FIRE HYDRANT W/ GATEVALVE AND BOX. SEE DETAIL 3/C-5000.
 - BOLLARDS. SEE DETAIL 5/C-5001
 - 1 1/2" WATERLINE BEND.

POINT TABLE - SITE AND PIPING LAYOUT

POINT	NORTHING	EASTING
1	1773745.13	1620209.72
2	1773763.46	1620235.28
2A	1773744.74	1620213.83
3	1773759.77	1620294.72
4	1773758.00	1620323.25
5	1773757.46	1620294.58
6	1773755.80	1620320.84



NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
SERF EXPANSION SERF SITE AND PIPING PLAN BLDG. 3093/3085 TA-03 SUBMITTED: <i>Coy & Bump</i> APPROVED FOR RELEASE: <i>[Signature]</i> SHEET C-1001 DATE: 10-24-11								
			PO Box 1663 Los Alamos, New Mexico 87545 CLASSIFICATION: UNCLASSIFIED REVIEWER: <i>[Signature]</i> DATE: 11/2/11 PROJECT ID: 102310 DRAWING NO: C-55752 REV: 0					



c:\pwworking\phx\10224116\102310-C-1001-RO.dwg, Oct. 24, 2011 @ 4:04pm

APPENDIX M
LANL Policies and Procedures

No: PD400

Revision: 1

Issued: 10/13/09
Effective Date: 10/13/09

Environmental Protection

1.0 PURPOSE

The purpose of this document is to ensure that:

- Environmental requirements and issues are identified and reviewed early in the planning process
- The environment is protected from harm during conduct of Los Alamos National Laboratory (LANL or the Laboratory) operations
- Mission execution is not disrupted by environmental issues
- Appropriate preventive measures and controls are incorporated into all projects, planning activities, and work execution to prevent and mitigate detrimental effects to the environment
- The Laboratory is in compliance with environmental legal requirements and [Prime Contract obligations](#) (see [P401](#), *Procedure to Identify, Communicate, and Implement Environmental Requirements*, Appendix A)
- The Laboratory meets the requirements of [Department of Energy \(DOE\) Order \(O\) 450.1A](#), *Environmental Protection Program*, by fully integrating operational activities with its [Environmental Management System \(EMS\)](#) and Integrated Safety Management (ISM) systems
- The Laboratory continuously improves its environmental performance through pollution prevention

It is the policy of the Laboratory to protect the environment from harm during conduct of Laboratory operations, while executing mission responsibilities. All new and modified projects, planning activities, and other work execution within the scope of this document, must be reviewed during the earliest stage of planning to determine applicable environmental requirements, controls, and Best Management Practices (BMPs).

- Cognizant managers must ensure that environmental review is accomplished as an integral element of the Integrated Work Management (IWM), work planning, authorization, and execution processes.
- If environmental requirements are identified, the cognizant manager or designee must consult the appropriate Laboratory environmental Subject Matter Experts (SMEs) regarding how to meet those requirements.
- Employee actions that result in noncompliance with environmental regulations are subject to disciplinary actions up to and including termination as defined in [P731](#), *Discipline*.

Activities involving classified or sensitive information are subject to the provisions of this document.

Actions taken to prevent or mitigate an emergency condition can be initiated without an environmental requirements review; however, any necessary Environmental Protection (ENV) Division assessments must be initiated as soon as practicable.

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to the Associate Director for Environment, Safety, Health, and Quality (ADESH&Q) as provided in the [Prime Contract](#). This document derives from the Laboratory [Governing Policies](#), particularly the section on Environment, and provides partial fulfillment of the requirements of [DOE O 450.1A, Environmental Protection Program](#).

This document coordinates with [SD350, Management of Projects](#), [P300, Integrated Work Management](#), and [P941, Site Planning](#). This document provides the basis for the Laboratory [EMS](#) as established in [P401, Procedure to Identify, Communicate, and Implement Environmental Requirements](#), [P402, Environmental Communication Procedure](#), and [P403, Environmental Aspects Identification Requirement](#), and executed through [SD400, Environmental Management System Description Document](#). It also complements [P405, National Environmental Policy Act \(NEPA\), Cultural Resources, and Biological Resources \(NCB\) Reviews](#), [P407, Water Quality](#), [P408, Air Quality Reviews](#), [P409, Waste Management](#), and individual environmental compliance quality assurance procedures managed by the ENV Division.

- Issuing Authority (IA): Principal Associate Director for Operations (PADOPS)
- Responsible Manager (RM): Associate Director for Environment, Safety, Health, and Quality (ADESH&Q)
- Responsible Office (RO): Environmental Protection (ENV) Division

2.2 Applicability

This document applies to all Laboratory employees.

3.0 PROGRAM DESCRIPTION

This document describes the process to review work at the Laboratory to ensure that the Laboratory's environmental policy provisions are met.

Work activities must be reviewed during the earliest planning and proposal stages to ensure environmental requirements are identified and met and preventive actions are incorporated.

New and modified projects, planning activities, and work execution (excluding office/business/administrative functions) must be reviewed for requirements for the following:

- Air Quality
- Biological Resources
- Cultural Resources
- National Environmental Policy Act (NEPA)
- Pollution Prevention
- Potential Release Sites (contaminated sites)
- Waste and Materials Management
- Water Quality

Institutional tools that are available for identifying environmental requirements include the following:

- The [Permits and Requirements Identification \(PR-ID\) System](#)
- The [Excavation/Fill/Soil Disturbance Permit Process \(EX-ID\)](#) permit process (see [P101-17, Excavation/Fill/Soil Disturbance](#))
- The IWM system (see [P300, Integrated Work Management](#))
- The [Job Hazard Analysis \(JHA\)](#) tool (see [P300](#))
- [Form WFO-4, Safety, Security, and Compliance Form for Work for Others \(WFO\)](#)

Advantages and limitations of these tools are described in Attachment A, *Institutional Tools and Support for Identifying Environmental Requirements*.

3.1 Resources

Program, project, facility, and line managers are expected to plan for, define, and work to obtain the resources needed to accomplish their charter or work assignments, including environmental protection activities, waste and excess materials, and facility cleanout at activity conclusion. Routine environmental review (i.e., up to two hours of time for each SME) is funded by institutional resources. SME resources required beyond routine review must be funded by the organization requesting the evaluation.

3.2 Excluded Activities

Office and computer work, including accounting, administrative actions (e.g., staffing or budgeting), human resources, conducting inspections, contracting, computer modeling and simulation, software development, official travel, data analysis, report writing, and similar work are not subject to the provisions of this document. Also excluded is extending existing programs or projects (with no change in scope) with new funding or with a new sponsor.

3.3 Identify Environmental Requirements

The environmental review process identifies requirements, controls, and BMPs that must be adequately addressed during planning and authorization of all new work or changes to existing work. The process follows a graded approach, taking into consideration the scope, duration, and complexity of the proposed work.

For a description of institutional tools and support for identifying environmental requirements, see Attachment A, *Institutional Tools and Support for Identifying Environmental Requirements*.

3.3.1 Projects or Facilities

According to [P313, Roles, Responsibilities, Authorities, and Accountability](#), people who are planning new or modified projects (within the scope of this document) must use the [PR-ID](#) system to identify potential environmental requirements or issues.

Definition: In general, a project is a unique effort that supports a program mission, having defined start and end points, undertaken to create a product, facility, or system, and containing interdependent activities planned to meet a common objective or mission. A project is a set of activities directed to an overall goal. For ongoing programs, the planned period, which is at least one fiscal year, is considered a project.

According to [SD350, Management of Projects](#), environmental program projects are defined as projects.

Depending on the institutional tool or process used, SMEs will analyze the intended work using media-specific (air, water, waste, etc.) criteria maintained in ENV Division documentation.

3.3.2 Programs

Environmental planning at the program level is strongly encouraged. According to [P313, Roles, Responsibilities, Authorities, and Accountability](#), people planning programmatic activities are expected to contact environmental SME's to ensure that alternatives are understood and that Site-wide Environmental Impact Statement analysis, Environmental Assessment, or other NEPA reviews are planned, funded, and conducted in a timely manner. (See [P405, National Environmental Policy Act \(NEPA\), Cultural Resources, and Biological Resources \(NCB\) Reviews](#)).

3.3.3 Other Work Activities

A work activity that does not qualify as a project or program must still identify environmental requirements for each of the subject areas listed above in Section 3.0.

3.3.4 Ongoing Work

Ongoing activities and continuous improvements are addressed through the Laboratory's [EMS](#). The [EMS](#) process reduces environmental impacts associated with ongoing activities through:

- Identifying activities, products, and services that have the potential to negatively or positively interact with the environment
- Developing controls to mitigate the negative interactions
- Reviewing the activities, products, services, and controls annually
- Actively reducing impacts through pollution prevention

For more details, see the [EMS](#), and [P403, Environmental Aspects Identification Requirement](#).

3.4 Contact Subject Matter Experts (SMEs)

After identifying environmental requirements using one of the tools or processes in Attachment A, *Institutional Tools and Support for Identifying Environmental Requirements*, the person planning the work must contact the relevant SMEs to determine:

- Acceptable ways to meet requirements
- Opportunities for environmentally preferable alternatives

4.0 RESPONSIBILITIES

4.1 Environmental Protection (ENV) Division

- Maintains Laboratory expertise for environmental compliance, DOE environmental monitoring, and dose assessment. This expertise includes a detailed knowledge of existing laws and regulations and how they apply to the Laboratory's work.
- Publishes and maintains media-specific review procedures and tools.
- Provides technical and regulatory support to facility management and operating groups to achieve compliance.
- Provides SME input to the [PR-ID](#), [EX-ID](#), and the [JHA](#) tools.

- Provides project completion review(s) to identify best management practices and integration/implementation problems.
- Provides institutional assurance that the Laboratory is operating in compliance with applicable environmental laws and regulations, and consent and compliance orders and permits.
- Determines significant environmental aspects through the [EMS](#).
- Conducts compliance assurance audits and tracks results.
- Responsible Office for regulators, stakeholders, and the public on technical environmental compliance issues.
- Responsible Office for maintaining environmental data quality and reporting on progress against Laboratory-wide environmental objectives and targets negotiated with DOE/National Nuclear Security Administration (NNSA). (Shared with Environmental Programs Directorate.)

4.2 Engineering Division

- Maintains and continuously improves the [PR-ID](#) system to maximize the effectiveness of environmental reviews.
- Integrates environmental and nonenvironmental elements of the [PR-ID](#) system to ensure comprehensive but efficient project review requirements.
- Owns and maintains policy and guidance on when use of the [PR-ID](#) system is required.

4.3 Industrial Hygiene and Safety Division

- Maintains and continuously improves the [EX-ID](#) system to maximize the effectiveness of environmental reviews.
- Provides personnel and expertise to screen for asbestos, lead, radioactive contamination, high explosives and/or beryllium, as deemed appropriate.
- Maintains the procedures set forth in [P101-17, Excavation/Fill/Soil Disturbance](#), to ensure environmental reviews are included in approval processes.

4.4 Technical Staff Advisor/Integrated Work Management (IWM), Associate Director for Environment, Safety, Health, and Quality (ADESH&Q)

- Maintains and continuously improves [JHA](#) tool to maximize the effectiveness of environmental reviews.

4.5 Integrated Safety Management System/Worker Safety Rule (ISMS/WSR) Office

- Maintains subcontractor environmental requirements documentation in Exhibit F.

4.6 Infrastructure Planning Division

- Ensures project planners within the organization are trained on the [PR-ID](#) system and understand how to address environmental issues in project planning.
- Maintains [P941, Site Planning](#), or its successor documents, to ensure that environmental reviews are included in approval processes.

4.7 Facility Operations Directors (FODs) and Responsible Line Managers (RLMs)

- Before starting work, the RLM with responsibility for safety, including control of environmental impacts, and the responsible FOD, will implement controls for the environmental hazards that were identified in the environmental review. (See [P313](#), *Roles, Responsibilities, Authorities, and Accountability*.)
- Ensure that required environmental controls are implemented and permits are in place.
- Provide project completion review(s) to identify best management practices, lessons learned, and integration/implementation problems.

4.8 Program Manager

- Develops Laboratory plans and programs at the institutional, programmatic, project, or facility level. This excludes such activities as the day-to-day scheduling of facility work.
- Engages the [PR-ID](#) system early in the plan or program development to ensure that environmental requirements are incorporated at the required time.
- Ensures that potential environmental costs associated with environmental reviews, requirements implementation, and prevention and mitigation measures, as well as waste disposition pathways and costs, are identified and budgeted in the work.
- Provides project completion review(s) to identify BMPs, lessons learned, and integration/implementation problems.

4.9 Project Manager

- Ensures environmental subcontract requirements are transmitted to subcontractors.
- In projects without an assigned Program Manager, ensures that potential environmental costs associated with environmental reviews, requirements implementation, and prevention and mitigation measures, as well as waste disposition pathways and costs, are identified and budgeted in the work.
- Ensures that environmental requirements are included in project design and execution.
- In projects without an assigned Program Manager, provides project completion review(s) to identify BMPs and integration/implementation problems.
- Contacts ENV groups for assistance.

4.10 Work Authorizer

- Authorizes or approves work under [P300](#), *Integrated Work Management*.
- Ensures that environmental requirements are incorporated into IWM processes.
- Ensures that identified mitigation measures are incorporated into the project or work plan.
- In projects without an assigned Project Manager, ensures environmental subcontract requirements are transmitted to subcontractors.

4.11 Principal Investigator

- Develops project proposals.
- In projects without an assigned Program Manager or Project Manager, ensures that potential environmental costs associated with environmental reviews, requirements implementation, and prevention and mitigation measures, as well as waste disposition pathways and costs, are identified and budgeted in the work.
- In projects without an assigned Work Authorizer, ensures that identified mitigation measures are incorporated into the project or work plan.

4.12 Maintenance Manager/Coordinator

- Implements the Annual Maintenance Plan for a facility.
- Ensures that environmental requirements are implemented in the course of performing maintenance.

4.13 Work Planner

- Develops planning documents within the maintenance program.
- Ensures that environmental requirements and BMPs are identified, and costs are incorporated into the work plan.

5.0 IMPLEMENTATION

The requirements in this document are to be implemented by the applicable nuclear and high-hazard facilities 60 days after the issue date. This is to allow time to complete the Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review. If a nuclear or high-hazard facility has not completed its USQ/USI review within 60 days, an exception or variance must be requested following the process described in Section 7.

For all other facilities the requirements in this document are to be implemented starting on the issue date.

All identified requirements must be addressed at the appropriate stage of the work. Some requirements may need to be implemented before work can begin; others may apply to the closeout of the work. Institutional tools and SME guidance will determine when a requirement must be implemented.

Failure to implement requirements may result in institutional fines and penalties, project delays, cost overruns, and individual criminal liabilities.

6.0 TRAINING

N/A

7.0 EXCEPTION OR VARIANCE

To obtain an exception or variance to this document, see the following instructions:

- Managers may request an exception or variance from the IA through the RM.
- At the IA's request, the RM will provide a recommendation or supporting information.
- The IA or his or her designee will provide the requester with a written response and copy the RM.

The requesting organization must maintain the official copy of record of the approved correspondence granting the exception or variance.

8.0 DOCUMENTS AND RECORDS

8.1 Office of Record

ENV Division is the Office of Record for this Institutional Document.

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL [Definition of Terms](#).

9.2 Acronyms

See LANL [Acronyms and Names](#).

10.0 HISTORY

Revision History		
10/31/08	PD400	Renumbered document, IPP400, <i>Environmental Protection</i> .
10/13/09	PD400, Rev. 1	Reformatted to meet the requirements as set forth in PD311 , <i>Requirements System and Hierarchy</i> .

11.0 REFERENCES

[Prime Contract](#):

- Appendix B, *Statement of Work: §1.0, General*
- [DOE O 450.1A](#), *Environmental Protection Program*

11.1 Other References

- [P401](#), *Procedure to Identify, Communicate, and Implement Environmental Requirements*
- [Environmental Management System \(EMS\)](#)
- [P731](#), *Discipline*
- [SD350](#), *Management of Projects*
- [P300](#), *Integrated Work Management*
- [P941](#), *Site Planning*
- [P402](#), *Environmental Communication Procedure*

- [P403](#), *Environmental Aspects Identification Requirement*
- [SD400](#), *Environmental Management System Description Document*
- [P405](#), *National Environmental Policy Act (NEPA), Cultural Resources, and Biological Resources (NCB) Reviews*
- [P407](#), *Water Quality*
- [P408](#), *Air Quality Reviews*
- [P409](#), *Waste Management*
- [Permits and Requirements Identification \(PR-ID\)](#)
- [Excavation/Fill/Soil Disturbance Permit Process \(EX-ID\)](#)
- [P101-17](#), *Excavation/Fill/Soil Disturbance*
- [Job Hazard Analysis \(JHA\)](#) tool
- [P313](#), *Roles, Responsibilities, Authorities, and Accountability*
- [PD311](#), *Requirements System and Hierarchy*
- [Integrated Environmental Review \(IER\)](#)
- [Subject Matter Expert \(SME\) Contacts](#)
- [Deployed Environmental Generalists](#)
- [Geographic Information System \(GIS\) Tool](#)

12.0 FORMS

[Form WFO-4](#), *Safety, Security, and Compliance Form*

13.0 ATTACHMENTS

Attachment A. *Institutional Tools and Support for Identifying Environmental Requirements*

14.0 CONTACT

Environmental Protection-Risk Reduction Office (ENV-RRO)
Telephone: (505) 667-4348
Fax: (505) 667-0731
Location: TA-59, Bldg. 0116, Room 119
MS K404

No: PD400 Environmental Protection
Attachment A. Institutional Tools and Support for Identifying Environmental Requirements
(Page 1 of 4)

Tools

Five institutional tools are available for identifying environmental hazards, requirements, and controls:

1. [Permits and Requirements Identification \(PR-ID\)](#)
2. [Excavation/Fill/Soil Disturbance Permit Process \(EX-ID\)](#)
3. Integrated Work Management (IWM)
4. [Job Hazard Analysis \(JHA\)](#)
5. [Form WFO-4, Safety, Security, and Compliance Form](#)

1. [Permits and Requirements Identification \(PR-ID\)](#)

The PR-ID system is the appropriate tool for proposed work that meets one or more of the following criteria:

- Has a broad and evolving scope
- Has alternatives
- Comprises multiple complex tasks
- Requires longer planning times than simple tasks
- Requires design activities, design reviews, or formal project management
- Is funded at line item or general plant project levels or by substantial investments of capital expenditure or programmatic funds
- Frequently involves multiple organizations, Technical Areas, or buildings

Limitations:

- The [PR-ID](#) system is not designed to provide task-specific controls, such as those required for IWM.
- Failure to communicate [PR-ID](#) requirements to subcontractors is likely to result in a compliance violation.

A project that uses the [PR-ID](#) system will:

- Be reviewed by Subject Matter Experts (SMEs) in all the required subject areas
- Receive assistance from the appropriate SMEs in resolving environmental issues and implementing requirements
- Have a written record of environmental requirements

No: PD400 Environmental Protection

Attachment A. Institutional Tools and Support for Identifying Environmental Requirements (Cont.)

(Page 2 of 4)

2. Excavation/Fill/Soil Disturbance Permit Process (EX-ID)

The EX-ID system is appropriate for:

- Ground-disturbing activities, whether part of a larger project (such as geotechnical testing) or independent activities (such as utility repairs)

Limitations:

- The EX-ID system will not provide task-specific controls, such as those required for IWM.
- It will not identify requirements for some environmental subject areas such as air quality.
- It may not provide sufficient lead time for complex environmental issues

A project that uses the EX-ID system will:

- Receive SME reviews for water quality, cultural resources, biological resources, National Environmental Policy Act (NEPA), waste and materials management, and contaminated sites.
- Have a written record of environmental requirements.

3. Integrated Work Management (IWM)

The Integrated Work Management system requires identification and control of hazards (including environmental hazards) when planning and conducting work.

Limitations:

- Unless deployed environmental generalists or Environmental Protection (ENV) Division SMEs are included in planning the work, environmental requirements and controls may be overlooked.
- A standing Integrated Work Document (IWD) for routine activities will not identify site-specific environmental hazards.
- A project that uses the IWM process (without the JHA tool) may overlook relevant environmental issues and hazards.

A project that uses the IWM process (without the JHA tool):

- Must seek out the appropriate environmental expertise to identify requirements.
- May not provide sufficient lead time for complex environmental issues

No: PD400 Environmental Protection

Attachment A. Institutional Tools and Support for Identifying Environmental Requirements (Cont.)
(Page 3 of 4)

4. Job Hazard Analysis (JHA) Tool

The automated JHA tool is appropriate for proposed work that:

- Has a limited scope
- Has few, if any, alternatives
- Comprises relatively few tasks
- Requires little advance planning, other than scheduling and access
- Needs little or no design, design review, or formal project management
- Is usually limited to a specific location
- Is often funded through facility service agreements or support services contracts

Limitations:

- The JHA tool may not provide sufficient lead time to implement environmental controls if the proposed work is on a short schedule.
- Adequate identification of environmental hazards requires supplemental use of ENV Division's Geographic Information System (GIS) Tool.
- Environmental controls in the JHA tool often require follow up with SMEs. Failure to contact the SMEs, when noted in the JHA tool, will lead to failure to meet environmental requirements and failure to control hazards.
- A standing IWD for routine activities will not identify site-specific environmental hazards.
- A project that uses the JHA tool (including the GIS tool) may not recognize when an environmental control is not required or may not have sufficient expertise to know how to implement a control unless environmental SMEs are contacted as indicated in the JHA tool.

A project that uses the JHA tool (including the GIS tool):

- Will identify environmental requirements and controls for most common environmental hazards.

5. Form WFO-4, Safety, Security, and Compliance Form

Form WFO-4, Safety, Security, and Compliance Form, is used to identify potential areas of environmental concern for Work for Others (WFO) proposals. In general, it is a screening tool used for proposed work that is usually a continuation of similar work. Ongoing work is assumed to already control environmental hazards and comply with environmental requirements as a condition of conducting the work.

No: PD400 Environmental Protection

Attachment A. Institutional Tools and Support for Identifying Environmental Requirements (Cont.)
(Page 4 of 4)

Limitations:

- [Form WFO-4](#), does not identify specific controls for environmental hazards.
- Detailed SME reviews are not conducted for the full range of environmental subject areas.

A project that completes [Form WFO-4](#):

- Receives a confirmation that NEPA requirements are met.
- May be requested to contact air, water, or waste SMEs to ensure that proposed emissions, effluents, or waste are appropriately controlled.

Other Support

In addition to institutional tools, ENV Division provides environmental services directly to organizations and projects in the following ways:

- **[Integrated Environmental Review \(IER\)](#)**—A program for coordinating environmental SME support for integrated project teams, integrating environmental review efforts between SMEs, and providing environmental requirements briefings to Los Alamos National Laboratory (LANL or the Laboratory) teams and organizations, such as Subcontractor Technical Representatives and work planners.
- **[Subject Matter Expert \(SME\) Contacts](#)**—ENV Division SMEs are available to provide guidance and assistance with any of the environmental issues that may apply to proposed work.
- **[Deployed Environmental Generalists](#)**—Deployed environmental generalists are available to operations in many parts of the Laboratory to assist in developing Job Hazard Analyses (see the [JHA](#) tool), in preparing permits in accordance with the [PR-ID](#) system, and in complying with environmental requirements.
- **[Environmental Work Planning Permits & Requirements \(see the \[PR-ID\]\(#\) system\)](#)**—Describes the applicability of environmental requirements and actions needed to implement the requirements.
- **[Geographic Information System \(GIS\) Tool](#)**—An ENV Division tool for identifying potential environmental concerns associated with geographic areas at the Laboratory.

No: P407

Revision: 0

Issued: 10/09/08

Effective Date: 10/09/08

Water Quality

1.0 PURPOSE

This document supports Los Alamos National Laboratory (LANL or Laboratory) compliance with the permitting, reporting, and monitoring requirements of the Clean Water Act (CWA); Department of Energy (DOE O 450.1, *Environmental Protection Program*); and reporting requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA).

The requirements in this document are implemented through the review of all new and modified activities and projects to ensure that work is performed in compliance with applicable federal and state laws, permits, and regulations.

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to the Associate Director for Environment, Safety, Health, and Quality (ADESH&Q) as provided in the Prime Contract. This document derives from the Laboratory Governing Policies, particularly the section on Environment and Institutional Policy and Implementation Procedure (IPP) 400, *Environmental Protection*, in partial fulfillment of the requirements and intent of DOE O 450.1, *Environmental Protection Program*.

- Issuing Authority (IA): Associate Director for Environment, Safety, Health, and Quality (ADESH&Q)
- Responsible Manager (RM): Environmental Protection (ENV) Division Leader
- Responsible Office (RO): Environmental Protection-Water Quality and RCRA (ENV-RCRA) Group

2.2 Applicability

This document applies to all Laboratory employees and subcontractors

- who generate or plan to generate wastewater effluent (including storm water runoff) and
- whose activities impact or have the potential to impact the quality of groundwater or surface water.

All Laboratory employees and subcontractors conducting new or modified activities and projects must identify and comply with requirements governing

- generation and discharge or disposal of wastewater;
- nonwastewater discharges (uncontaminated industrial water, fire-suppression water, potable water);
- modification of wastewater stream contaminant profiles, volumes, or discharge locations;
- septic tank and holding tank system installation or modification;

- aboveground storage tank installation or modification;
- storm water discharges;
- soil disturbance, excavation, or fill;
- water discharges, spills, and leaks;
- dredge and/or fill operations; and
- groundwater or surface discharges for effluent and leachate (discharges onto or below the surface).

3.0 PROCEDURE DESCRIPTION

This document identifies Laboratory requirements for protection of surface and groundwater quality. The tools associated with this document summarize federal and state requirements for assessing new, modified, or relocated water-related activities, processes, or projects. Before starting work, the Responsible Line Manager (RLM) and the Facility Operations Director (FOD) must ensure that controls for hazards to water quality are identified and implemented in their areas of responsibility. The assessment of hazards includes the identification of environmental issues and regulatory requirements related to federal and state water quality laws, regulations, and permits. Project managers must use the Permits and Requirements Identification (PR-ID) process for these determinations.

3.1 Surface Water and Groundwater Quality Screening

A new [PR-ID](#) is required for all new, modified, or relocated activities, processes, or projects. This will identify any applicable CWA and New Mexico Water Quality Control Commission (NMWQCC) requirements likely to be associated with the project/activity and ensures requirements are met within regulatory timeframes. After online submittal, the PR-ID system generates a report which identifies the "hold points": permit or regulatory requirements associated with the project. The water quality toolset (see Section 3.2) provides support for addressing these hold points. After reviewing the appropriate tools, project managers or their designees consult with the ENV-RCRA Subject Matter Expert (SME) responsible for each subject area. Hold points must be resolved ("released") before projects may proceed.

If the project includes soil excavation or disturbance, complete an [Excavation/Fill/Soil Permit Review Request](#) online form.

3.2 Water Quality Toolset

Tools in the [Water Quality Toolset](#) provide guidance for responding to water quality hold points and summarize the requirements referenced in Section 11.0. The toolset is designed to be used electronically. Individual tools may be owned and maintained by any Laboratory organization but are provided online by ENV-RCRA and controlled through [ENV-RCRA-QP-009, Tool Creation, Revision, and Authorization](#). Select the appropriate tools from the toolset to resolve any surface water or groundwater quality regulatory issues associated with the project.

4.0 RESPONSIBILITIES

Facility Management and Engineering Division

- Maintain and continuously improve the PR-ID system to maximize the effectiveness of water quality review.
- Integrate water quality protection elements into the PR-ID system to assure comprehensive but efficient project screening requirements.

Facility Responsible Associate Director (RAD)

- Set and communicate expectations for compliance with applicable water quality requirements.
- Ensure PR-ID/Excavation/Fill/Soil Permit Identification (EX-ID) water quality regulatory/permit assessments are reviewed before approving project/activity start-up.
- Ensure effective implementation of applicable water quality requirements.

Responsible Line Manager (RLM)

- Define the work in sufficient detail to assess the risks associated with the water quality issues described in Section 2.2.
- Ensure work proceeds in an environmentally responsible manner and in compliance with the water quality requirements.

Facility Operations Director (FOD)

- Recommend initial project/activity start-up requirements in accordance with this document.
- Ensure facility activities comply with the water quality requirements identified in the PR-ID and EX-ID, where applicable.

Environment, Safety, Health, and Quality (ESH&Q) Manager

- Support and enable work execution to promote compliance with water quality regulatory requirements.
- Ensure the implementation of this document by ENV deployed staff.

Deployed Environment, Safety, Health, and Quality (ESH&Q) Personnel

- Implement this document.
- Contact ENV-RCRA for additional guidance when needed to clarify requirements summarized in the water quality tools.
- Notify ENV-RCRA when problems are identified with the water quality tools.
- Provide guidance on corrective and preventive actions that can be taken to reduce water quality problems.

Project Planner

- Provide a detailed project description to ENV-RCRA including any foreseeable water-quality related project activities.
- Engage PR-ID tools early in the plan development to ensure that the environmental assessment process is incorporated at the required time.

Project Manager

- Ensure that potential environmental impacts associated with water quality issues, schedules, and costs are identified and budgeted in the work.
- Ensure that environmental contract requirements are executed by contractors and subcontractors.
- Ensure that potential water quality environmental costs associated with environmental reviews—as well as waste disposition pathways and costs—are identified and budgeted in the work.
- Ensure that the requirements identified during the PR-ID process are included in project design and execution. Use the water quality tools to address hold points and identify regulatory/permit requirements.
- Provide project-completion review(s) to identify Best Management Practices (BMPs), used for storm water control.
- Contact ENV-RCRA for assistance with water quality issues and regulatory requirements.

Work Authorizer

- Ensure that water quality requirements are incorporated into the Integrated Work Management process.
- Ensure that mitigation measures (e.g., BMPs) are incorporated into the project.

5.0 IMPLEMENTATION

To implement the water quality review process, submit a [PR-ID](#), and then refer to the appropriate water quality tools. Consult with the water quality SME listed in the tool and/or in the PR-ID system if regulatory issues exist.

6.0 TRAINING

N/A

7.0 EXCEPTION OR VARIANCE

To obtain an exception or variance to this document, see the following instructions:

- Managers may request an exception or variance from the IA through the RM.
- At the IA's request, the RM will provide a recommendation or supporting information.
- The IA or his designee will provide the requestor with a written response and copy the RM.

8.0 DOCUMENTS AND RECORDS

Office of Record

ENV-RCRA is the Laboratory Office of Record for this document and maintains the administrative record.

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL [Definition of Terms](#).

See the [Environmental Terms Glossary](#).

9.2 Acronyms

See LANL [Acronyms and Names](#).

10.0 HISTORY

This document replaces and cancels Laboratory Implementation Requirement (LIR) 404-50-01, *Water Pollution Control*, but the LIR will remain in force and effect for each nuclear and high-hazard facility until that facility completes the Unreviewed Safety Question (USQ) or Unreviewed Safety Issue (USI) review determinations.

Revision History		
10/09/08	P407	Initial Issue

11.0 REFERENCES

Prime Contract:

- Appendix B, Statement of Work: §1.0, General
- Clause I-123, DEAR 970.5204-2, *Laws, Regulations, and DOE Directives* (Dec. 2000) (Deviation)
- [DOE O 450.1](#), *Environmental Protection Program*
- [DOE O 5400.1](#), *General Environmental Protection Programs*
- [DOE O 5400.5](#), *Radiation Protection of the Public and the Environment*
- [DOE O 435.1](#), *Radioactive Waste Management*

Other References:

- [Clean Water Act \(CWA\)](#)
- [Emergency Planning and Community Right-to-Know Act \(EPCRA\)](#)
- [PR-ID](#)
- [ENV-RCRA-QP-009](#), *Tool Creation, Revision, and Authorization*
- [NPDES–Permit Number NM0028355](#)
- [NPDES–Storm Water Multi-Sector General Permit for Industrial Activity, 60 FR 50804](#)
- [NPDES–General Permits for Storm Water Discharges from Construction Activities](#)

- [HSWA & RCRA Permits—under 40 CFR, Subchapter I, Parts 264 and 270](#)
- [NMAC 20, Chapter 6, Water Quality—Ground and Surface Water Protection](#)
- [New Mexico Water Quality Act](#)
- [Federal Facility Compliance Act-Title 42 U.S.C. 69393e](#)
- [20.5 NMAC, Petroleum Storage Tank Regulations](#)
- [33 CFR – Parts 320–323 and 330](#)
- [40 CFR—Parts, 110, 112, 122–126, 302 and 355](#)
- [20 NMAC 6.4, Standards for Interstate and Intrastate Surface Waters](#)
- [20 NMAC 6.2, Ground and Surface Water Protection](#)
- [20 NMAC 7.3, Liquid Waste Disposal and Treatment](#)
- [20 NMAC 9.1, Solid Waste Management](#)
- [NMWQCC—New Mexico Water Quality Control Commission](#)
- [CWA Applicable 404—Nationwide Permits](#)

12.0 FORMS

[Excavation/Fill/Soil Permit Review Request](#)

13.0 ATTACHMENTS

N/A

14.0 CONTACT

Environmental Protection-Water Quality and RCRA (ENV-RCRA) Group

Telephone: (505) 665-0453

Fax: (505) 667-5224

Website: [ENV-RCRA Webpage](#)

No: P409

Revision: 2

Issued: 06/04/10

Effective Date: 06/04/10

Waste Management

1.0 PURPOSE

The purpose of this document is to set requirements for the management of the following waste types: solid, [Resource Conservation and Recovery Act \(RCRA\)](#)-regulated, [Toxic Substances Control Act \(TSCA\)](#)-regulated, radioactive TSCA, low-level, mixed low-level, Transuranic (TRU), Mixed Transuranic (MTRU), administratively controlled (classified), and other waste generated by the Laboratory and accumulated, treated, stored, or disposed of by the Laboratory. This document also provides links to the tool that summarizes the requirements for management of infectious waste as [New Mexico Special Waste](#); the dispositioning of this waste is administered through the [Biosafety Manual](#).

2.0 AUTHORITY AND APPLICABILITY

2.1 Authority

This document is issued under the authority of the Laboratory Director to direct the management and operation of the Laboratory, as delegated to the Associate Director for Environment, Safety, Health, and Quality (ADESH&Q) as provided in the [Prime Contract](#), Department of Energy Acquisition Regulation (DEAR) 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* (Dec. 2000). This document derives from the Laboratory [Governing Policies](#), particularly the section on Environment.

- Issuing Authority (IA): Associate Director for Environment, Safety, Health, and Quality (ADESH&Q)
- Responsible Manager (RM): Environmental Protection (ENV) Division
- Responsible Office (RO): Environmental Protection-RCRA and Water Permitting and Compliance Group (ENV-RCRA)

2.2 Applicability

This document applies to all Laboratory and subcontractor employees who generate and/or manage solid waste, radioactive waste, mixed solid/radioactive waste, environmental cleanup waste and/or environmental investigation-derived waste.

3.0 PROCEDURE DESCRIPTION

3.1 Using this Document

This document is designed to be used **electronically**; it provides requirements and links to [Waste Management Tools](#) that summarize the federal, state, and Laboratory requirements listed in Section 11.0. Anyone can originate a waste management tool provided they follow the instructions in [ENV-RCRA-QP-009](#), *Tool Creation, Revision, and Authorization*. The originator of the tool is responsible for the technical content of the tool. All tools, regardless of the originating organization, must be submitted to ENV-RCRA for final approval and posting. ENV-RCRA is responsible for, and manages, all tools associated with this document. These tools cannot establish lesser or more stringent requirements or introduce new requirements; they may serve only as summaries of the requirements in higher-level documents.

3.2 Waste Minimization

Before generating solid waste, radioactive waste, mixed solid/radioactive waste, environmental cleanup waste, and/or environmental investigation-derived waste, generators must consult with their [Waste Management Coordinators \(WMCs\)](#) and must comply with the requirements summarized in the [Waste Minimization Tool](#).

3.3 Identifying the Waste Type

3.3.1 Office Waste

Office waste is a regulated waste. All Laboratory employees must comply with the requirements summarized in the [Office Waste Tool](#).

3.3.2 Waste Identification Tool

The [Waste Identification Tool](#) is designed to help workers quickly identify their waste types and lead to additional tools that summarize the waste management requirements for their waste types. Whenever there is doubt about the identification of a waste type, or workers are working with a [New Process Waste Stream](#), workers should consult their [WMCs](#).

Workers should use the following resources for information on their waste types:

- [Hazardous/Mixed Waste](#)
- [Universal Waste](#)
- [New Mexico Special Waste](#)
- [Polychlorinated Biphenyl \(PCB\) Waste](#)
- [Radioactive Waste](#)

If a [No-Owner Waste](#) is discovered, workers should contact their [WMCs](#).

Should a waste type not be referenced on the above list, workers should contact their [WMCs](#).

4.0 RESPONSIBILITIES

4.1 Generators

- Responsible for waste management from cradle to grave.
- Make waste determinations.
- If the [WMC](#) and management agree a “no path” waste stream must be generated, work with the [WMC](#) to prepare a “Waste with No Disposal Path” approval package.
- Assist in preparing and reviewing waste management sections of Integrated Work Documents (IWDs), waste minimization plans, waste management plans, and project documentation.
- Minimize waste generation and/or segregate waste streams to reduce the costs of waste management and meet the Treatment, Storage, and/or Disposal Facility (TSDF) waste acceptance criteria.
- Generators who own less-than-90--day waste accumulation areas: ensure inspections are performed weekly and/or when waste is actively managed.

- Manage waste in accordance with this document and its associated tools and maintain waste management records.
- Provide the TSDF accurate and complete documented waste characterization information ensuring that regulated constituents in waste streams are identified.
- Notify the Facility Operations Directors (FODs) or designees—or, if unavailable, notify Emergency Management and Response (EM&R)—and responsible [WMCs](#) of a release of waste or wastewater into the environment or of an accidental discharge to a wastewater treatment facility.
- Complete and sign *Waste Profile Forms* ([Form 1346](#), *Waste Profile Form*), and transmit them, along with any necessary supporting information, to the [WMC](#) for review and signature.

4.2 Environment, Safety, Health, and Quality (ESH&Q) Managers, ESH&Q Deployed Staff and Waste Management Coordinators (WMCs)

- See [P313](#), *Roles, Responsibilities, Authorities, and Accountability*.

Note: The supervisory structure presented in [P313](#) for ESH&Q managers varies at specific facilities.

5.0 IMPLEMENTATION

The requirements in this document are effective on the date of issue.

However, for applicable nuclear, high- and moderate-hazard facilities and accelerators, the requirements in this document are effective 45 days after the issue date. This is to allow time to complete the Unreviewed Safety Question/Unreviewed Safety Issue (USQ/USI) review. If the USQ/USI review cannot be completed within 45 days, the FOD must seek and obtain from the IA an exception or variance as described in Section 7.0.

6.0 TRAINING

The training courses listed in this section are required for all workers who generate waste (except office trash). Workers must notify their managers of expired training.

There is no grace period for the training requirements below; this training must be completed and current.

- Generators and [WMCs](#): Course #23263, *Waste Generation Overview Live*, and Course #21464, *Waste Generation Overview Refresher*, every three years.

Note: The RCRA-related training listed below must be completed within six months of employment; during this period, workers must work under the supervision of a trained worker.

- Persons who work in, or are owners of, less-than-90-day waste accumulation areas (<90 day areas): Course #7488, *RCRA Personnel Training*, Course #28582, *RCRA Refresher (Self-Study)*, every twelve months.
- Persons who work in TSDFs or Remediation Workers: Course #7488, *RCRA Personnel Training*, Course #28582, *RCRA Refresher (Self-Study)*, every twelve months. Course #4464, *HAZWOPER: General Site Worker*, or Course #4465, *HAZWOPER: Limited Site Worker*, Course #28652, *HAZWOPER: Refresher*, every twelve months; HAZWOPER courses to be selected by management as necessary for job duties.

7.0 EXCEPTION OR VARIANCE

To obtain an exception or variance to this document, see the following instructions:

- Managers may request an exception or variance from the IA through the RM.
- At the IA's request, the RM will provide a recommendation or supporting information.
- The IA or designee will provide the requester with a written response and copy the RM.

The requesting organization must maintain the official copy of record of the approved correspondence granting the exception or variance.

8.0 DOCUMENTS AND RECORDS

8.1 Office of Record

ENV Division is the Laboratory Office of Record for this Institutional Document and maintains the administrative record.

9.0 DEFINITIONS AND ACRONYMS

9.1 Definitions

See LANL [Definition of Terms](#) or see the [Waste Management Glossary Tool](#).

9.2 Acronyms

See LANL [Acronym Master List](#) or see the [Waste Management Acronym Tool](#).

10.0 HISTORY

Revision History		
03/27/08	P409, Rev. 0	Initial Issue. This document and its linked waste management tools replaces and cancels the Laboratory Implementation Requirements (LIRs) and Laboratory Implementation Guidance (LIG) listed below. The LIRs will remain in force and effect for each nuclear facility until that facility completes the Unreviewed Safety Question (USQ) or Unreviewed Safety Issue (USI) review determinations. <ul style="list-style-type: none"> ▪ LIG 404-00-02, <i>Acceptable Knowledge Guidance</i> ▪ LIR 404-00-02, <i>General Waste Management Requirements</i> ▪ LIR 404-00-03, <i>Hazardous and Mixed Waste Requirements</i> ▪ LIR 404-00-04, <i>Managing Solid Waste</i> ▪ LIR 404-00-05, <i>Managing Radioactive Waste</i> ▪ LIR 404-00-06, <i>Managing Polychlorinated Biphenyls</i>
05/22/08	P409, Rev. 1	Section 6.0 Training: Changed Waste Profile Form Signers to Waste Generators and removed Waste Documentation Forms from the Waste Generators list.
06/04/10	P409, Rev. 2	Extensive revision: Clarified training requirements and responsibilities, corrected links to tools, clarified tool creation process, and simplified the document.

11.0 REFERENCES

[Prime Contract:](#)

- DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution* (Dec. 2000)
- Part II, Section H-83 (DEAR 5223-1)
- Part III, Section J, App B 4.2
- Part III, Section J, App G
- Appendix B, *Statement of Work: §1.0, General*

11.1 Other References

- [P313](#), *Roles, Responsibilities, Authorities, and Accountability*
- [P930-1](#), *LANL Waste Acceptance Criteria*
- [P930-2](#), *Radioactive Waste Certification Program*

12.0 FORMS

[Form 1346](#), *Waste Profile Form*

13.0 ATTACHMENTS

There are no attachments associated with this document.

14.0 CONTACT

Environmental Protection-RCRA and Water Permitting and Compliance Group (ENV-RCRA)

Telephone: (505) 667-0666

Fax: (505) 667-5224

Website: <http://int.lanl.gov/orgs/env/rcra/index.shtml>

To report errors or broken links or to request additions or changes, click [here](#).

If you have read and understand the preceeding document, click here to receive EDS credit.

APPENDIX N
**Waste Acceptance Criteria for TA-50 RLWTF, TA-46 SWWS,
and TA-16 HEWTF**

**No: P930-1 LANL Waste Acceptance Criteria [\[Back\]](#)
Attachment 1. **Radioactive Liquid Waste Treatment Facility (RLWTF) (Page 1 of 9)****

The Technical Area (TA)-50 Radioactive Liquid Waste Treatment Facility (RLWTF) receives and treats radioactive and industrial wastewaters with a radionuclide concentration of 500 nanocuries per liter or less (not including tritium) and with a tritium concentration of 20 nanocuries per liter or less. These wastewaters cannot contain Resource Conservation and Recovery Act (RCRA)-regulated toxic organic constituents, RCRA-regulated listed constituents, or (except for small volumes) RCRA-regulated characteristic constituents. Certain other contaminants are also prohibited, as set forth in this attachment.

The Waste Acceptance Criteria (WAC) in this attachment apply to industrial wastewaters being sent for processing at the TA-50 RLWTF. This WAC does not apply to the “acid” and “caustic” process wastewaters generated at the Plutonium Complex (TA-55). A separate WAC pertaining to the “acid” and “caustic” process wastewaters can be obtained from the TA-55 Plutonium Complex Waste Management Coordinator (WMC).

The RLWTF receives and treats aqueous radioactive wastewater generated at LANL to meet the discharge criteria specified in a National Pollutant Discharge Elimination System (NPDES) permit. The majority of this wastewater is received at the RLWTF through a network of buried pipelines, known as the “Radioactive Liquid Waste Collection System” (RLWCS). Other wastewater is transported to the RLWTF by truck.

The WAC outlined in this attachment are applicable to all wastewaters that are conveyed to the TA-50 RLWTF, whether by the RLWCS or by truck.

These WAC are based on the following:

- Department of Energy (DOE) O 435.1, *Radioactive Waste Management*, and its associated DOE M 435.1, *Radioactive Waste Management Manual*.
- DOE O 5400.5, *Radiation Protection of the Public and the Environment*.
- US Department of Transportation (DOT) regulations, 49 Code of Federal Regulation (CFR), *Transportation*, Parts 106-180.
- New Mexico hazardous waste management regulations (New Mexico Administrative Code (NMAC) 20, *Environmental Protection*, Chapter 4, Part 1, *Hazardous Waste Management*), which implement the federal RCRA.
- New Mexico Water Quality Control Commission regulations and standards, and NPDES permit NM0028355.

1.1 Facility Requirements for Connection to the Radioactive Liquid Waste Treatment Facility (RLWTF)

Buildings connected to the RLWTF by the RLWCS must meet the following criteria:

- The pipelines and associated telemetry must comply with the standards established in the EM/RLW-FDR-01, *Pipeline Design Requirements for the LANL Radioactive Liquid Waste Collection System*. A copy of this document can be obtained from the RLWTF Operations Manager at 667-4301.
- Pipelines within buildings that are part of the RLWCS must be labeled “Radioactive Waste Line.” Labels can be obtained from the RLWTF at (505) 667-4301.

No: P930-1 LANL Waste Acceptance Criteria
Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 2 of 9)

- Each sink connected to the RLWCS must be posted with a sign informing users of the requirements for disposing of wastewater down the drain. Signs may be obtained from the RLWTF at (505) 667-4301.

In addition, the drains listed in Table 1-1 must be plugged or have administrative controls to minimize the inadvertent introduction of large volumes of volatile organic liquids (e.g., gasoline) into the RLWCS.

Table 1-1. Controls for the Radioactive Liquid Waste Treatment Facility (RLWTF) Drains			
Building	Room	Description	Control
03-29	Wing 9	Drain closest to rollup door	Plug the drain
03-66	B100N	Two floor drains	Administrative control*
03-102	119	Drain closest to rollup door	Administrative control*
03-1264	---	Only floor drain	Administrative control*
35-213	B-29	Three floor drains	Plug the drain closest to the rollup door
48-01	244	Two floor drains	Administrative control*
48-01	322	Only floor drain	Plug the drain
50-01	34B	Only floor drain	Administrative control*
50-01	Outside	Drain at the caustic unload station	Jersey barrier to preclude vehicle entry into bermed area
50-37	116	Drain closest to rollup door	Administrative control*

* Administrative Control includes (1) gasoline vehicles not permitted entry; (2) gasoline vehicles braked and chocked outside before rollup door is opened; and (3) sign posted.

Note: The RLWCS begins at the first connection point of the collection system with the facility piping that is outside the facility.

1.2 Waste Profile Form (WPF)

Only wastewater having an approved WPF (Form 1346, *Waste Profile Form*) may be discharged to the RLWTF. Instructions for completing the WPF (Form 1346) are in TL-001, *Waste Generator Instruction for Completing the Waste Profile Form (WPF)*, found on the Plans & Procedures for Waste and Environmental Services (WES) webpage under the Waste tab. Assistance in completing the WPF can be obtained by calling the Waste Disposition Project (WDP).

Upon completion, the WPF is to be sent to the Waste and Environmental Services-Waste Technical Services (WES-WTS) group. A copy of the WPF will be sent to the generator's WMC upon acceptance or rejection of the wastewater at the RLWTF. Contact your WMC for specific information related to the status of a WPF.

No: P930-1 LANL Waste Acceptance Criteria
Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 3 of 9)

1.3 Waste Acceptance Criteria Exception Form (WEF) (Form 1973)

Some waste streams that do not meet the WAC may be acceptable for treatment at the RLWTF. Also, a temporary change in the waste stream may require that the RLWTF be notified. The documentation for handling both of these situations is a WEF (Form 1973, *Waste Acceptance Criteria Exception Form*). RLWTF personnel will work with the generator to fill out a WEF. The WEF will need to be approved by RLWTF personnel before the new waste stream or the modified waste stream can be sent to the RLWTF. The WEF (Form 1973) may be obtained by clicking on the link or contacting your WMC.

1.4 Wastewater Acceptance Criteria

To be acceptable for treatment at the RLWTF, wastewater must meet the criteria outlined in this section. Specifically, certain wastes are unacceptable for treatment at the RLWTF (see Table 1-2), and wastes must not have concentrations of radioactive or nonradioactive constituents in excess of amounts given in Tables 1-3 and 1-4.

If a waste stream includes any of the material listed in Table 1-2 or exceeds concentrations set forth in Tables 1-3 and 1-4, the generator may complete a WEF (Form 1973, *Waste Acceptance Criteria Exception Form*) and submit the WEF (Form 1973) along with the WPF (Form 1346, *Waste Profile Form*). The RLWTF Process Engineer will then determine if the waste stream can be accepted for treatment.

1.4.1 Unacceptable Wastewaters

Wastewaters with characteristics set forth in Table 1-2 are unacceptable for discharge to the RLWTF.

Table 1-2. Wastes that are Unacceptable for Treatment at the Radioactive Liquid Waste Treatment Facility (RLWTF)	
Nonradioactive Constituents	Resource Conservation and Recovery Act (RCRA)-regulated characteristic waste (D001 for ignitability, D003 for reactivity, as defined in 40 CFR 261.21, <i>Identification and Listing of Hazardous Waste, Characteristic of ignitability</i> , and 40 CFR 261.23, <i>Identification and Listing of Hazardous Waste, Characteristic of reactivity</i> .)
	RCRA-regulated characteristic waste (D002 for corrosivity, as defined in 40 CFR 261.22, <i>Identification and Listing of Hazardous Waste, Characteristic of corrosivity</i>) in volumes greater than 50 gallons per discharge.
	RCRA-regulated toxic metal waste (D004 – D011) (40 CFR 261.24, <i>Identification and Listing of Hazardous Waste, Toxicity characteristic</i>)
	RCRA-regulated toxic organic waste (D012 – D043) (40 CFR 261.24)
	RCRA-regulated listed waste (F-, K-, P-, U-listed) (40 CFR 261.31, <i>Identification and Listing of Hazardous Waste, Hazardous wastes from non-specific sources</i> , 40 CFR 261.32, <i>Identification and Listing of Hazardous Waste, Hazardous wastes from specific sources</i> , and 40 CFR 261.33, <i>Identification and Listing of Hazardous Waste, Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof</i>)
	DDT, dioxins, or pesticides at any detectable concentration determined by an approved Environmental Protection Agency (EPA) method
	Toxic Substance Control Act (TSCA) waste as defined in 40 CFR 761, <i>Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions</i> , and 40 CFR 766, <i>Dibenzo-Para-Dioxins/Dibenzofurans</i> , including but not limited to waste containing PCBs

No: P930-1 LANL Waste Acceptance Criteria
Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 4 of 9)

Table 1-2. Wastes that are Unacceptable for Treatment at the Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.)

Other	Sanitary waste (except for rad decontamination showers and sinks)
	Biological or microorganism waste
	Detergents and surfactants
	Boiler or chiller waters containing rust, scale, or other inhibitors
	Sludges or solids
	Dyes and scintillation cocktails

Table 1-3. Limits on Radionuclides Acceptable for Discharge to the Radioactive Liquid Waste Treatment Facility (RLWTF)

Radionuclides	Maximum Allowable Concentration (Ci/L)
Total Radionuclide Content: (sum of gross alpha, beta, gamma, or the sum of nuclides known to be in the waste)	5.0E-07
Alpha Emitters	
Am-241 Pu-240 Pu-238 U-234 Pu-239	1.0E-07
U-235 U-238 Np-237	1.0E-08
Th-232	1.0E-10
Beta Emitters	
As-74 Rb-83 Be-7 Sc-46 Ce-141 Sc-48 Co-57 Se-75 Co-58 Sn-113 Eu-152 Sr-85 Mn-52 Sr-89 Mn-54 V-48 Y-88	1.0E-07
I-133 Na-22 Rb-84	5.0E-08
Zn-65	4.0E-08
Co-60	2.0E-08
Cs-134 Cs-137 Co-56	1.0E-08
Sr-90	5.0E-09
H-3 (accelerator-produced)	0 (none allowed)
H-3 (reactor-produced)	2.0E-08
Ra-226 + Ra-228	5.0E-10
Other Radionuclides	1.0E-08

No: P930-1 LANL Waste Acceptance Criteria
Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 5 of 9)

Table 1-4. Limits on Nonradioactive Constituents Acceptable for Discharge to the Radioactive Liquid Waste Treatment Facility (RLWTF)

Constituent	Maximum Allowable Concentration (mg/L except where noted)
Ammonia-Nitrogen	5
Arsenic (D004)	<5
Barium (D005)	<100
Cadmium (D006)	<1
Chromium (D007)	<5
Chlorine (Free)	1
Copper	1
Cyanide	5
Fluoride	10
Lead (D008)	<5
Mercury (D009)	<0.2
Nitrate-Nitrogen	70
Perchlorate	1
Selenium (D010)	<1
Silver (D011)	<5
Zinc	25
Chemical Oxygen Demand (COD)	250
Total Suspended Solids (TSSs)	10,000
Total Toxic Organics (TTOs)*	25

* See Table 1-5 containing TTO list.

No: P930-1 LANL Waste Acceptance Criteria
Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 6 of 9)

1.4.2 Radionuclide Content

The total radionuclide concentration [defined as the sum of gross alpha, gross beta (not including tritium), and gross gamma or the sum of individual alpha-, beta-, and gamma-emitting nuclides known to be in the waste] of a waste stream sent to the RLWTF may not exceed the value listed in Table 1-3. Limits on individual radionuclides are listed in Table 1-3.

The activity of the four predominant radionuclides must be listed on the WPF (Form 1346, *Waste Profile Form*). Radionuclides (in any concentration) that are known to be in the waste stream must also be listed on the WPF (Form 1346).

1.4.3 Nonradioactive Constituents

Liquid waste streams that contain nonradioactive constituents below the concentration limits in Table 1-4 and with a pH between 2 and 12.5 are acceptable for discharge to the RLWTF. A listing of the Total Toxic Organics (TTOs) is shown in Table 1-5.

Inorganic wastes with a pH from 0 to 2 and from 12.5 to 14 are also permitted for discharge to the RLWTF (Environmental Protection Agency [EPA] Hazardous Waste Number of D002) in the volume range of 0 to 50 gallons per discharge with an approved WPF (Form 1346, *Waste Profile Form*) and adequate flush water used to minimize corrosion in the RLWCS.

1.4.4 Industrial Soaps and Nonsolvent Cleaners

Janitorial wastewaters, such as mop water, are acceptable in the volume range of 0 to 25 gallons per discharge. Wastewater from lab glassware and laundry is acceptable in discharges of less than 100 gallons per discharge. The concentration of industrial cleaner must be less than 0.2% by weight. Wastewater with soaps or cleaners from machinery and/or equipment cleaning operations is acceptable in discharges of less than 100 gallons per discharge and containing industrial cleaners in concentrations of less than 0.2% by weight. Such waste streams may not have any detectable sheen or emulsions from oil, grease, rust inhibitor, or other petrochemicals.

1.4.5 Physical Characteristics

Wastewater temperature must be less than or equal to 60°C (140°F). Temperatures above 60°C (140°F) will cause expansion and damage to the RLWCS. The generator must provide waste stream flow-rate data on the WPF (Form 1346, *Waste Profile Form*). Volume increases beyond the limits specified by the generator on the WPF (Form 1346) are not allowed.

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Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 7 of 9)

Table 1-5. Total Toxic Organics (TTO)		
Semivolatiles (Method 625A)	Semivolatiles (Method 625B)	Volatile Organics (Method 624)
Parachlorometa cresol	Acenaphthene	Acrolein
2-Chlorophenol	Acenaphthylene	Acrylonitrile
2,4-Dichlorophenol	Anthracene	Benzene
2,4-Dimethylphenol	Benzidine	Dichlorobromomethane
2,4-Dinitrophenol	Benzo (a) anthracene	Bromoform
2-Methyl-4,6-dinitrophenol	Benzo (b) fluoranthene	Bromomethane
2-Nitrophenol	Benzo (k) fluoranthene	Carbon tetrachloride
4-Nitrophenol	Benzo (a) pyrene	Chlorobenzene
Pentachlorophenol	Benzo (g,h,i) Perylene	Chloroethane
Phenol	Benzyl butyl phthalate	2-Chloroethyl vinyl ether
2,4,6-Trichlorophenol	Bis (2-Chloroethyl) ether	Chloroform
	Bis (2-Chloroethoxy) Methane	Chloromethane
	Bis (2-Ethylhexyl) phthalate	Chlorodibromomethane
	Bis (2-Chloroisopropyl) ether	1,2-Dichlorobenzene
	4-Bromophenyl phenyl ether	1,3-Dichlorobenzene
	2-Chloronaphthalene	1,4-Dichlorobenzene
	4-Chlorophenyl phenyl ether	1,1-Dichloroethane
	Chrysene	1,2-Dichloroethane
	Dibenzo (a,h) Anthracene	1,1-Dichloroethylene
	Di-N-Butylphthalate	1,2-Trans-chloroethylene
	3,3'-Dichlorobenzidine	1,2-Dichloropropane
	Diethyl phthalate	1,3-Dichloropropene
	Dimethyl phthalate	Ethyl benzene
	2,4-Dinitrotoluene	Methylene chloride
	2,6-Dinitrotoluene	1,1,2,2-Tetrachloroethane
	Di-n-octyl phthalate	Tetrachloroethylene
	1,2-Diphenylhydrazine	1,1,1-Trichloroethane
	Fluoranthene	Trichloroethylene
	Fluorene	1,1,2-Trichloroethane
	Hexachlorobenzene	Toluene
	Hexachlorobutadiene	Vinyl chloride
	Hexachlorocyclopentadiene	
	Hexachloroethane	
	Indeno (1,2,3-cd) pyrene	
	Isophorone	
	Napthalene	
	Nitrobenzene	
	N-Nitrosodimethylamine	
	N-Nitrosodi-n-propylamine	
	N-Nitrosodiphenylamine	
	Phenanthrene	
	Pyrene	
	1,2,4-Trichlorobenzene	

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Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 8 of 9)

1.5 Transported Wastewaters

Wastewater may be transported to the TA-50 RLWTF in containers (such as Tuff Tanks™ and 55-gallon drums) or tanker trucks, in compliance with applicable DOT regulations.

The generator is responsible for assuring that an approved WPF (Form 1346, *Waste Profile Form*) and an on-line Waste Disposal Request (WDR) Form, found in the Waste Management Database Applications, are completed before transport. Either the waste generator or WMC must be present at the time and place of pickup to ensure that the correct items are transported. The generator must also provide the necessary equipment, such as forklifts or pumps, required for safely loading the wastewater.

The RLWTF does not treat solid waste or sludge. Any solid particles in excess of the value listed in Table 1-4 that have settled to the bottom of the liquid waste container will not be accepted for treatment at the RLWTF. The generator is responsible for the solid particles left over in the liquid waste container.

1.5.1 Tanker Truck Operations

Waste transported in the RLWTF tanker truck must

- qualify as a DOT Exempt Classification or as a limited quantity of radioactive materials as defined by 49 CFR 173.425, *Table of Activity Limits-Excepted Quantities and Articles*, and must
- be located in an area accessible by a tanker truck.

The generator must:

- coordinate the date, time, and location with the RLWTF WMC (667-4301);
- ensure that either the waste generator or the waste generator's WMC is present at the time and place of pickup; and
- provide any equipment required for safely transferring the waste (for example, forklifts).

1.5.2 Flatbed Truck Operations

Generators are responsible for their waste containers. After waste is disposed of at the RLWTF, RLWTF personnel triple-rinse the containers and survey them for surface contamination. The generator is responsible for retrieval and disposal of the empty containers.

Waste transported to the RLWTF in containers by flatbed truck must be transported in any of the following containers:

- Tuff Tanks™ or other DOT-approved portable containers. Tuff Tanks™ are not to be filled above the maximum fill line. If there is no maximum fill line, they must be filled to at least 60% and no more than 90% of capacity.
- DOT-approved, 55-gal. or 35-gal. metal, closed-head drums. Drums are to be filled to at least 60% and no more than 90% of capacity.
- Glass bottles or plastic carboys (not to exceed 5-gal. capacity) with fitted, screw-type caps.

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Attachment 1. Radioactive Liquid Waste Treatment Facility (RLWTF) (Cont.) (Page 9 of 9)

Glass bottles or plastic carboys must not have any bottom outlets and must be overpacked in accordance with the appropriate DOT packaging authorization and packing group. If a liquid waste is not regulated by DOT, liquid waste transported in these containers must still be overpacked in a metal or plastic drum. The overpack must contain enough absorbent to absorb all of the liquid waste.

1.6 Nonconformances

The RLWTF Process Engineer will issue a nonconformance report to any generating group that discharges or transports a waste stream to the RLWTF that does not meet the criteria outlined in this attachment and for which a WAC exception was not approved by the RLWTF. Environmental Protection-Water Quality and RCRA (ENV-RCRA) will also be notified of the nonconformance.

RLWTF personnel will periodically audit generator documentation, such as WPFs (Form 1346, *Waste Profile Forms*) and WEFs (Form 1973, *Waste Acceptance Criteria Exception Forms*), against actual discharges to the RLWCS. RLWTF personnel will also periodically inspect generator facilities for compliance with Section 1.1, including inspection of drains identified as having the possibility for inadvertent introduction of large volumes of volatile organic liquids (e.g., gasoline) into the RLWCS. In addition, RLWTF personnel reserve the right to perform scheduled or non-scheduled monitoring of discharges from wastewater-generating facilities.

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Attachment 2. Contact-Handled Transuranic (TRU) Waste (Page 1 of 9)**

Contact-handled Transuranic (TRU) waste is waste containing alpha-emitting TRU radionuclides having atomic numbers greater than 92 and half-lives that exceed 20 years, at concentrations greater than 100 nCi/g of waste. The Waste Acceptance Criteria (WAC) for TRU waste are based on the following:

- The most recent WAC for the Waste Isolation Pilot Plant (WIPP),
- US Department of Transportation (DOT) regulations,
- Technical Area (TA)-54, Area G, Safety Analysis Report results and/or Technical Safety Requirements (TSRs),
- Resource Conservation and Recovery Act (RCRA) permit requirements,
- As-Low-As-Reasonably Achievable (ALARA) considerations, and
- Contact-Handled TRU Waste Authorized Methods for Payload Control (CH-TRAMPAC).

Contact-Handled TRU waste generators must be approved to package Contact-Handled TRU waste and must provide acceptable knowledge to the Contact-Handled TRU Waste Disposition Project (WDP) for review and approval as defined in the Waste Generator Instructions (WGIs) document (e.g., packaging configuration, acceptable knowledge) before waste generation. Approval to package Contact-Handled TRU waste includes

- Implementation of a WGI document, and
- Implementation of TRU-WDP-approved packaging and quality-assurance procedures

This document will be developed by the generators with assistance and approval by Waste Disposition Project-Transuranic Waste Project Support (WDP-TWPS). All Contact-Handled TRU waste generated for disposition will be reviewed and approved under a WGI document. The following sections describe the general WIPP WAC requirements. Any waste outside of these parameters must have a WGI document approved *before* generation and packaging of the waste for disposition and an approved WEF (Form 1973, *Waste Acceptance Criteria Exception Form*) before the waste is shipped to TA-54.

Newly generated TRU waste must be generated and packaged to meet the requirements shown in this section. Newly generated TRU waste is intended to be characterized and certified for disposal in WIPP with no additional repackaging being performed. Any TRU waste failing to meet the WIPP waste certification requirements, at the discretion of the WDP manager, may be returned to the waste generator to have the unacceptable condition remediated. If the WDP remediates and repackages the waste, the costs of the remediation will be charged to the sending organization. TA-54 is not obligated to repackage newly generated TRU waste that does not meet the WIPP waste certification requirements.

2.1 Waste Form

TRU waste must be in solid form. Waste that complies with the following criteria meets this restriction.

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Attachment 2. Contact-Handled Transuranic (TRU) Waste (Cont.) (Page 2 of 9)

2.1.1 Free Liquids

Liquid waste is prohibited at WIPP. Residual liquids containing Polychlorinated Biphenyls (PCBs) are prohibited at WIPP. Waste must contain as little residual liquid as is reasonably achievable by pouring, pumping, and/or aspirating. Internal containers must contain less than 1 in. or 2.5 cm liquid in the bottom of the container. The total residual liquid in any payload container (e.g., 55-gal. drum or Standard Waste Box [SWB]) must be less than 1% by volume of that container.

Free liquids must be solidified in accordance with WIPP requirements as specified by the WGI document.

2.1.2 Explosives, Corrosives, and Compressed Gases

Waste must contain no explosives, corrosives, or compressed gases (pressurized containers). Empty gas cylinders are acceptable if each cylinder is punctured or if the valve is held open with a wire through it. See Section 3.5.3 of the current version of Department of Energy/Waste Isolation Pilot Plant (DOE/WIPP)-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* for requirements for identifying materials that meet the definition of explosives, corrosives, and compressed gases.

2.1.3 Restricted Constituents

The following prohibitions and limitations apply to TRU waste:

- *Sealed containers.* All waste containers greater than 4 liters must be vented before being overpackaged in an outer waste container. This includes payload containers smaller than 55-gal. (e.g., 30-gal. and 15-gal. drums) that are overpacked in 55-gal. drums. Because of limitations associated with the Real-Time Radiography (RTR) characterization technique, any containers larger than three liters should be equipped with appropriate filters. RTR cannot distinguish whether a can has been taped, which makes it meet the definition of a sealed container. Any can is assumed to be sealed unless it is filtered.
- *Pyrophoric material.* Pyrophoric radioactive materials must be present only in small residual amounts (less than 1% by weight) in payload containers and must be generally dispersed in the waste. Radioactive pyrophorics in concentrations greater than or equal to 1% by weight and all nonradioactive pyrophorics must be reacted (or oxidized) and/or otherwise rendered nonreactive before placement in the payload container. Nonradionuclide pyrophoric materials are not acceptable at WIPP.
- Classified wastes are prohibited from being stored at TA-54, Area G.

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Waste Acceptance Criteria For Transuranic RLW

Effective Date: 02-06-2009

Next Review Date: 02-06-2012

Procedure Owner

Signature

Date

P.J. Rice

P.J. Rice

1-28-09

Waste Acceptance Criteria for Transuranic RLW	Procedure No:	EP-RLW-AP-2902
	Revision:	0
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HISTORY OF REVISIONS

<i>Document</i>	<i>Date</i>	<i>Action / Description</i>
RLW-AP-0401, R.0	Feb 2007	New Document
EP-RLW-AP-2902, R.0	Feb 2009	New document number issued. Editorial changes such as document numbers for referenced documents. Changed “normality” to “molarity” for acid wastes.

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THESE WASTE ACCEPTANCE CRITERIA (WAC) APPLY ONLY TO “ACID” AND “CAUSTIC” PROCESS WASTEWATERS GENERATED AT THE PLUTONIUM FACILITY.

The TA50 Radioactive Liquid Waste Treatment Facility (RLWTF) treats radioactive liquid wastes (RLW) generated at the Los Alamos National Laboratory (LANL). Room 60 of the RLWTF is dedicated to the treatment of two RLW streams generated at the TA55 Plutonium Facility.

This document sets forth the waste acceptance criteria for these two waste streams^A. The WAC are based on the following:

- DOE Order 435.1, “Radioactive Waste Management”
- DOE Order 5400.5, “Radiation Protection of the Public and the Environment”
- New Mexico Hazardous Waste Management regulations (20 NMAC 4.1), which implement the Resource Conservation Recovery Act (RCRA) regulations
- New Mexico Water Quality Control Commission regulations and standards
- LANL’s National Pollutant Discharge Elimination System (NPDES)
- ALARA considerations
- Safety basis considerations

Some of the above requirements do not directly apply to acid waste and caustic waste (e.g., NPDES permit). However, the ability to treat certain constituents in Room 60 and/or in the main RLWTF treatment process can affect WAC limits.

^A A separate WAC, Attachment 1 of P930-1, “LANL Waste Acceptance Criteria”, exists for industrial wastewaters generated at TA55 and other LANL facilities.

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1. Facility Requirements for Connection to the RLWTF

Buildings connected to the TA50 RLWTF must meet the following criteria:

- The pipelines and associated telemetry must comply with the standards established in the “Pipeline Design Requirements for the LANL Radioactive Liquid Waste Collection System” (EM/RLW-FDR-01).
- Pipelines that are within buildings that are part of the “Acid” and “Caustic” waste lines must be labeled “Radioactive Waste Line”.
- Each sink and drain connected to the RLW collection system must be posted with a sign informing the user of the requirements for disposing of waste down the drain.

NOTE: The RLW collection system begins at the first connection point to the collection system from the facility piping outside the facility. This is generally the first manhole outside the facility.

2. Waste Profile Form

Only wastewater having an approved WPF ([Form 1346](#), *Waste Profile Form*) may be discharged to the RLWTF. Instructions for completing the WPF are in *Waste Generator Instruction for Completing the Waste Profile Form*, [TL-001](#). The form can be obtained on the LANL web at LANL Online Forms, Form 1346. Assistance in completing the WPF can be obtained by calling the Waste Acceptance group.

Upon completion, the WPF is to be sent to the Waste Acceptance Group. A copy of the WPF will be sent to the waste generator and the generator’s Waste Management Coordinator upon acceptance or rejection by the RLWTF. Contact your WMC for specific information related to the status of a WPF.

When the characteristics of a waste stream change (for example, changes in chemical, physical, or radionuclide composition, or waste volume), the waste generator must:

- Cease discharging.
- Verify WPF parameters.
- Re-characterize the waste stream (if necessary).
- Complete and submit a new WPF.
- Obtain an approved WPF prior to discharge.

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3. WAC Exception Form

Some waste streams, which do not meet the WAC, may be acceptable for treatment at the RLWTF. Also, a temporary change in the waste stream may require that the RLWTF be notified. The documentation for handling both of these situations is a WAC Exception Form (WEF). RLWTF personnel will work with the generator to fill out a WEF. The WEF will need to be approved by the RLWTF before the new waste stream or the modified waste stream can be sent to the RLWTF. The WEF may be obtained by contacting your WMC.

4. Acid and Caustic Waste Acceptance Criteria

4.1. Unacceptable Wastes

Certain wastes, identified in Table 1, are unacceptable for treatment at the RLWTF. If a waste stream exceeds the amounts in Table 1, an environmental ALARA assessment must be performed in accordance with DOE Order 5400.5, Chapter II, 2.a. and attached to the WEF. The RLWTF will determine if the waste stream can be accepted for treatment.

4.2. Radionuclide Content

The gross alpha concentration of acid waste may not exceed E-4 Ci/L (or 100,000 nCi/L). The gross alpha concentration of caustic waste may not exceed 2.25E-3 Ci/L (or 2.25 million nCi/L). Additionally, limits for gross beta, gross gamma, and individual radioisotopes are given in Tables 2 and 3.

Radionuclides known to be in the waste stream are required to be listed on the WPF. Waste characterization for individual radionuclides will be performed at least once annually to demonstrate adherence to the criteria set forth in Tables 2 and 3.

4.3. Non-Radioactive Content

The molarity of acid waste must be reported for each transfer. The pH of caustic waste must be greater than seven, and must be reported for each transfer.

Waste temperature must be less than 140 °F to prevent damage to the acid waste and caustic waste transfer lines.

Non-radioactive constituents known to be in the waste stream are required to be listed on the WPF. Waste characterization for individual non-radioactive constituents will be performed at least once annually to demonstrate adherence to the criteria set forth in Table 4.

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5. Protocol for Acid and Caustic Waste Transfers

As set forth in Section 4, waste to be transferred to TA50 for treatment is analyzed for molarity (acid waste), pH (caustic waste), and gross alpha (both). In addition, caustic waste discharges to TA50 will be followed with a water flush of nominally 40 liters. (Acid waste discharges to TA50 via the acid line do not require a water flush.)

Individual waste transfers must be pre-approved by the RLWTF (Operations Manager, Shift Operations Manager, or Process Engineer) prior to physically transferring either acid waster or caustic waste to the TA50 RLWTF. The approval sequence is detailed in procedure EP-RLW-DOP-2908, "TRU Waste Transfers from TA55 to TA50, WM-66."

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Table 1: Unacceptable Wastes

Radionuclides	<ul style="list-style-type: none"> ▪ Accelerator-produced tritium
Chemical Constituents	<ul style="list-style-type: none"> ▪ RCRA-regulated toxic characteristic waste: D001, ignitable and D003, reactive (40 CFR 261.21, 261.23) ▪ RCRA-regulated toxic metal waste: D004 – D011 (40 CFR 261.24) ▪ RCRA-regulated toxic organic waste: D012 – D043 (40 CFR 261.24) ▪ RCRA-regulated listed waste: F-, K-, P-, and U-listed (40 CFR 261.31, 32, and 33) ▪ DDT, dioxins, or pesticides at any detectable concentration via an analytical method approved by EPA ▪ Biological or microorganism waste ▪ Samples and waste from analytical operations with no associated WPF (Analytical operations are not exempt from the WPF process.) ▪ Polychlorinated biphenyls (PCBs) at any detectable concentration via an analytical method approved by EPA, or at any suspected concentration
Other	<ul style="list-style-type: none"> ▪ Non-radioactive waste ▪ Waste from electroplating operations ▪ Sanitary waste (except for rad decon showers and sinks) ▪ Detergents and surfactants ▪ Boiler or chiller waters containing rust inhibitors, scale inhibitors, or other inhibitors ▪ Sludges or solids ▪ Cooling tower blowdown ▪ Dyes and scintillation cocktails

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TABLE 2
Limits on Radionuclides Acceptable for Discharge to the TA50 RLWTF
(TA55 "Acid" Line)

Maximum Concentration by Sum of Radionuclides (Ci/L)	
α -emitting radionuclides	1.0E-04 gross alpha
β -emitting radionuclides	2.0E-05 gross beta (not including tritium)
γ -emitting radionuclides	6.0E-06 gross gamma
Maximum Concentration by Nuclide (Ci/L)	
²⁴¹ Am	1.67E-05
³ H (accelerator- produced)	0 (none allowed)
³ H (reactor-produced)	2.0E-08
²³⁸ Pu	1.67E-05
²³⁹ Pu	1.67E-05
²²⁶ Ra	1.5E-08
²³⁷ Np	1.0E-08
²³⁴ U	5.0E-05
²³⁵ U	6.0E-07
²³⁸ U	6.0E-07

TABLE 3
Limits on Radionuclides Acceptable for Discharge to the TA50 RLWTF
(TA55 "Caustic" Line)

Maximum Concentration by Sum of Radionuclides (Ci/L)	
α -emitting radionuclides	2.25E-03 gross alpha
β -emitting radionuclides	7.50E-04 gross beta (not including tritium)
γ -emitting radionuclides	2.70E-04 gross gamma
Maximum Concentration by Nuclide (Ci/L)	
²⁴¹ Am	7.5E-04
³ H (accelerator- produced)	0 (none allowed)
³ H (reactor-produced)	2.0E-08
²³⁸ Pu	7.5E-04
²³⁹ Pu	7.5E-04
²²⁶ Ra	1.5E-8
²³⁷ Np	5.0E-08
²³⁴ U	2.3E-06
²³⁵ U	1.0E-07
²³⁸ U	1.0E-08

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TABLE 4
Limits on Non-Radioactive Constituents Acceptable for Discharge to the RLWTF
(Both the TA55 “Acid” and “Caustic” Lines)

Constituent	Maximum Allowable Concentration (mg/L, except where noted)
Aluminum	50
Ammonia-Nitrogen	10
Arsenic (D004)	5
Barium (D005)	100
Beryllium	1
Boron	50
Cadmium (D006)	1
Chromium (D007)	5
Chlorine (free)	1
Cobalt	5
Copper	10
Cyanide	5
Lead (D008)	5
Mercury (D009)	0.2
Perchlorate	4 ppb
Selenium (D010)	1
Silver (D011)	5
Vanadium	1
Zinc	50
Chemical Oxygen Demand	250
Total Suspended Solids	2,000



Section 16.1 Attachment 3 - Procedure Change Request

Procedure Change Request				
Section #1- Type of Request				
Manual/Procedure No. (if known): EP-RLW-AP-2902			Revision: 0	
Title: Waste Acceptance Criteria For Transuranic RLW				
Detailed description of requested change (Attach additional sheets if needed. Number additional sheets): New procedure number; changed "normality" to "molarity"; editorial changes. <i>This document supersedes RLW-AP-2901. JCDs 01-28-2009</i>				
Requestor Signature: <i>J.C. Del Signore</i>	Print Name: J.C. Del Signore	Phone: 665-5956	Date: 01-13-2009	
Section #2 - Procedure Owner Supervisor Approval For Processing				
<input type="checkbox"/> New Procedure	<input type="checkbox"/> Major Revision	<input checked="" type="checkbox"/> Minor Revision	<input type="checkbox"/> Special Procedure	
<input type="checkbox"/> IPC	<input type="checkbox"/> Deactivation	<input type="checkbox"/> Cancellation	<input type="checkbox"/> IPC Rollup	
<input checked="" type="checkbox"/> Approved		<input type="checkbox"/> Disapproved (Return to originator)		Priority: Normal
Procedure Owner Supervisor Signature: <i>P.J. Rice</i>		Print Name: P.J. Rice		Date: 1-13-09
Section #3 - Review and Concurrence				
IPC # N/A	IPCs Incorporated: N/A		Affected Pages: All	
Other affected facilities or N/A: N/A Obtain Concurrence all facilities/organizations affected by this change				
Review and Concurrence: Review organizations (N/A if not required); document additional review organizations, if needed on continuation sheet. CSE approval required for all technical procedures except minor revisions, IPC Rollup, and non-AB related cancellations/deactivations. CSE approval always required for changes affecting safety basis steps.				
Department:	Print Name:	Signature:	Date:	
ES-SE	Cliff Kirkland	<i>Cliff Kirkland</i>	1/12/09	
EWMO-RLW	S.W. Hanson	<i>S.W. Hanson</i>	1.14.09	
CSE USQ Number (as applicable): RLWTF-09.0212-JCS				
ADC: <input checked="" type="checkbox"/> Unclassified		<input type="checkbox"/> OUO	<input type="checkbox"/> UCNI	<input type="checkbox"/> Classified
Print Name J.C. Del Signore		Signature <i>J.C. Del Signore</i>		
Section #4 - Final Approval By Procedure Owner				
Validation Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Document is Authorized to serve as Part 1 of the IWD <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Periodic Review Requirements Satisfied? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Training Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Classroom/Briefing	<input type="checkbox"/> Just-in-Time	<input type="checkbox"/> Hold for Completion of Training
		<input type="checkbox"/> On the Job	<input type="checkbox"/> Required Reading	<input type="checkbox"/> Release Procedure to field
Approval Signature: <i>P.J. Rice</i>	Print Name: P.J. Rice	Z Number: 214458	Date: 1-28-09	Phone: 231-5833

Lisance within ASUAL CD-DTS 1.28.09

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Attachment 16. Sanitary Wastewater System (SWWS) (Page 1 of 9)**

16.1 Facility Requirements

The purpose of the Waste Acceptance Criteria (WAC) for the Technical Area (TA)-46 Sanitary Wastewater System (SWWS) Plant is to ensure compliance with the Laboratory's National Pollutant Discharge Elimination System (NPDES) Outfall Permit and the SWWS Plant's Groundwater Discharge Permit and to assure against operational upsets of the physical and biological processes of the plant caused by incompatible waste streams.

Sanitary sewer waste, including bathroom waste, kitchen waste, janitorial waste from non-rad areas, and de minimus quantities of cooling and boiler blowdown from equipment rooms and from other sources, is acceptable for discharge into the SWWS Plant. Industrial wastewater, including radioactive waste, chemical waste, high explosives waste, and other industrial waste is not acceptable for discharge into the SWWS Plant.

The SWWS WAC Committee is responsible for the review of proposals to discharge new waste streams into the SWWS Plant. The SWWS WAC Committee includes four members: the SWWS plant operations manager; the sampling representative from the Environmental Protection-Water Quality and RCRA (ENV-RCRA) group; the SWWS plant system engineer for the Laboratory's Utilities and Infrastructure Organization; and the NPDES Outfall Permit Program Lead for ENV-RCRA.

Sanitary sewer waste acceptable for treatment at the SWWS Plant is usually discharged into drains or sinks. Before discharging treated effluent to the environment, the SWWS Plant treats the sanitary sewer waste to meet the effluent limits specified in the Laboratory's NPDES Permit No. NM0028355. Most sanitary sewer waste is discharged directly into the SWWS Plant through the sanitary sewer collection system. A smaller volume is transported to the SWWS Plant from sanitary holding tanks, septic tank systems, wastewater containers, and portable toilets. SWWS Plant personnel periodically pump these sources and truck the waste to the SWWS Plant.

SWWS Plant WAC are based on the following requirements:

- As-Low-As-Reasonably Achievable (ALARA) Laboratory policy
- Clean Water Act (The Federal Water Pollution Control Act)
- Department of Transportation (DOT) Regulations
- Department of Energy (DOE) O 5400.5, *Radiation Protection of the Public and the Environment*
- New Mexico Solid Waste Regulations (disposal of sludge, grit, and screenings)
- New Mexico Water Quality Act
- New Mexico Water Quality Control Commission (WQCC) Regulations
- NPDES Outfall Permit No. NM0028355 and Discharge Plan (DP-857)
- RCRA
- Toxic Substance Control Act (TSCA)
- Water Quality Standards for Interstate and Intrastate Streams in New Mexico
- Groundwater Discharge Permit for the SWWS Plant, DP-857
- New Mexico Liquid Waste Disposal Regulations

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 2 of 9)

16.2 Transportation Requirements

Typically, sanitary sewer waste is transferred to the SWWS Plant through the sanitary sewer collection system; however, SWWS Plant personnel transport some sanitary sewer waste to the SWWS Plant from waste generation points where the sanitary collection system is unavailable. SWWS Plant personnel have been instructed not to transport wastewater to the SWWS Plant until after a WPF (Form 1346, *Waste Profile Form*) has been completed and approved.

Waste generators must notify SWWS Plant personnel at least 48 h before pickup and transport of wastewater to the SWWS Plant. Before pickup, SWWS Plant personnel will contact the waste generator to coordinate the time and location of the pickup. The waste generator or the Waste Management Coordinator (WMC) must be present at the time and location of pickup to ensure that the correct tanks are pumped. Failure to have a waste generator or WMC at the designated site and time may result in the delay of wastewater pickup.

All sanitary sewer waste will be hauled by the SWWS vacuum truck to the SWWS, no exceptions.

16.3 Waste Profile Form (WPF)

All new waste streams (excluding sanitary wastewater from restrooms, drinking water fountains, showers, and office-type kitchens) to be discharged or transported to the SWWS Plant must be evaluated by the SWWS WAC Committee using a WPF (Form 1346, *Waste Profile Form*). The waste generator is responsible for completing a WPF (Form 1346) for a new waste stream. Instructions for completing the WPF (Form 1346) are included in TL-001, *Waste Generator Instruction for Completing the Waste Profile Form (WPF)*, found on the Plans & Procedures for Waste and Environmental Services (WES) webpage under the Waste tab.

Acceptable knowledge criteria may be used to complete the WPF (Form 1346) instead of analytical data for new waste streams originating from new buildings and facilities (with previous approval from the SWWS WAC Committee). All waste streams originating from existing holding tanks, septic tank systems, and containers must have an approved WPF (Form 1346) on file with the waste services coordinator before transport of sewer waste to the SWWS Plant. WPFs (Form 1346s) for sanitary sewer waste from holding tanks, septic tank systems, and other sources are valid for one year and may be extended by the waste generator annually if the waste stream has not changed up to maximum of three years.

If a change is planned to a waste stream discharged into the sanitary sewer collection system or transported to the SWWS Plant, the waste generator must notify ENV-RCRA and complete a new WPF (Form 1346) before discharge or transport. The waste generator should also notify the SWWS plant manager or SWWS plant system engineer of any changes in waste stream discharges (i.e., quantity and/or quality). Examples of changes include both changes in contaminant loading and volume of sanitary sewer waste. All sampling of waste streams at LANL must be sampled by an approved independent and experienced entity in accordance with the SWWS Committee requirements.

The waste generator must provide a charge account number for sampling, investigation, preparation of work package, and/or pumping of the waste stream. A charge number must be issued by the group requesting SWWS personnel to pump approved wastewater streams contained in tanks, drums or other types of containment. Routine pumping or establishment of portable toilets will require a new work order number each Fiscal Year (FY) and a site specific hazard form.

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 3 of 9)

16.4 Waste Acceptance Criteria (WAC)

All sanitary sewer waste discharged or transported to the SWWS Plant must meet the WAC described in this section. If a waste generator is planning a new waste stream or believes that a planned change is likely to exceed the limits set forth in Tables 16-1, 16-2, or 16-3, the waste generator must complete a WPF (Form 1346, *Waste Profile Form*) and obtain approval from the SWWS WAC Committee *before* discharge or transport.

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 4 of 9)

Table 16-1. Waste Acceptance Criteria (WAC) for Discharges to the Sanitary Wastewater System (SWWS) Plant

(All metal concentrations are for the total metal concentrations present in the sample.)

Contaminant	Limits at a Flow Rate of 100 gal./day or Less	Limits at a Flow Rate Greater than 100 gal./day
pH (If <100 gal/day pH 5.0 acceptable per Table 16-1)	5–11 SU	5.5–11 SU
Chemical Oxygen Demand (COD)	≤750 mg/L	≤500 mg/L
Microtox® results	<55% screen >20% EC50	<50% screen >25% EC50
Temperature	≤180°F	≤140°F
Total Suspended Solids (TSS)	≤330 mg/L	≤330 mg/L
Total Dissolved Solids (TDS)	≤1,000 mg/L	≤1,000 mg/L
Oil and grease	<100.0 mg/L	<50.0 mg/L
Aluminum	<5.0 mg/L	<5.0 mg/L
Arsenic	<0.2 mg/L	<0.1 mg/L
Barium	<40.0 mg/L	<20.0 mg/L
Beryllium	<0.01 mg/L	<0.01 mg/L
Boron	<2.0 mg/L	<1.0 mg/L
Cadmium	<0.1 mg/L	<0.05 mg/L
Chromium	<3.8 mg/L	<1.9 mg/L
Cobalt	<2.2 mg/L	<1.1 mg/L
Copper	<1.0 mg/L	<0.5 mg/L
Cyanide (total)	<5.0 mg/L	<0.34 mg/L
Fluoride	<180.0 mg/L	<80.0 mg/L
Iron	<100.0 mg/L	<35.0 mg/L
Lead	<0.4 mg/L	<0.2 mg/L
Magnesium	<100.0 mg/L	<50.0 mg/L
Manganese	≤10.0 mg/L	<7.5 mg/L
Mercury (total)	<1.5 µg/L	<0.77 µg/L
Molybdenum	<4.0 mg/L	<2.0 mg/L
Nickel	<0.5 mg/L	≤0.25 mg/L
Nitrogen (total)	≤100 mg/L	≤50 mg/L
Phosphorus (total)	<80.0 mg/L	<40.0 mg/L
Polychlorinated Biphenyls (PCBs)	none detected	none detected
Selenium	<5.0 µg/L	<5.0 µg/L
Silver	<5.0 mg/L	<1.0 mg/L
Vanadium	<0.2 mg/L	<0.1 mg/L
Zinc	<10.0 mg/L	<0.5 mg/L

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 5 of 9)

Table 16-2. Limits for Radioactivity (Drinking Water Limits)	
Parameter	Limit (pCi/L)
Gross Alpha	15
Gross Beta	50
Tritium	20,000

Radionuclides—Sanitary sewer waste exceeding the drinking water limits for radioactivity shown in Table 16-2 cannot be discharged into the SWWS Plant. A radioactive source facility may not discharge a radioactive waste stream into the sanitary sewer collection system for treatment at the SWWS Plant.

pH—Sanitary sewer waste with a pH less than 5.5 or greater than 11.0 standard units is not acceptable for treatment at the SWWS Plant.

Chemical Waste—The SWWS Plant is regulated under NPDES Outfall Permit No. NM0028355 and under Groundwater Discharge Permit No. DP-857. The SWWS Plant is not a permitted facility under the Laboratory's RCRA permit. Wastes regulated under RCRA (such as acetone, methyl-ethyl-ketone [MEK], 1,1,1-trichloroethane [TCA], and electroplating wastes) are not accepted for treatment at the SWWS Plant. For additional information concerning the disposal of RCRA waste, contact the ENV-RCRA group. Sanitary sewer waste not regulated by RCRA may be accepted for treatment at the SWWS Plant on a case-by-case basis depending on the chemical constituents, concentrations, and volumes generated. All sanitary sewer waste must meet the SWWS Plant WAC listed in Table 16-1, unless a WEF (Form 1973, *Waste Acceptance Criteria Exception Form*) is completed by the waste generator and approved by the SWWS WAC Committee.

Nitrogen—Total nitrogen concentrations in sanitary sewer waste must not exceed 100 mg/L for flow rates less than or equal to 100 gallons per day and must not exceed 50 mg/L for flow rates greater than 100 gallons per day. Waste streams containing nitrogen in excess of the SWWS Plant WAC will be evaluated on a case-by-case basis.

Metals—Sanitary sewer waste containing metals at levels regulated by RCRA (See Table 1-4 of Attachment 1, *Radioactive Liquid Waste Treatment Facility [RLWTF]*) are not accepted for treatment at the SWWS; therefore, the metal concentrations shall not exceed the limits shown in Table 1-4. A WEF (Form 1973, *Waste Acceptance Criteria Exception Form*) must be completed by the waste generator and approved by the SWWS WAC Committee for any exceptions.

Temperature—The temperature of sanitary sewer waste discharged into the sanitary sewer collection system shall not exceed 60°C (140°F) unless the flow rate of the waste is less than 100 gallons per day, in which case the temperature shall not exceed 82.2°C (180°F).

Toxicity—All wastes must meet the Microtox® requirements for toxicity before discharge to the SWWS Plant at a dilution representing the actual dilution of the liquid waste discharged into the sanitary collection system.

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 6 of 9)

Microtox® Measures the Toxicity of Aqueous Solutions—The light output of the Microtox® reagent, a suspension of luminescent bacteria, is measured before and after the reagent is exposed to the sample being tested. When toxic materials inhibit bacterial metabolism, light output drops in proportion to the toxicity. The Microtox® testing method has been included in the 19th Edition of *Standard Methods for the Analysis of Water and Wastewater*. The Biochemical Oxygen Demand (BOD) test will be utilized in place of the Microtox® test when a laboratory is not available to conduct the Microtox® test.

BOD5, Biochemical Oxygen Demand—This is a microbial bioassay test conducted over a five day period. Acceptable limits will be a maximum of 500 mg/L BOD5 for less than 100 gallons; and a maximum of 300 mg/L BOD5 for greater than 100 gallons.

Chlorine from Disinfection of Water Supply Facilities—Sanitary sewer waste volumes of less than 20 gal. may be discharged directly to the SWWS Plant without regard to chlorine concentration. Volumes greater than 20 gal. but less than 1,000 gal. must be de-chlorinated to less than 3 ppm before discharge to the SWWS Plant. Volumes greater than 1,000 gal. must be reviewed and approved by the SWWS WAC Committee on a case-by-case basis before discharge.

Sample Location—Samples for evaluation of contaminants must be taken as close to the point of discharge into the sanitary sewer collection system as possible. When sampling cannot be completed at the point of discharge, samples should be taken at the first available manhole or sampling port downstream of the point of discharge.

Prohibited Waste—Table 16-3 lists the categories of waste that are not acceptable for discharge or transport to the SWWS Plant.

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 7 of 9)

Table 16-3. Waste Prohibited at the Sanitary Wastewater System (SWWS) Plant
Resource Conservation and Recovery Act (RCRA) Regulated Waste
<p>Waste exhibiting the characteristic of ignitability as defined in 40 CFR 261.21, <i>Identification and Listing of Hazardous Waste, Characteristic of ignitability</i></p> <p>Waste exhibiting the characteristic of reactivity as defined in 40 CFR 261.23, <i>Identification and Listing of Hazardous Waste, Characteristic of reactivity</i></p> <p>Waste exhibiting the characteristic of toxicity as defined in 40 CFR 261.24, <i>Identification and Listing of Hazardous Waste, Toxicity characteristic</i></p> <p>F-listed waste as defined in 40 CFR 261.31, <i>Identification and Listing of Hazardous Waste, Hazardous wastes from non-specific sources</i></p> <p>K-listed waste as defined in 40 CFR 261.32, <i>Identification and Listing of Hazardous Waste, Hazardous wastes from specific sources</i></p> <p>P-listed waste as defined in 40 CFR 261.33, <i>Identification and Listing of Hazardous Waste, Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof</i></p> <p>U-listed waste as defined in 40 CFR 261.33</p>
Other Prohibited Waste
<p>Cooling tower and boiler blowdown in excess of 500 gal. per day</p> <p>Polychlorinated Biphenyls (PCBs)</p> <p>Sanitary sewer at temperatures >140°F for flows >100 gal./day</p> <p>Sanitary sewer at temperatures >180°F</p> <p>Non-aqueous waste</p> <p>Medical waste</p> <p>Radioactive waste</p> <p>Toxic waste (as defined by Microtox® methodology)</p> <p>Non-characterized holding tank or septic tank system</p> <p>Surface drainage</p> <p>Roof drainage</p> <p>Surface-active agents, excessive detergents, or other substances that may cause excessive foaming in the SWWS Plant</p> <p>Dilution water added to achieve compliance with any of requirements of the SWWS/Waste Acceptance Criteria (WAC)</p>

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 8 of 9)

16.5 Holding Tank and Septic Tank Systems

Holding tank and septic-tank systems must have approved WPFs (Form 1346, *Waste Profile Forms*) on file with the waste services coordinator before transport of sanitary sewer waste to the SWWS Plant. Sanitary sewer wastes from holding tank and septic tank systems are subject to the WAC requirements listed in Table 16-4. As needed, sanitary sewer waste from septic tank systems will receive additional pretreatment and low-flow discharge into the SWWS Plant at the discretion of the SWWS Plant Operations Manager (superintendent) to ensure that the sanitary sewer wastes do not cause plant upsets or non-compliances.

Table 16-4. Waste Acceptance Criteria (WAC) for Holding Tank and Septic Tank Systems

	Holding Tank	Septic Tank Systems
Chemical Oxygen Demand (COD)	1,500 mg/L	8,000 mg/L
Total Suspended Solids (TSS)	5,000 mg/L	15,000 mg/L
TDS	10,000 mg/L	N/A
Total N	300 mg/L	500 mg/L
Total P	200 mg/L	N/A
Oil and grease	200 mg/L	350 mg/L
Microtox® test	<55% (screen) and >20% (EC50)	N/A
RDX	0.0 mg/L	0.2 mg/L

A sign designating the holding tank or septic tank system number must be provided at the tank location. Waste generators must provide for roadways to on-site holding tank and septic tank systems that are adequate for pump truck use with no restrictions to access. All septic and holding tanks and related equipment must be plainly visible and protected from any snow removal activities. Tanks must have adequate capacity to contain the sanitary flow from connected buildings. The facility operations director must ensure that new or upgraded installations must be equipped with high-level alarms for holding tanks. The alarm light must be visible to building residents. All holding tanks and septic tanks without an approved WPF (Form 1346, *Waste Profile Form*) must be characterized before any pumping activities. It is the waste generator's responsibility that all WAC requirements for holding tank and septic tank systems are met before pumping and transport of sanitary sewer waste to the SWWS Plant. Waste generators must provide at least a 48 h notice to SWWS Plant personnel before sanitary sewer waste transport.

To ensure the integrity of the SWWS Plant and to maintain compliance with the Laboratory's NPDES permit, additional sampling (including, but not limited to SWWS WAC parameters, RCRA parameters, and various metals) may be required for holding tank and septic tank systems that have not been pumped within the past three years.

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Attachment 16. Sanitary Wastewater System (SWWS) (Cont.) (Page 9 of 9)

16.6 Portable Toilets

Sanitary sewer waste from portable toilets used at construction sites or for other activities at the Laboratory may be transported to the SWWS Plant for treatment and disposal. Please contact the SWWS Plant personnel in order to make arrangements for this service. The Sanitary Portable Toilet Request Form must be completed in advance by the requester and faxed to the SWWS Plant at (505) 667-7746.

16.7 Additional Requirements

16.7.1 Posting of Sinks and Drains Connected to the Sanitary Wastewater System (SWWS) Plant

Each sink or drain connected to the sanitary sewer collection system or to a holding tank or septic tank system must be posted with a sign informing the user of the requirements for disposing of sanitary sewer waste down the sink or drain. The approved sign may be obtained from the ENV-RCRA group. The waste generator is responsible for ensuring that all sinks are posted with the most current sign.

16.7.2 Labeling of Sanitary Sewer Lines

Sanitary sewer lines that are visible inside buildings are the responsibility of the building manager and must be labeled "Sanitary Sewer."

16.7.3 Waste Acceptance Criteria (WAC) Non-Compliance and Monitoring

Non-compliance with SWWS Plant WAC requirements may result in termination of SWWS Plant treatment and disposal services upon recommendation of the SWWS WAC Committee and approval by the Utilities and Infrastructure Organization. It is then the waste generator's responsibility to find alternative means and methods of disposal that comply with federal and state environmental regulations. Waste stream monitoring must be conducted by Laboratory and Support Services Subcontractor (SSS) environmental personnel as required to ensure compliance with the SWWS WAC.

16.8 Waste Acceptance Criteria Exception Form (WEF) (Form 1973)

Some waste streams that do not meet all of the requirements of the SWWS Plant WAC may be acceptable for treatment at the SWWS Plant. An exception from a WAC requirement may be requested by a waste generator by completing the WEF (Form 1973, *Waste Acceptance Criteria Exception Form*) and submitting it to the waste services coordinator and SWWS WAC Committee. The Committee will evaluate the WEF (Form 1973) and approve or disapprove the proposed exception. Conditions of approval may include pretreatment and/or low-flow discharge into the SWWS Plant. Decisions of the Committee may be appealed to the Utilities and Infrastructure Organization. The decision of the Utilities and Infrastructure Organization is final.

TA-16 WASTE ACCEPTANCE CRITERIA

(TA-16-388, TA-16-399, TA-16-260, TA-16-1508)

Revision 1
February 2008
LA-UR-08-1520

1.0 INTRODUCTION

Weapons Engineering Technology Division (WT) treats waste at the following facilities in Technical Area 16 (TA-16):

- the TA-16-388 Flash Pad, which treats Resource Conservation and Recovery Act (RCRA) regulated wet or dry HE, HE-contaminated combustibles, and HE-contaminated non-combustibles;
- the TA-16-399 Burn Tray, which is used to treat RCRA-regulated dry HE;
- the TA-16-260 steam cleaning operation, which treats non-RCRA regulated HE-contaminated materials; and
- the High Explosives Wastewater Treatment Facility (HETWF) located at TA-16-1508, which treats HE-contaminated wastewater.

All waste treated at TA-16 must be accompanied by a Treatment Request Form appropriate to the waste and an active Waste Profile Form (WPF). Improperly characterized waste will be returned to the generator at the generator's expense. The generator must provide charge codes to cover the costs of treating wastes and residue analysis, treatment, and/or disposal.

2.0 ACCEPTABLE WASTES

2.1 RCRA-Regulated Wastes

WT-5 treats RCRA-regulated detonable wastes at the TA-16-388 Flash Pad and TA-16-399 Burn Tray. These wastes must contain explosives that detonate at greater than the speed of sound and carry the Environmental Protection Agency (EPA) Hazardous Waste Number D003 for reactivity. Waste characterization and acceptance is described in the LANL General Part B Renewal Application; this TA-16 Waste Acceptance Criteria (WAC) supplements those requirements. Detonable wastes that can be accepted for treatment at TA-16-388 and/or TA-16-399 are outlined in Table 1. If the waste has an EPA Hazardous Waste Number that is not listed

in Table 1, it cannot be treated at the TA-16 Burn Ground. It is important that all non-HE process waste be segregated from HE wastes to minimize the amount of waste that must be treated. Please refer to Table 2 for restrictions or other considerations for each waste type. Table 3 provides guidance for determining whether scrap metal is detonable.

2.2 Wastewater Treated at the HEWTF

Limits for wastewater treated at HEWTF are based on LANL's National Pollutant Discharge System (NPDES) water quality permit and levels WT-5 has set to be protective of the environment (Table 4). Based on operational data, WT-5 may revise acceptable limits.

The HEWTF consists of granulated activated carbon filters, designed to remove HE and very low levels of solvents, ion exchange units designed to remove perchlorate, and ion exchange units designed to remove barium. The wastewater treated at the HEWTF is generally collected in sumps and transported to the HEWTF by tanker truck. Other containers may be used, with the wastewater being transported either in the original containers or in tanker trucks. The treated wastewater is evaporated within the treatment system or discharged through outfall 05A055.

2.3 Non-Detonable Materials

Materials that have non-detonable quantities of HE may require treatment to meet the DOE Explosives Safety Manual, Section 18.6(s) requirements before release to the public. A WPF must be prepared for each material, identifying whether there are other EPA Hazardous Waste Numbers attached to the waste. If steam cleaning is not an appropriate treatment method under the 49 CFR 268 Land Disposal Restrictions, non-detonable RCRA-regulated waste may require off-site treatment instead of treatment at TA-16 facilities. WT-5 may require scrap metal to be segregated by metal type (e.g., aluminum segregated from carbon steel, etc.) so that it can be treated as "processed scrap metal." Guidance for determining whether scrap metal is detonable is provided in Table 3. Degree of confinement is not discussed but may also be a factor.

3.0 WASTE PROFILE FORM

All waste streams must be profiled using a Waste Profile Form (WPF). The first time a WPF is used, the generator must supply WT-5 with the analytical or acceptable knowledge documentation (AK) used for waste characterization. The WPF form can be obtained at

<http://enterprise.lanl.gov/forms/1346.pdf>. Additional assistance for filling out the form is available from the appropriate WMC; the listing of WMCs by division and/or group is available at: http://int.lanl.gov/environment/waste/lanl_only/wmc_area_support.shtml or by calling the Generator Support Services Team.

The Generator Support Services Team of the Waste & Environmental Services Division, first reviews a WPF then routes it to WT-5 for review and acceptance. WT-5 maintains the right to reject any waste streams that might degrade any treatment facility (e.g., corrosive materials), be harmful to workers conducting treatment (e.g., highly toxic wastes), fall outside our treatment capabilities, or cause unacceptable environmental releases. WT-5 also maintains the right to reject waste streams from a generator if it appears that the generator is not providing accurate characterization. If WT-5 has questions about waste compositions, the generator may be required to perform additional sampling or more detailed AK documentation.

4.0 TREATMENT REQUEST FORMS

The appropriate request form, located in Attachments 1-3, must be submitted for each shipment of waste or wastewater. Each form is specific to the type of treatment and must be accompanied by an approved WPF. Request forms should be utilized as follows:

- Attachment 1 – TA-16 Burn Ground Treatment Request Form
Used to request open burn treatment for RCRA-regulated wastes at the TA-16-388 Flash Pad or the TA-16-399 Burn Tray.
- Attachment 2 – TA-16 HEWTF Treatment Request Form
Used to request treatment of wastewater at the HEWTF.
- Attachment 3 – TA-16-260 Steam Cleaning Request Form
Used to request steam cleaning of non-detonable material at TA-16-260.

5.0 WAC EXCEPTION FORM

WAC Exception forms are required as follows:

- There is no WAC Exception Form for the RCRA-regulated wastes treated at the TA-16 Burn Ground. If the type of waste is not described in Table 1, the waste cannot be treated at the TA-16 Burn Ground until the permit is changed (a lengthy process).
- Some waste streams that do not meet the WAC, may be acceptable for treatment at the HEWTF. If TA-16 rejects a WPF for treatment at the HEWTF, the generator may submit a WAC Exception Form (HEWTF WEF), shown in Attachment 4. WT-5 will review the waste stream, possible generator treatment options, and quantities of waste to determine whether an exception is possible.

Table 1: Detonable HE and HE-Contaminated Waste Treated at the TA-16 Burn Ground

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA ^a Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits ^b (milligrams per liter)
HE-Contaminated Water	Laboratory analysis; HE processing; maintenance, Environmental Restoration (ER), decontamination and decommissioning (D&D), research and development (R&D), and drilling activities	Acceptable Knowledge ^c	D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D009	Mercury	0.2
			D011	Silver	5.0
			D018	Benzene	0.5
			D022	Chloroform	6.0
			D028	1,2-Dichloroethane	0.5
			D029	1,1-Dichloroethylene	0.7
			D030	2,4-Dinitrotoluene	0.13
			D035	Methyl ethyl ketone	200.0
			D036	Nitrobenzene	2.0
			D038	Pyridine	5.0
			D040	Trichloroethylene	0.5
			F001	Spent halogenated solvents	NA ^d
			F002	Spent halogenated solvents	NA ^d
F004	Spent nonhalogenated solvents	NA ^d			
F005	Spent nonhalogenated solvents	NA ^d			
HE-Contaminated Oil/Solvent Waste	Laboratory analysis; dissolving HE and polymers; HE production; spills; and ER, D&D, and R&D activities	Acceptable Knowledge ^c	D001	Ignitability	NA ^d
			D002	Corrosivity	NA ^d
			D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D009	Mercury	0.2
			D011	Silver	5.0
			D018	Benzene	0.5
			D022	Chloroform	6.0
D028	1,2-Dichloroethane	0.5			
D029	1,1-Dichloroethylene	0.7			

Table 1: Detonable HE and HE-Contaminated Waste Treated at the TA-16 Burn Ground

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA ^a Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits ^b (milligrams per liter)
HE-Contaminated Oil/Solvent Waste (continued)			D030	2,4-Dinitrotoluene	0.13
			D035	Methyl ethyl ketone	200.0
			D036	Nitrobenzene	2.0
			D038	Pyridine	5.0
			D040	Trichloroethylene	0.5
			F001	Spent halogenated solvents	NA ^d
			F002	Spent halogenated solvents	NA ^d
			F003	Spent nonhalogenated solvents	NA ^d
			F004	Spent nonhalogenated solvents	NA ^d
			F005	Spent nonhalogenated solvents	NA ^d
Solid and Scrap HE	HE-processing; R&D, ER, and D&D activities; testing operations; disposition of weapons	Acceptable Knowledge ^c	D001	Ignitability	NA ^d
			D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D018	Benzene	0.5
D030	2,4-Dinitrotoluene	0.13			
HE-Contaminated Commercial Chemical Products	Spilled commercial chemical products contaminated with HE	Acceptable Knowledge ^c	D001	Ignitability	NA ^d
			D003	Reactivity	NA ^d
			U022	Acetone	NA ^d
			U019	Benzene	NA ^d
			U044	Chloroform	NA ^d
			U112	Ethyl acetate	NA ^d
			U154	Methanol	NA ^d
			U159	Methyl ethyl ketone	NA ^d
			U196	Pyridine	NA ^d
			U169	Nitrobenzene	NA ^d
U220	Toluene	NA ^d			
U239	Xylene	NA ^d			

Table 1: Detonable HE and HE-Contaminated Waste Treated at the TA-16 Burn Ground

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA ^a Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits ^b (milligrams per liter)
Wet HE	Filtration of HE wastewater; ER, R&D, and D&D activities; HE processing	Acceptable Knowledge ^c	D001	Ignitability	NA ^d
			D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D009	Mercury	0.2
			D011	Silver	5.0
			D018	Benzene	0.5
			D022	Chloroform	6.0
			D028	1,2-Dichloroethane	0.5
			D029	1,1-Dichloroethylene	0.7
			D030	2,4-Dinitrotoluene	0.13
			D035	Methyl ethyl ketone	200.0
			D036	Nitrobenzene	2.0
			D038	Pyridine	5.0
			D040	Trichloroethylene	0.5
			F001	Spent halogenated solvents	NA ^d
			F002	Spent halogenated solvents	NA ^d
			F003	Spent nonhalogenated solvents	NA ^d
F004	Spent nonhalogenated solvents	NA ^d			
F005	Spent nonhalogenated solvents	NA ^d			
K044	Wastewater sludges	NA ^d			
K045	Spent carbon	NA ^d			

Table 1: Detonable HE and HE-Contaminated Waste Treated at the TA-16 Burn Ground

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA ^a Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits ^b (milligrams per liter)
HE-Contaminated Solid Waste	HE processing activities; D&D, ER, R&D, and drilling activities; and laboratory use	Acceptable Knowledge ^c	D001	Ignitability	NA ^d
			D002	Corrosivity	NA ^d
			D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D009	Mercury	0.2
			D011	Silver	5.0
			D018	Benzene	0.5
			D022	Chloroform	6.0
			D028	1,2-Dichloroethane	0.5
			D029	1,1-Dichloroethylene	0.7
			D030	2,4-Dinitrotoluene	0.13
			D035	Methyl ethyl ketone	200.0
			D036	Nitrobenzene	2.0
			D038	Pyridine	5.0
			D040	Trichloroethylene	0.5
			F001	Spent halogenated solvents	NA ^d
			F002	Spent halogenated solvents	NA ^d
F003	Spent nonhalogenated solvents	NA ^d			
F004	Spent nonhalogenated solvents	NA ^d			
F005	Spent nonhalogenated solvents	NA ^d			
HE-Contaminated Equipment	HE processing; D&D, R&D, and ER activities; and laboratory use	Acceptable Knowledge ^c	D003	Reactivity	NA ^d
			D005	Barium	100.0
			D006	Cadmium	1.0
			D007	Chromium	5.0
			D008	Lead	5.0
			D009	Mercury	0.2
			D011	Silver	5.0
D030	2,4-Dinitrotoluene	0.13			

Table 1: Detonable HE and HE-Contaminated Waste Treated at the TA-16 Burn Ground

Waste Description	Waste Generating Activity	Basis for Hazardous Waste Designation	Potential EPA ^a Hazardous Waste Numbers	Potential Hazardous Constituents and/or Characteristics in the Waste	Regulatory Limits ^b (milligrams per liter)
HE-Contaminated Liquid Acids, Bases, and/or Inorganic Salt Solutions	Materials used as titrants, solvents, and cleaning fluids and/or material from hydrolysis research	Acceptable Knowledge ^c	D002	Corrosivity	NAd
			D003	Reactivity	NAd
			D018	Benzene	0.5
			D022	Chloroform	6.0
			D030	2,4-Dinitrotoluene	0.13
			D035	Methyl ethyl ketone	200.0
			D036	Nitrobenzene	2.0
			D038	Pyridine	5.0
			F001	Spent halogenated solvents	NAd
			F002	Spent halogenated solvents	NAd
			F003	Spent nonhalogenated solvents	NAd
F004	Spent nonhalogenated solvents	NAd			
F005	Spent nonhalogenated solvents	NAd			

^a U.S. Environmental Protection Agency. Note that these constituents will likely be present only in trace amounts.

^b A solid waste exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, Test Method 1311 in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), the extract from a representative sample of the waste contains any of the contaminants listed at a concentration equal to or greater than the respective value given in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart II, Part 261, Subpart C [6-14-00]. These constituents are included if they are likely to be present; however, they are not expected to exceed the toxicity characteristic limits on a routine basis.

^c Acceptable knowledge is broadly defined as process knowledge, additional characterization data, and/or facility records of analysis, U.S. Environmental Protection Agency, 1994, “Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste, A Guidance Manual,” *OSWER 9938.4-03*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

^d Not applicable: refers to the absence of regulatory limits for ignitable, corrosive, reactive wastes, and F-, K-, and U-listed wastes. The amount of F-listed waste is expected to be trace in all waste streams, with the exception of the HE-contaminated spent solvent waste, which is expected to be 30 percent or more (by volume) solvent.

Table 2: Treatment Consideration for RCRA Waste Categories

Waste Type	Treatment Considerations
HE-Contaminated Water	Most HE-contaminated water is treated at the HEWTF rather than burned. However, if there is a high percentage of HE in water, it may be treated at TA-16-388.
HE-Contaminated Oil/Solvent	Most oils and solvents do not have enough HE to be detonable. Non-detonable oils/solvents that have less than 1 percent HE should be sent off-site for incineration.
Solid and Scrap HE	All explosives with a detonation rate greater than the speed of sound are acceptable at the TA-16 Burn Ground.
HE-Contaminated Commercial Chemical Products	If commercial chemical products are spilled and come into contact with HE, they should be evaluated to determine if they are detonable or not. If they are not detonable and there is less than 1 percent HE, they should be treated off-site.
Wet HE	Wet explosives with a detonation rate greater than the speed of sound are acceptable at the TA-16 Burn Ground.
HE-Contaminated Solid Waste	This waste consists mainly of wipes, gloves, glass, and small pieces of metal with enough HE contamination to classify them as detonable. The types of HE must be those that detonate at greater than the speed of sound. Whenever possible, metal should be segregated from other wastes so it can be flashed and recycled. Table 2 provides guidance on determining whether the metal is detonable or not.
HE-Contaminated Equipment	HE-contaminated equipment consists of kettles, machine tools, pipes, etc. that have sufficient HE to classify them as detonable. The types of HE must be those that detonate at greater than the speed of sound. This equipment is recycled as scrap metal. Oil must be drained out of the equipment and all non-metal hoses and other attachments must be removed before being shipped to the TA-16 Burn Ground. Table 2 provides guidance on determining whether the metal is hazardous or not.
HE-Contaminated Acids, Bases, and/or Inorganic Salt Solutions	To protect workers and equipment, the TA-16 Burn Ground does not usually accept acids or bases. The generator may be asked to perform generator treatment (note, generator treatment must be registered with ENV-SWRC) to neutralize the waste.

Table 3: Guidance for Determining Whether HE-Contaminated Scrap Metal is Detonable

Metal Surfaces	HE	Disposition
All Surfaces Visible	HE not visible	<ul style="list-style-type: none"> • Non-RCRA • Place in Ace Metals recycling bins. Do NOT release to KSL salvage.
	HE visible but <critical diameter ^a	<ul style="list-style-type: none"> • Non-RCRA • Steam clean • Place in Ace Metals recycling bins
	HE visible and > critical diameter	<ul style="list-style-type: none"> • RCRA (D003) • Flash under RCRA interim status permit • Place in Ace Metals recycling bins.
Not All Surfaces Visible	<p>Visible surfaces have HE < critical diameter</p> <p style="text-align: center;">AND</p> <p>Process knowledge supports HE < critical diameter in non-visible spaces</p>	<ul style="list-style-type: none"> • Non-RCRA • Steam clean, if surface and contamination are amenable • Place in Ace Metals recycling bins.
	<p>Visible surfaces have HE < critical diameter</p> <p style="text-align: center;">AND/OR</p> <p>Process knowledge supports HE > critical diameter in non-visible spaces</p>	<ul style="list-style-type: none"> • RCRA • Flash under RCRA interim status permit • Place in Ace Metals recycling bins.
All types of surfaces	Generator is uncertain whether there is a detonable quantity of HE	<ul style="list-style-type: none"> • Assume the waste is RCRA • Flash under RCRA interim status permit • Place in Ace Metals recycling bins.

^a If the explosive is experimental and the critical diameter is unknown, the generator should assume that any visible explosive is detonable.

Table 4: High Explosives Wastewater Treatment Facility (HEWTF) Waste Acceptance Criteria (WAC)

Parameters	Acceptance Criteria* (as mg/L unless otherwise indicated)
Hydrogen ion concentration (pH)	5-10 pH units
Chemical Oxygen Demand (COD)	833
Oil and grease	10% floating oils, grease or other petroleum products
Total Suspended Solids (TSS)	NA
Radioactive materials (human-made)	0
Acetone	7.0
Aluminum (total)	100
Arsenic (total)	0.04
Barium	24
Boron (total)	5.0
n-butyl alcohol	5.6
Cadmium (total)	0.2
Chloride	case-by-case
Chloroform	0.5
Chromium (total)	5.1
Cobalt (total)	1.0
Copper (total)	1.6
Cyclohexanone	1.0
1,2-dichloroethane	0.5
2,4-dinitrotoluene	1.5
2,6-dinitrotoluene	2.6
Ethyl acetate	1.0
Ethyl ether	1.0
Lead (total)	0.4
Mercury (total)	0.01
Methanol	8.0
Methylene chloride	1.0
Methyl ethyl ketone	1.0
Methyl isobutyl ketone	1.0
Nickel	3.98
Perchlorate	100 parts-per-billion (ppb)
Selenium (total)	0.05
Silver	0.43
Toluene	1.0
Vanadium (total)	0.10
Zinc (total)	95.4
Other constituents	to be determined on a case-by-case basis

mg/L = milligrams per Liter

* A waste exception form may be accepted for higher concentrations of constituents on a case-by-case basis.

ATTACHMENT 1
TA-16 BURN GROUND
TREATMENT REQUEST FORM
FOR RCRA-REGULATED HE AND HE-CONTAMINATED WASTES

**TA-16 BURN GROUND
TREATMENT REQUEST FORM
(FOR RCRA-REGULATED HE AND HE-CONTAMINATED WASTES)**

Requested By:	Group:	Phone:	Date:
Accum. Start Date:	Location of Waste:		
Cost Information/Task Order:			
Classified: yes <input type="checkbox"/> no <input type="checkbox"/> Other Waste Concerns (e.g. carcinogens or other toxic material):			
Is this debris to be treated to the alternative 40 CFR 268.45 Standards? yes <input type="checkbox"/> no <input type="checkbox"/>			
Physical State (check one): solid <input type="checkbox"/> liquid <input type="checkbox"/> sludge <input type="checkbox"/>			
Waste Profile Form Number (<i>a final, approved copy must be attached</i>):			

Shaded areas to be filled by WT-5 only.

HE or HE-Contaminated Waste Description	Quantity/units (see below)*		TA-16 Structure (EPA Treatment Code)	Date Staged	Date Treated
Solvents		388	388 (X01)		
Dry HE	Complete page 2	388 or 399	388 or 399 (X01)		
Wet HE	Complete page 2	388	388 (X01)		
Solvents		388	388 (X01)		
Combustible Solids – estimate pounds of HE by type on page 2		388	388 (X01)		
Non-combustible Solids – estimate pounds of HE by type on page 2		388	388 (X01)		
Other (describe – use page 2)	See page 2	See page 2	Various (X01)		

**Either use pounds (lb) or provide both a volume (liters or gallons) and density.*

Certification by WT-5 or designee that above waste meets the WAC for the appropriate structure Name: _____ Date: _____
Special Instruction to Treatment Unit Personnel:

Additional Waste Information

Fill out for wastes falling under Wet HE or Dry HE on page 1:

Total amount of waste in pounds (including water in wet HE):		
Amount of HE in waste		
Explosive Number	Name	Amount (pounds)
0101	TNT	
6018	COMP-B	
9501	PBX-9501	
9502	PBX-9502	
9404	PBX-9404	
8003	XTX 8003	
8004	XTX 8004	
0534	X534	
Other:		

Fill out for wastes falling into the “Other” category on page 1:

Waste Description	Quantity/units (see below)*	TA-16 Structures (circle one) (EPA Treatment Code)	Date Staged	Date Treated
		388/399 (X01)		
		388/399 (X01)		

*Either use pounds (lbs) or provide both a volume (liters or gallons) and density.

ATTACHMENT 2

**TA-16 HIGH EXPLOSIVES WASTEWATER TREATMENT FACILITY (HEWTF)
TREATMENT REQUEST FORM**

TA-16 HIGH EXPLOSIVES WASTEWATER TREATMENT FACILITY (HEWTF) TREATMENT REQUEST FORM

Requested By:	Group:	Phone:	Date:
Location of Waste:			
Cost Information/Task Order:			

Shaded areas to be filled by WT-5 only

Wastewater Description	Quantity/units (see below)*	WPF Number	TA-16 Structure	Date Treated
			HEWTF	

**For wastewater use volume (gallons or Liters).*

Acceptance by WT-5 or designee

Name: _____ Date: _____

Special Instruction to Treatment Unit Personnel

ATTACHMENT 3
TA-16-260 STEAM CLEANING
REQUEST FORM

TA-16-260 STEAM CLEANING REQUEST FORM

Requested By:		
Group:	Phone:	Date:
Location of Waste:		
Cost Information/Task order:		

Shaded areas to be filled by WT-5 only.

Equipment Description	Quantity/units (see below)*	TA-16 Structure	WPF #	Date Staged	Date Treated
		16-260			
		16-260			
		16-260			
		16-260			

**Either use number of pieces of equipment or pounds (lbs).*

Acceptance by WT-5 or designee:	
Name: _____	Date: _____
Special Instruction to Treatment Unit Personnel:	

ATTACHMENT 4

**TA-16 HIGH EXPLOSIVES WASTEWATER TREATMENT FACILITY (HEWTF)
WASTE EXCEPTION FORM**

**TA-16 HIGH EXPLOSIVES WASTEWATER TREATMENT FACILITY (HEWTF)
WASTE EXCEPTION FORM**

Waste Profile Form Number <i>(Please attach WPF to this form):</i>
Describe from which Waste Acceptance Criteria an exception is being requested:
Approximate quantity of waste subject to exception request (gallons/year):

Basis for Exemption:		
Special Instructions to the Generator:		
Signature:	Z Number:	Date:

APPENDIX O
Executive Summary of Implementation Plan

EXECUTIVE SUMMARY

Approximately every five years the Los Alamos National Laboratory (Laboratory) must apply for renewal and re-certification of the existing Industrial Point-Source National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 issued by the U.S. Environmental Protection Agency (EPA) under the requirements specified in the Clean Water Act Section 402 and 40 CFR 122. The NPDES regulations require the submittal of a re-application 180 days prior to expiration of the existing permit. The Laboratory's current permit will expire July 31, 2012. The Laboratory must submit an NPDES Permit Re-Application package by February 2, 2012 or deal with potential consequences that include delays in permit renewal by the EPA or re-certification by the New Mexico Environment Department; potential discharge violations, which could result in fines, penalties, or increased monitoring costs. In the extreme case, discontinuance of an existing permit could cause interruptions in operations or the complete shutdown of several mission critical facilities.

The coordination and completion of the Laboratory's 2012 NPDES Permit Re-Application has been delegated to the Environmental Protection Division's Water Quality and Resource Conservation and Recovery Act (ENV-RCRA) Group and is summarized in this Implementation Plan. The scope of work includes the preparation of the appropriate EPA forms and submittal package that is made up of defensible data and information for the following outfalls:

- 001 - Power Plant (TA-3-22)
- 13S - Sanitary Waste Water System (SWWS) Plant (TA-46-347)
- 03A022 - Cooling Tower Blow Down (TA-3-2274)
- 03A027 - Cooling Tower Blow Down (TA-3-285 and 2327)
- 03A199 - Cooling Tower Blow Down (TA-3-1837)
- 03A160 - Cooling Tower Blow Down (TA-35-124)
- 03A181 - Cooling Tower Blow Down (TA-55-6)
- 03A113 - Cooling Tower Blow Down (TA-53-293 and 1032)
- 03A048 - Cooling Tower Blow Down (TA-53-964 and 979)
- 051 - Radioactive Liquid Waste Treatment Facility (RWLTF) (TA-50-1)
- 05A055 - High Explosives Wastewater Treatment Facility (HEWTF) (TA-16-1508)

The information required includes the location of the outfall, a detailed description of all sources and processes that contribute to the discharged waste stream, the volume and frequency of the discharge, and current analytical data for each effluent waste stream. The effort has the following key milestones:

- Initial Kick-off Meeting – 6/2/11
- Outfall Surveys – 6/6/11 to 7/15/11
- Draft NPDES Permit Re-Application Review Submittal to FODs/Outfall Owners – 8/24/11
- Socialize Draft NPDES Permit Re-Application with NMED/EAP – 9/29/11 to 11/4/11
- Final NPDES Permit Re-Application Submittal to NNSA – 1/27/12
- NNSA Submittal to EPA – 2/2/12

APPENDIX P
**Sampling and Analysis Plan for Los Alamos National
Laboratory's NPDES Permit Re-Application, August 2011**

Sampling Plan
for
Los Alamos National Laboratory's
NPDES Permit Re-application

Prepared by ENV-RCRA
August 2011

Signatures

Prepared by:  Beth Gray, ENV-RCRA	Date: 9/22/11
Approved by:  Marc Bailey, ENV-RCRA Project Leader	Date: 9/22/11
Authorized by:  Michael Saladen, ENV-RCRA Team Leader	Date: 9/22/11
Authorized by:  Anthony Griggs, ENV-RCRA Group Leader	Date: 9/22/2011
Classification Review by:  Gian Bacigalupa, Derivative Classifier	Date: 9/22/2011 <input checked="" type="checkbox"/> Unclassified

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1.0 Introduction

1.1 NPDES Permits

Effluent discharges to surface waters from Laboratory operations are currently regulated under the Laboratory's National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 issued by the U.S. Environmental Protection Agency (EPA). Discharges from permitted outfalls must meet the numerical effluent limits specified in the current NPDES Permit. The Laboratory's current permit will expire on July 31, 2012. If the Laboratory is to continue activities regulated by the current permit, it must apply for a new permit 180 days prior to the expiration of the current permit.

1.2 Institutional Responsibility

When re-applying for the NPDES permit, LANL is obligated to provide the most accurate and complete characterization of discharges from industrial and sanitary outfalls included in the Laboratory's permit. Characterization of wastewater discharges will be accomplished through Lab-wide sampling as required by EPA's application Form 2C. Sampling results will be provided to EPA. The information provided in the re-application will be reviewed by EPA and forms the basis for establishing numerical effluent limits in the new NPDES permit. The following identifies the four basic factors affecting the quality of environmental data provided in the re-application: sample collection, sample preservation, sample analysis, and record management. Deficiency in any of these areas may result in poor data provided in the re-application and consequently impact the development of permit limits. Important to any sampling program is the quality of field operations. A high quality field-sampling program is based on good housekeeping, collection of representative samples, proper handling and preservation of samples, chain of custody procedures, and records management.

The Laboratory is responsible for properly operating and maintaining all facilities and systems of treatment in such a manner as to achieve compliance with the NPDES Permit. The Water Quality and RCRA Group (ENV-RCRA) administers the Laboratory's NPDES self-monitoring program (compliance sampling and outfall discharge characterization sampling for the permit re-application) and submits the data to EPA in accordance with EPA's Consolidated Permits Program.

1.3 Scope

This sampling plan documents the sampling, analysis, and record keeping procedures implemented by Water Quality & Hydrology (WQH) to insure compliance with the guidelines for the NPDES permit application set forth in EPA's Consolidated Permits Program.

Information presented in this sampling plan includes:

- Parameters to be quantified for each outfall category (and certain individual outfalls) based on EPA document "Application Form 2C- Wastewater Discharge Information".
- The methods and equipment used to collect, preserve, and analyze samples that satisfy the requirements of "Application Form 2C- Wastewater Discharge Information".
- Timetables for sampling that ensure timely submission of all relevant data requested in Application Form 2C (Rev. August 1990), *General Information*, and Form 1.
- Proper documentation of procedures and results.

2.0 Definitions

2.1 Compliance Sample

A sample collected at an NPDES outfall (using EPA approved methods) following final treatment, prior to or at the point of discharge as documented in Part II of the Laboratory's NPDES permit is a

compliance sample. Analysis of these samples must be by EPA approved methods (40 CFR 136) unless other test procedures have been specified in the Laboratory's permit or approved by the Regional Administrator or Regional Administrator designee. Compliance sampling is performed by the Laboratory's Water Quality and Hydrology Group (WQH) as an Institutional Responsibility. Analyses are performed by General Engineering Laboratories (GEL). Results are reported to EPA on Discharge Monitoring Reports (DMRs) following the end of each monitoring period. Some samples collected as part of the permit re-application process may also serve as compliance samples, and some compliance samples will be used for the re-application.

2.2 Composite Sample

The method for collecting a composite sample will include at least 3 flow proportional sample aliquots of at least 100 milliliters, collected at an NPDES outfall (using EPA approved methods) at periodic intervals during the operating hours of a facility over a 24-hour period.

For Volatile Organic Analysis (VOA), four sample aliquots (not necessary to be flow proportional) or grab samples will be collected and composited in the laboratory immediately before analysis. 24-hour composite samples will be used where possible for all other pollutants not specified under the section 2.3 "Grab Samples". Form 2C instructions state that "The Director may waive composite sampling for any outfall for which you demonstrate that use of an automatic sampler is infeasible and that a minimum of four grab samples will be representative of your discharge". EPA Region 6 indicated during the previous re-application process, that where "conditions" do not allow for composite sampling, single "grab" samples can be collected, but must be documented in the application.

2.3 Manual Grab Sample

A manual grab sample is an individual sample of at least 100 milliliters collected at a NPDES outfall at a randomly selected time over a period not exceeding 15 minutes.

Grab samples are required for pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, and fecal coliform. Grab samples were also used for other parameters per EPA Region 6 1/30/98 guidelines.

2.4 Outfall Categories

The following outfall categories are in the current NPDES permit and will have sampling performed to support the re-application:

- 01A Power-plant discharge
- 03A Treated cooling tower blowdown, evaporative coolers, chillers, condensers and air washer blowdown
- 05A High explosive waste discharges
- 13S Sanitary wastewater discharges
- 051 Radiological wastewater treatment plant discharge

2.5 Portable ISCO Sampler (3700 Series)

The portable ISCO is a battery operated, programmable, calibrated sampler capable of proportional sampling based on flow and used for composite sampling. These samplers will be used to sample over a 24-hour period and have the capability of sampling a continuous flow, or an intermittent flow (using a flow sensor). Individual manual grabs will be composited at the analytical laboratory.

2.6 Representative Sample

Samples and measurements taken for the purpose of the re-application shall be indicative of the range of values that could be expected from the complete population of values.

3.0 Safety Issues

The WQH NPDES compliance self-monitoring sampling program (which includes re-application sampling) requires comprehensive consideration of all field health and safety related issues. Sampling personnel must have knowledge of the physical, chemical, environmental, Radiological, and biological hazards present when sampling at industrial and sanitary wastewater outfalls. Prior to starting sampling activities, sampling personnel will complete an Integrated Work Document (IWD) which addresses site-specific training, hazards and controls, referenced procedures, and training.

3.1 Sampling Activities

Pre-sampling activities include scheduling, preparation of sample documentation and correspondence, and standardization/calibration of equipment. These tasks are considered administrative in nature (i.e. follow MSDS instructions and IWD for protective equipment when utilizing buffers and titrants for standardization and calibration of equipment). Detailed instructions on these tasks can be found in WQH ENV-RCRA-IWD-005 for NPDES Compliance Sampling.

Before proceeding to the outfall to be sampled, the sampler must comply with any site specific training or procedures related to sample collection required by outfall owner or Facility Manager In charge of the outfall (WQH Handbook for NPDES Compliance Sampling) and ENV-RCRA-QP-015 Field Water Quality Analysis.

3.2 Packaging and Transportation All relevant Laboratory and Department of Transportation (DOT) "Hazardous Materials Regulations" criteria will be followed when transporting collected wastewater samples; see the Hazard Control Plan (HCP).

4.0 Sample Collection

4.1 Representative Sampling

Samples and measurements taken for the purpose of permit re-application should be representative of the permitted discharge:

- Samples will be collected at the location specified for compliance sampling in the current permit.
- Sufficient volume will be collected to allow duplicate analyses and QA testing. All requirements found in 40 CFR 136 will be followed.
- An up-to-date logbook will be maintained, noting environmental conditions and field observations including processing conditions (communication with outfall contact) and date and time of grab sample collection or automatic sampler set-up/shut-down.

4.2 Required Sampling

Tables 1-8 (see Attachments) list the individual parameters requiring monitoring in Application Form 2C of EPA's Consolidated Permits Program. Table 4.1 lists outfall categories with the applicable tables of parameters requiring monitoring for that category.

Table 4.1:

Category	Required Tables	Discharge Frequency	Sampling Method
01A Power Plant Discharge	Table 1 Table 2 Table 3 Table 4	Table 5 Table 6 Table 7	Continuous discharge to the permitted outfall. Sample throughout the 24-hour period <u>composite based on flow</u>
03A Cooling Towers And Air Washers	Table 1 Table 2 Table 3 Table 4	Table 5 Table 6 Table 7	Discharges to the permitted outfall throughout the day based on conductivity of the basin water. Grab
05A High Explosive Waste Discharges	Table 1 Table 2 Table 3 Table 4	Table 6 Table 7	As needed following treatment at the H.E. Wastewater Treatment Plant Grab
13S Treated Sanitary Sewage Effluent	Table 1 Table 2 Table 3 Table 4	Table 5 Table 6 Table 7	Discharges to the permitted outfall throughout the day Use the existing ISCO Sampler installed at the chlorine contact chamber (tied in to flow level recorder).
051 Industrial Waste Treatment Plant Discharge	Table 1 Table 2 Table 3 Table 4	Table 5 Table 6 Table 7	Discharges to the permitted outfall as needed after batch treatment. Grab

4.3 Specific NPDES Permitted Outfalls to be Sampled

Outfalls to remain in the permit will be sampled for Application Form 2C parameters:

Outfall	TA-Bldg	Outfall	TA-Bldg
001	3-22	03A181	55-6
03A022	3-2238	03A199	3-1498
03A027	3-2327	051	50-1
03A048	53-963/97	13S	46-347
03A113	53-293, 4, 952,	05A055	16-1508
03A160	35-124		

4.4 Method of Collection

The method of sample collection will be determined on an outfall by outfall basis. In those instances where the guidelines in Form 2C are not feasible, Grab samples will be collected per instructions from EPA Region 6. The methods of collection will be by manual grab, 24 hr composite (at least 3 grabs of 100 milliliters each). Sufficient volume will be collected to fill the particular sample containers required by the analytical laboratory.

4.5 Collection Technique

All sample containers and sample lines/tubing will be replaced with new before sample collection in accordance with proper aseptic techniques described in 40 CFR 136. The sampler will engage proper techniques in handling the collected samples to minimize cross contamination and the number of people handling the sample. All activities associated with preparation, collection, and submission will be documented in the designated "Application Sampling" logbook. All holding times and required preservatives listed in 40 CFR 136 will be met and proper chain-of-custody procedures will be followed.

5.0 Analytical Services

5.1 Analysis Laboratory

The laboratory used to analyze the re-application samples will follow EPA approved methods (40 CFR 136) <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=585e311d3a943ef031fded1d94589fde&rgn=div8&view=text&node=40:23.0.1.1.1.0.1.3&idno=40> or as listed in NPDES Permit No. NM0028355. The laboratory will be consulted on the type and number of containers they require to satisfy the requirements of the approved EPA methods and DOE Statement of Work.

5.2 Documentation

Proper analytical request and chain-of-custody procedures will be followed in sample submission to the selected analytical laboratory. A sample tracking form will be used to verify proper turnaround times.

5.3 QA/QC

All samples will be handled in accordance with chain-of-custody procedures established by the analytical laboratory and the Department of Energy (DOE) Statement of Work. Analytical and QA/QC activities will be governed by the contracted analytical laboratory's established procedures. A minimum of 10% parameter "spikes", duplicates, and blanks will be performed by the analytical laboratory. A contracted company will validate all data packs submitted to WQH.

All samples will be handled in accordance with Water Quality and SMO chain-of-custody procedures. Analytical and QA/QC procedures will be governed by Statements of Work for Analytical Services. A qualified third party will perform data validation and verification of all data packages.

6.0 Records

6.1 Records Content

Sample forms used will include the date, location, time, sampler's name, date and time analysis was performed, individual who performed the analysis, analytical technique used and the results of such analysis.

6.2 Record Retention

The Laboratory will retain records of all monitoring information, including all calibration and maintenance records, and records of all data needed to complete the application for this permit. Records of all sampling activities will be kept for a minimum of three years or until the next re-application deadline as a historical record of the 2011 re-application process.

6.3 Submission of Results

All analytical results will be submitted to the NPDES Re-application Project Leader for documentation in the Form 2C as soon as the quality control review has been completed.

6.4 EPA Application Form 2C Table

FORM 2C Parameters

EPA 625

EPA 624

EPA 608

Pollutant
Biochemical Oxygen Demand
Chemical Oxygen Demand
Total Organic Carbon
Total Suspended Solids
Ammonia (as N):
Temperature (winter)
Temperature (summer)
pH
Bromide
Chlorine, Total Residual
Color
Fecal Coliform
Flouride
Nitrate-Nitrite (as N)
Nitrogen, Total Organic (as N)
Oil and Grease
Phosphorus (as P), Total
Alpha, Total
Beta, Total
Radium, Total
Radium 226, Total
Sulfate (as SO4)
Sulfide (as S)
Sulfite (as SO3)
Surfactants
Aluminum, Total
Barium, Total
Boron, Total
Cobalt, Total
Iron, Total
Magnesium, Total
Molybdenum, Total
Manganese, Total
Tin, Total
Titanium, Total
Antimony, Total
Arsenic, Total
Beryllium, Total
Cadmium, Total
Chromium, Total
Copper, Total
Lead, Total
Mercury, Total
Nickel, Total
Selenium, Total
Silver, Total
Thallium, Total
Zinc, Total
Cyanide, Total
Phenols, Total

Base/Neutral
Acenaphthene
Acenaphthylene
Anthracene
Benzidine
Benzo(a)Anthracene
Benzo(a)Pyrene
3,4-Benzofluoranthrene
Benzo(ghi)Perylene
Benzo(k)Fluoranthene
Bis (2-Chloroethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Chloroisopropyl) Ether
Bis (2-Ethylhexyl) Phthalate
4-Bromophenyl Phenyl Ether
Butyl Benzyl Phthalate
2-Chloronaphthalene
4-Chlorophenyl Phenyl Ether
Chrysene
Dibenzo(a,h)Anthracene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
3,3-Dichlorobenzidine
Diethyl Phthalate
Dimethyl Phthalate
Di-N-Butyl Phthalate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-N-Octyl Phthalate
1,2-Diphenylhydrazine
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)Pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitrosodimethylamine
N-Nitrosodi-N-Propylamine
N-Nitrosodiphenylamine
Phenanthrene
Pyrene
1,2,4-Trichlorobenzene
Acid
2-Chlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
4,6-Dinitro-O-Cresol
2,4-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
P-Chloro-M-Cresol
Pentachlorophenol
Phenol
2,4,6-Trichlorophenol
Dioxin
2,3,7,8-Tetrachlorodibenzo-P-Dioxin

Volatile
Acrolein
Acrylonitrile
Benzene
Bis (Chloro-methyl) Ether
Bromoform
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
2-Chloroethylvinyl Ether
Chloroform
Dichlorobromomethane
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
1,2-Dichloropropane
1,3-Dichloropropylene
Ethylbenzene
Methyl Bromide
Methyl Chloride
Methylene Chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
Toluene
1,2-Trans-Dichloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

Pesticides/PCB
Aldrin
α-BHC
β-BHC
γ-BHC
δ-BHC
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
Dieldrin
α-Endosulfan
β-Endosulfan
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Heptachlor
Heptachlor Epoxide
Toxaphene
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1018

Field
Field
Field
Field
Field

Part A
Part B
Part C