Los Alamos
NATIONAL LABORATORY

Environmental Protection & Compliance Division
Compliance Programs Group

Los Alamos National Laboratory
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Symbol: EPC-DO: 21-075
LAUR: 21-21894
Locates: NA
Date: FEB 25 2021

Ms. Nancy Williams
U.S. Environmental Protection Agency, Region 6
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN)
1201 Elm Street, Suite 500
Dallas, TX 75270

Subject: NPDES Permit No. NM0028355 Notice of Planned Change for the Radioactive Liquid Waste Treatment Facility (RLWTF) Outfall 051

Dear Mr. Weis:

The National Pollutant Discharge Elimination System (NPDES) Permit No. NM0028355 for the Nuclear Security Administration (NNSA) and Triad National Security, LLC (Triad) requires the permittee(s) to notify the U. S. Environmental Protection Agency (EPA) of any physical alterations or additions to a permitted facility that could significantly change the nature or increase the quantity of pollutants discharged (see Part III.D.1.a. Report Requirements).

This notice of planned change provides information regarding the following changes at the RLWTF:

1. Updated Table 4 of the Fact Sheet for Outfall 051 with flow rates and volumes based upon actual data from the discharges to Outfall 051 in June 2019, March 2020, and August 2020 previously provided with the Triad comments on October 26, 2020. Attachment 1 provides a red line of the Fact Sheet. This change **will not** increase the quantity of pollutants in the effluent or the volume discharged to the outfall.

2. Updated Section 5.0 of the Fact Sheet for Outfall 051 to include the analytical data from the discharges to Outfall 051 in June 2019, March 2020, and August 2020 previously provided with the Triad comments on October 26, 2020. Attachment 1 provides a red line of the Fact Sheet. This change **will not** increase the quantity of pollutants in the effluent or the volume discharged to the outfall.

3. Updated Table 3 of the Fact Sheet for Outfall 051 to add four new chemicals to the treatment process at the RLWTF. The chemicals include sodium bicarbonate, calcium carbonate, magnesium chloride, and calcium chloride will be added each effluent tank prior to its discharge to Outfall 051. The addition of these chemicals will raise the pH, alkalinity, and hardness to improve effluent quality prior to discharge. Attachment 1 provides a red line of the Fact Sheet. Attachment 2 provides Safety Data Sheets (SDS) for each chemical. This change **will not** increase the quantity of pollutants in effluent or the volume discharged to the outfall.

4. Updated Table 3 of the Fact Sheet for Outfall 051 to add sodium hypochlorite to the treatment process at the RLWTF. Sodium hypochlorite will be used to clean and/or disinfect the reverse

osmosis unit(s). Attachment 1 provides a red line of the Fact Sheet. Attachment 2 provides Safety Data Sheets (SDS). This change **will not** increase the quantity of pollutants in effluent or the volume discharged to the outfall.

5. Piping modification to improve the effluent discharge line to Outfall 051. The modification will remove the flexible hose effluent line that currently connects to the outfall discharge line and replace it with hard pipe routed through an underground trench box to the outfall discharge line. Attachment 3 provides drawings that show the existing flexible hose and the new piping and trench box. This change **will not** increase the quantity of pollutants in the effluent or the volume discharged to the outfall.

The NNSA/DOE and Triad respectfully submit the contents of this notice of change in accordance with the existing NPDES Permit NM0028355 and request that the information be included in the record in accordance with the provisions identified in the Public Notice: Los Alamos National Laboratory (LANL) Limited Reopening of the Public Comment Period for NPDES Permit No. NM0028355. If you need additional information or have questions, please contact Karen Armijo, DOE/NNSA, at 505-665-7314 or Jennifer Griffin, Triad, at 505-667-6741.

Sincerely,

TAUNIA VAN VALKENBURG (Affiliate)

Digitally signed by TAUNIA VAN VALKENBURG (Affiliate)
Date: 2021.02.25 15:32:53 -07'00'

Taunia Van Valkenburg
Environmental Protection and Compliance Division - Compliance Programs
Group Leader

Attachment(s): Attachment 1 NPDES-FS-18-010-R.2, Outfall 051 Fact Sheet [February 2021]
Attachment 2 Safety Data Sheets for Additional Treatment Chemicals
Attachment 3 Drawings for Improved Piping Modification to Route Aboveground Portion of Effluent Discharge Line into a Trench Box

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ATTACHMENT 1

NPDES-FS-18-010-R.2, Outfall Fact Sheet [February 2021]

EPC-DO: 21-075

LA-UR-21-21894

Date: FEB 25 2021

Industrial and Sanitary Outfalls 2019 NPDES Permit Re-Application Outfall 051 Fact Sheet

TA-55 Facility Operations
TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF)

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Table of Contents

List of Tables

Revision Log

Revision No.	Date	Page Nos.	Change Description
0	3/19/2019	NA	Original
1	7/31/2019	Page 6, Table 3	Deleted the concentration percentage for sodium hydroxide in Table 3. Deleted WEST W-126 from the table.
		Page 8, Table 5	Deleted 2-propanoic acid from the table because it was only associated with WEST W-126. WEST W-126 was the only chemical that included 2-propanoic acid.
		Page 8, Table 5	Revised Table 5 to include those chemicals identified on approved Waste Stream Profiles (WSPs) only. The previous table included all WSPs including those pending approval. Many of the ~~the~~ WSPs that were pending approval were canceled or otherwise not approved due to non-compliance with the Waste Acceptance Criteria for the RWLTF.
		Attachment D, page D-72	Replaced the MSDS for Caustic Soda/Sodium Hydroxide with a current SDS
		Attachment D, page D-95	Deleted the MSDS for WEST W-126. This chemical is no longer in use at the RLWTF.
2	2/22/21	Section 2.2. Page 5 and 6	Corrected the process description to make it easier to understand.
		-Table 3, Page 6	Added 5 chemicals to the table. Four of the chemicals are used to adjust hardness and alkalinity of the effluent prior to discharge. The fifth chemical is used to clean/disinfect equipment.
		-Table 4, Page 7	Updated the table with flow data from discharges performed in June 2019, March 2020, and August 2020. This data was submitted to EPA with the Triad Comments on October 26, 2020.
		Section 5.1, Page 7	Added statements regarding the use of analytical data from discharges performed in June 2019, March 2020, and August 2020. This data was submitted to EPA with the Triad Comments on October 26, 2020.

INDUSTRIAL AND SANITARY OUTFALLS 2019 NPDES PERMIT RE-APPLICATION OUTFALL 051 FACT SHEET

1.0 OUTFALL LOCATION [Section I]

Outfall ID No.:	051	**Outfall Location:**	TA-50
Category:	Radioactive Liquid Waste Discharge	**Originating Structure for the Discharge:**	TA-50-1
Flow Type:	Intermittent (batch)	**Receiving Stream:**	Effluent Canyon, Tributary to Mortandad Canyon, Water Quality Segment 20.6.4.128 NMAC
Longitude:	106° 17' 54" W	**Latitude:**	35° 51' 54" N

2.0 FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES [Section II]

Outfall 051 is located at TA-50 and discharges to Effluent Canyon which is a tributary to Mortandad Canyon in Water Quality Segment 20.6.4.128 NMAC. The outfall discharges treated radioactive liquid waste effluent from that originates at TA-50-1. Attachment A provides a location map. The discharge is comprised of treated effluent from the Radioactive Liquid Waste Treatment Facility (RLWTF). Table 1 identifies the discharge source, the source location, and source composition.

Table 1
Sources for Discharges to Outfall 051

TA	Buildings	Types	Transportation Mode (Piping, Truck etc.)	Discharge Source Description	Source Composition
50	1, 66, 230, 248, 250, 257, 261	Process Cooling Storm Water	Piping, Truck	Radioactive Liquid Waste Treatment Facility (RLWTF)	Treated effluent from the RLWTF.
52	181, 183				

2.1 Process Schematic and Water Balance [II.A]

A process schematic line drawing that shows the route taken by water from intake to the discharge at Outfall 051 is provided in Attachment B. This drawing includes all operations that contribute process water to the discharge at the outfall. A water balance is also provided on the process schematic with average flows. The water balance is based upon actual data collected from operations personnel.

2.2 Water Treatment Processes [II.B]

The RLWTF receives and treats radioactive liquid waste (RLW) process, cooling, and/or storm water from various generator facilities located throughout the Los Alamos National Laboratory (LANL). All wastewater that is discharged to the facility must comply with the facility's Waste Acceptance Criteria and must have a completed and approved Waste Stream Profile Form prior to its discharge. The RLWTF consists of (a) an underground collection system (double walled piping and vaults) that conveys water to Technical Area (TA) 50 from generators at LANL; (b) structures located at TA-50 that house treatment operations and the mechanical evaporator system (MES) located at TA-50-257; and (c) Solar Evaporation Tanks (SET) located at TA-52-181 and 183. The RLWTF treatment operations are centralized at TA-50-1, which houses the treatment equipment, process tanks, analytical laboratories, and offices. Structures adjacent to TA-50-1 provide low level waste (LLW) influent and emergency storage (TA-50-250), transuranic (TRU) influent storage (TA-50-66), secondary waste storage (TA-50-248), and mechanical evaporation (TA-50-257). The treatment operations are divided into the following:

- **Main LLW Treatment Process:** Consists of LLW influent collection, LLW influent storage, LLW treatment, and discharge of treated effluent water to the environment. The treatment process includes the addition of chemicals to the influent in reaction tanks, filtration, ion exchange, and reverse osmosis (RO). Treated effluent may be discharged to the NPDES Outfall 051, the SET located at TA-52, or the mechanical evaporation system (MES) located at TA-50-257. The main LLW treatment process generates solids/sludge and RO concentrate that is routed to the secondary treatment process.

- **TRU Treatment Process:** Consists of influent collection, influent storage, TRU treatment, ~~and~~ sludge concentration, and sludge solidification. The treatment process includes addition of chemicals and filtration. The

treated effluent ~~water from the TRU treatment process~~ is ~~not~~ discharged to the LLW influent tanks or directly to the LLW treatment process. ~~to the environment. Treated effluent water either receives additional treatment in the Secondary RO or it is sent to the bottoms storage tanks located at TA-50-248~~. Sludge from the TRU treatment process is concentrated, solidified with cement in a drum tumbler, and shipped to the Waste Isolation Pilot Plant as a solid TRU waste for disposal.

- **Secondary Treatment Process**: Consists of a rotary vacuum filter to treat sludge from the main LLW treatment process, a secondary RO, ~~to treat RO concentration from the main LLW treatment process and/or effluent from the TRU treatment process,~~ and bottoms storage tanks located at TA-50-248 ~~for RO concentrate~~. Treated water is either stored as bottoms or routed back to the main LLW reaction tanks. Sludge from the rotary vacuum filter is drummed and shipped offsite for disposal as LLW radioactive solid waste. Bottoms from the storage tanks are shipped offsite in tanker trucks for disposal as LLW radioactive solid waste.

Table 2 identifies the wastewater treatment codes associated with the RLWTF. Attachment B provides a schematic of the buildings and vaults associated with the influent collection system. The vaults are monitored by radio signal and/or process logic controller at the facility to ensure that there are no leaks into the double walled piping. Photographs are provided in Attachment C.

Table 2
Wastewater Treatment Codes Assigned to Outfall 051

Treatment Code	Description	Justification
1F	Evaporation	Mechanical Evaporator (MES) and Solar Evaporation Tanks (SET)
1O	Mixing	Various Storage and Reaction Tanks
1S	Reverse Osmosis (RO) (Hyperfiltration)	Primary RO Unit
1U	Sedimentation (Settling)	Sludge
2C	Chemical Precipitation	Chemical precipitation of radionuclides in reaction tanks.
2J	Ion Exchange	Removal of Perchlorate using ion exchange.
2K	Neutralization	Influent and Room 60 Neutralization
5Q	Landfill	Drums of TRU Waste
5R	Pressure Filtration	Pressure Filter
5U	Vacuum Filtration	Rotary Vacuum filter for low level waste sludge

The water treatment processes identified in Table 2 utilize chemicals to promote precipitation, adjust pH, clean membranes, and/or otherwise treat the radioactive liquid wastewater. Table 3 provides a list of the chemicals used at the RLWTF.

Table 3
List of Treatment Chemicals used in the Operations that Contribute to Outfall 051

Source	Chemical Name	Reason for Use	Toxic Pollutant and/or Hazardous Substances Table 2C-3 or 2C-4	
Radioactive Liquid Waste Treatment Facility	EDTA	Membrane Cleaning	EDTA	2C-4
	Ferric Sulfate	Promote Precipitation/Flocculation	Ferric Sulfate Sulfuric Acid	2C-4
	Hydrochloric Acid	Membrane Cleaning	Hydrochloric acid	2C-4
	Magnesium Hydroxide	Promote Precipitation/Flocculation	NA	NA
	Magnesium Sulfate	Precipitation/Flocculation	NA	NA
	SIR-110	Ion Exchange Resin	NA	NA
	Sodium Bisulfite	Membrane Cleaning	Sodium Bisulfite	2C-4
	Sodium Hydroxide	Raising pH, Promote Precipitation, Flocculation, and Membrane Cleaning	Sodium Hydroxide	2C-4
	Sulfuric Acid	pH Adjustment	Sulfuric acid	2C-4
	Sodium bicarbonate	Alkalinity Adjustment	NA	NA
	Calcium carbonate	Hardness Adjustment	NA	NA
	Magnesium chloride	Hardness Adjustment	NA	NA
	Calcium Chloride	Hardness Adjustment	NA	NA

Table 3 List of Treatment Chemicals used in the Operations that Contribute to Outfall 051				
Source	Chemical Name	Reason for Use	Toxic Pollutant and/or Hazardous Substances Table 2C-3 or 2C-4	
	Sodium Hypochlorite	Clean/Disinfect	Sodium Hypochlorite	2C-4
	Bright Dyes FLT Yellow-Green Liquid	Water Line and Drain Tracing Dye	NA	NA
	Bright Dyes FLT Yellow-Green Tablet	Water Line and Drain Tracing Dye	NA	NA

EDTA = Ethylene Diamine Tetraacetic Acid

2.3 Discharge Rate and Frequency [II.C]

The discharge rates and frequencies for Outfall 051 are provided in Table 4.

Table 4 Discharge Rates and Frequencies for Outfall 051							
Source [a]	Frequency		Flow Rates and Volumes				
	Days/Week	Months	Average (MGD)	Maximum (MGD)	Average Volume (GPD)	Maximum Volume (GPD)	Duration (days)
Radioactive Liquid Waste Treatment Facility	4	12	~~0.020~~0.0159	~~0.040~~0.0213	~~20,000~~15,936	~~39,840~~21,345	208

a. ~~Estimated based on the operating parameters of the Effluent Storage Tanks.~~Calculated based upon discharges in June 2019, March 2020, and August 2020.

GPD = gallons per day; MGD = million gallons per day

3.0 PRODUCTION [Section III]

Section III is not applicable to Outfall 051.

4.0 IMPROVEMENTS [Section IV]

Future improvements to the treatment processes at the RLWTF includes the startup of a newly constructed main low-level waste treatment facility located at TA-50-230 and 261. The new facility utilizes the same treatment/process technologies as the existing facility described in Section 2.2 (e.g., neutralization, reverse osmosis) and is expected to complete startup testing in 2019 with an estimated operational start date in2023. A Notice of Change will be submitted for this change prior to the start of operations and impact to the outfall. The startup of the new facility is not expected to impact the outfall location, flowrates, and discharge frequency provided in Table 4. A red lined schematic and a process flow diagram for the new facility are provided in Attachment D.

5.0 INTAKE AND EFFLUENT CHARACTERISTICS [Section V]

5.1 Analytical Data [V.A, B, and C]

The analytical results provided for the Outfall 051 Permit Reapplication on the Form 2C were provided from the following sources:

- Operational s~~S~~amples collected on September 26, 2018 and shipped to an independent laboratory for analysis.
- Field samples collected and analyzed on August 26, 2018 for temperature, residual chlorine, and pH.
- Field samples collected and analyzed on February 5, 2019 for sulfite.
- Compliance samples collected from discharges to Outfall 051 on June 18, 2019, March 10, 2020, and August 18, 2020.
- Hardness (long term average) = ~~17.3~~75.2 mg/L ($CaCO_3$)

Revision 0 of the Fact Sheet did not includes a~~A~~ discharge monitoring report summary ~~is not provided for Outfall 051 because the effluent form the RLWTF was not discharged to Effluent Canyon between October 2014 and September 2018. Effluent from the RLWTF was routed to the MES.~~ because there were no effluent discharges to the outfall prior to the submittal of the permit application in March 2019. Discharge monitoring and reporting was performed for discharges to Outfall 051 on June 18, 2019, March 10, 2020, and August 18, 2020. A discharge monitoring summary and Form 2C Crosswalk was submitted as Enclosure 5 of EPC-DO-20-096, Triad Comments on the Draft Industrial and Sanitary Wastewater NPDES Permit No. NM0028355 Published for Public Comment on November 30, 2019 that was submitted on October 26, 2020.

5.2 Potential Pollutants [V.D]

The treatment chemicals associated with the RLWTF and the content of the wastewaters treated by the RLWTF constitute the pollutant load of the discharge to Outfall 051. Table 5 identifies the Table 2C-3 and 2C-4 pollutants by discharge source. It also identifies those pollutants (if any) that were detected in the analytical results from the samples collected for the 2019 Permit Application.

Table 5
Potential Pollutants by Source for Outfall 051

Source Description	POTENTIAL Toxic Pollutant and/or Hazardous Substances Table 2C-3 or 2C-4		Analytical Data Results from Operational Samples Collected for Outfall 051 [a]
Effluent from the Radioactive Liquid Waste Treatment Facility (RLWTF) - Chemicals used during treatment at the RLWTF.	EDTA	2C-4	pH = 6.1 – 8.9 S.U.
	Ferric Sulfate	2C-4	Iron = 46.4 ug/L, Sulfate = 54.3 mg/L
	Sulfuric Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Hydrochloric Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Sodium Bisulfite	2C-4	Sulfite was not detected.
	Sodium Hydroxide	2C-4	pH = 6.1 – 8.9 S.U.
Effluent from the RLWTF - Chemicals identified on approved waste stream profile forms associated with the wastewaters discharged to the RLWTF for treatment.	Acetic Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Acetone [b]	2C-4	Not analyzed. [c]
	Acrolein	2C-4	Not detected.
	Ammonia	2C-4	Ammonia = 1.17 mg/L
	Ammonium Acetate	2C-4	Ammonia = 1.17 mg/L
	Ammonium Biflouride	2C-4	Ammonia = 1.17 mg/L Fluoride = 0.198 mg/L
	Ammonium Hydroxide	2C-4	Ammonia = 1.17 mg/L
	Ammonium Thiocyanate	2C-4	Ammonia = 1.17 mg/L
	Benzene [b]	2C-4	Not detected.
	Benzoic Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Calcium Chloride	2C-4	Residual Chlorine < 0.5 mg/L
	Carbon Disulfide [b]	2C-3 & 2C-4	Not analyzed. [c]
	Chlorine	2C-4	Residual Chlorine <0.5 mg/L
	Chlorobenzene [b]	2C-4	Not detected.
	Dichlorobenzene	2C-4	Not detected.
	Dichloropropene	2C-4	Not detected.
	EDTA	2C-4	pH = 6.1 – 8.9 S.U.
	Ethylbenzene	2C-4	Not detected.
	Ferric Chloride	2C-4	Residual Chlorine < 0.5 mg/L
	Ferric Sulfate	2C-4	
	Formic Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Hydrochloric Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Hydrofluoric Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Naphthalene	2C-4	Not detected
	Nitric Acid	2C-4	pH = 6.1 – 8.9 S.U. Nitrate = 7.63 mg/L
	Phosphoric Acid	2C-4	pH = 6.1 – 8.9 S.U. Total Phosphorus was not detected

Table 5 Potential Pollutants by Source for Outfall 051			
Source Description	**POTENTIAL Toxic Pollutant and/or Hazardous Substances Table 2C-3 or 2C-4**		**Analytical Data Results from Operational Samples Collected for Outfall 051 [a]**
	Potassium Hydroxide	2C-4	pH = 6.1 – 8.9 S.U.
	Sodium	2C-4	Not analyzed. [c]
	Sodium Fluoride	2C-4	Fluoride = 0.198 mg/L
	Sodium Hydroxide	2C-4	pH = 6.1 – 8.9 S.U.
	Sodium Hypochlorite	2C-4	Residual Chlorine < 0.5 mg/L
	Sodium Nitrite	2C-4	Nitrate = 7.63 mg/L
	Sodium Phosphate	2C-4	Total Phosphorus was not detected.
	Strontium	2C-3	Not analyzed. [c]
	Sulfuric Acid	2C-4	pH = 6.1 – 8.9 S.U.
	Toluene [b]	2C-4	Not detected.
	Trichloroethylene [b]	2C-4	Not detected.
	Uranium	2C-3	Not analyzed. [c]
	Vanadium	2C-3	Not analyzed. [c]
	Vanadyl Sulfate	2C-4	Sulfate = 54.3 mg/L

a. Results are from operational samples collected from the RLWTF Effluent Tanks. These samples are representative of the effluent after final treatment and the potential discharge to Outfall 051.
b. The potential pollutant was determined to not be associated with a "Listed" Resource Conservation and Recovery Act (RCRA) hazardous waste at the point of generation. This waste determination was documented with the associated waste stream profile form and in the waste characterization and tracking system database.
c. The potential pollutant was not analyzed because it is not specifically called out on the Form 2C.

EDTA = Ethylene Diamine Tetraacetic Acid

The safety data sheets associated with the chemicals used to treat water at the RLWTF are provided in Attachment E.

6.0 POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS [Section VI]

Section VI is not applicable to Outfall 051.

7.0 BIOLOGICAL TOXICITY TESTING DATA [Section VII]

Whole Effluent Toxicity (WET) 48-hr acute lethality was performed on September 24, 2018 to determine the results at a critical dilution of 100% using a dilution series of 32%, 42%, 56%, 75%, and 100%. The methods used in conducting these tests followed the guidelines stablished by the EPA manual "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition" (EPA-821-R-02-012). The WET including the following criteria as required by the permit:

- Daphnia pulex, 3-hr composite, 1/3 months

The WET test results indicated that the effluent from Outfall 051 passed the test for Daphnia pulex .

8.0 CONTRACT ANALYSIS INFORMATION [Section VIII]

Operational samples from the RWLTF effluent were collected on September 26, 2018 for the Form 2C constituents required by the permit application forms. These samples were submitted to independent laboratories as summarized in Table 6.

Table 6 List of Independent Laboratories Used for NPDES Water Analysis		
Laboratory Name	**Address and Contact Info**	**Analytes**
GEL Laboratories LLC	2040 Savage Road Charleston SC 29407 (843) 556-8171	Biological Oxygen Demand, General Chemistry, Pesticides, Polychlorinated Biphenyls, Radiochemistry, Semi-volatile Organic Compounds, Total Metals, Total Suspended Solids, Volatile Organic Compounds

Table 6
List of Independent Laboratories Used for NPDES Water Analysis

Laboratory Name	Address and Contact Info	Analytes
New Mexico Water Testing Laboratory, Inc.	401 North Coronado Ave Espanola, NM 87532 (505) 929-4545	E.coli
Cape Fear Analytical LLC	3306 Kitty Hawk Road Suite 120 Wilmington, NC 28405 (910) 795-0421	TCDD (Dioxin)
Pacific EcoRisk	2250 Cordelia Rd. Fairfield, CA 94534 (707) 207-7760	Whole Effluent Toxicity

ATTACHMENT 2

Safety Data Sheets for Additional Treatment Chemicals

EPC-DO: 21-075

LA-UR-21-21894

Date: FEB 25 2021

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 29-Jan-2010 **Revision Date** 18-Jan-2018 **Revision Number** 6

1. Identification

Product Name Sodium bicarbonate

Cat No. : S233-3; S233-10; S23310LC; S233-50; S233-300LB; S233-500; S635-3; S637-12; S637-50; S63750LC; S637-212; XXS637GPD350LB; NC1205558; XXS631PET25KG; NC0710541; NC1150577; NC1522424

CAS-No 144-55-8
Synonyms Sodium hydrogen carbonate; Sodium acid carbonate; Carbonic acid, monosodium salt (Crystalline/Powder/Certified ACS/USP/FCC/EP/BP/WP/JP)

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Sodium bicarbonate	144-55-8	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Move to fresh air. Get medical attention immediately if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products
Sodium oxides
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	1	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.
Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Avoid ingestion and inhalation. Avoid contact with skin, eyes and clothing. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	8.3 0.1M aq. solution
Melting Point/Range	270 °C / 518 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	> 50°C
Viscosity	Not applicable
Molecular Formula	C H Na O3
Molecular Weight	84.01

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Avoid dust formation. Incompatible products. Exposure to moist air or water. Excess heat. Temperatures above 50°C.

Incompatible Materials Strong oxidizing agents, Acids

Hazardous Decomposition Products Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological Information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium bicarbonate	LD50 = 4220 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium bicarbonate	144-55-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium bicarbonate	EC50: 650 mg/L/120h	LC50: 8250 - 9000 mg/L, 96h static (Lepomis macrochirus)	-	EC50: 2350 mg/L/48h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium bicarbonate	X	X	-	205-633-8	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 29-Jan-2010
Revision Date 18-Jan-2018
Print Date 18-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
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End of SDS

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 15-Oct-2009 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name Sodium carbonate anhydrous

Cat No. : 10861

CAS-No 497-19-8
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Serious Eye Damage/Eye Irritation	Category 2

Label Elements

Signal Word
Warning

Hazard Statements
Causes serious eye irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Keep only in original container
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Spills
Absorb spillage to prevent material damage
Storage
Store in a dry place. Store in a closed container
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Sodium carbonate	497-19-8	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Inhalation Remove to fresh air. If symptoms arise, call a physician. If not breathing, give artificial respiration.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point Not applicable
Method - No information available

Autoignition Temperature

Explosion Limits
Upper No data available

Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Sodium oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	1	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Avoid ingestion and inhalation. Wash hands before breaks and immediately after handling the product.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.
Engineering Measures	Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	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. Tight sealing safety goggles.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	11.3 @ 20°C (10 g/l aq.sol)
Melting Point/Range	854 °C / 1569.2 °F
Boiling Point/Range	1600 °C / 2912 °F @ 760 mmHg
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid,gas)	Not flammable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	2.53
Bulk Density	500-800 kg/m^3
Solubility	Partially soluble
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C Na2 O3
Molecular Weight	105.99

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Avoid dust formation. Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Strong acids, Fluorine, Metals

Hazardous Decomposition Products Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium carbonate	2800 mg/kg (Rat)	> 2000 mg/kg (rabbit)	2.3 mg/l 2h (Rat)

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium carbonate	497-19-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains. .

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium carbonate	EC50: = 242 mg/L, 120h (Nitzschia)	Lepomis macrochirus: LC50: 300 mg/L/96h Gambusia affinis: LC50: 740 mg/L/96h	-	EC50: = 265 mg/L, 48h (Daphnia magna)

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Sodium carbonate	497-19-8	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Sodium carbonate	497-19-8	X	-	207-838-8	X	X	X	X	KE-31380

U.S. Federal Regulations

SARA 313	Not applicable
SARA 311/312 Hazard Categories	See section 2 for more information
CWA (Clean Water Act)	Not applicable
Clean Air Act	Not applicable
OSHA - Occupational Safety and Health Administration	Not applicable
CERCLA	Not applicable
California Proposition 65	This product does not contain any Proposition 65 chemicals.
U.S. State Right-to-Know Regulations	Not applicable
U.S. Department of Transportation	
Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N
U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Health, Safety and Environmental Department Email: tech@alfa.com www.alfa.com
Creation Date	15-Oct-2009
Revision Date	14-Feb-2020
Print Date	14-Feb-2020
Revision Summary	SDS authoring systems update, replaces ChemGes SDS No. 497-19-8/1.

Disclaimer

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End of SDS

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 09-Feb-2010 **Revision Date** 17-Jan-2018 **Revision Number** 5

1. Identification

Product Name Magnesium chloride hexahydrate

Cat No. : M35-12; M35-212; M35-500; M35SAM-1; M35SAM-2; M35SAM-3; XXM3550LB; NC1767692

CAS-No 7791-18-6
Synonyms Magnesium dichloride hexahydrate

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Magnesium chloride hexahydrate **Revision Date** 17-Jan-2018

Component	CAS-No	Weight %
Magnesium chloride, hexahydrate	7791-18-6	>95
Magnesium chloride	7786-30-3	-

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Chlorine. Magnesium oxides. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	0	1	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Ensure adequate ventilation. Wear personal protective equipment/face protection. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a cool, well-ventilated place. Refer product specification and/or label for storage temperature range.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	5-6.5 5% aq. solution
Melting Point/Range	117 °C / 242.6 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	> 106°C
Viscosity	Not applicable
Molecular Formula	Cl2 Mg . 6 H2 O
Molecular Weight	203.31

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Avoid dust formation.

Incompatible Materials Metals

Hazardous Decomposition Products Chlorine, Magnesium oxides, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Magnesium chloride, hexahydrate	LD50 = 8100 mg/kg (Rat)	Not listed	Not listed
Magnesium chloride	LD50 = 2800 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause skin, eye, and respiratory tract irritation

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Magnesium chloride, hexahydrate	7791-18-6	Not listed	Not listed	Not listed	Not listed	Not listed
Magnesium chloride	7786-30-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea

Magnesium chloride	EC50: 2200 mg/L/72h	Pimephales promelas: EC50: 2.12 g/L:96H	EC50 Pseudomonas putida: EC50:26,14 g/L/h Photobacterium phosphoreum: EC50: 36,3 mg/L/30 min Photobacterium phosphoreum: EC50: 77,2 mg/L/24 h	EC50 : 1400 mg/L/24h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Magnesium chloride, hexahydrate	7791-18-6	-	-	-
Magnesium chloride	7786-30-3	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Magnesium chloride, hexahydrate	7791-18-6	-	-	-	X	X	X	X	-
Magnesium chloride	7786-30-3	X	-	232-094-6	X	X	X	X	KE-22691

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Not applicable

Health Administration

CERCLA	Not applicable
California Proposition 65	This product does not contain any Proposition 65 chemicals.
U.S. State Right-to-Know Regulations	Not applicable
U.S. Department of Transportation	
Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N
U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	09-Feb-2010
Revision Date	17-Jan-2018
Print Date	17-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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End of SDS

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 14-Aug-2009 **Revision Date** 17-Jan-2018 **Revision Number** 4

1. Identification

Product Name Calcium chloride dihydrate

Cat No. : C69-50; C69-500; C69-500LC; C70-500; C79-3; C79-3LC; C79-500; XXC6912KG; NC1773041

CAS-No 10035-04-8
Synonyms (Crystals/Powder/Granules/USP/FCC/EP/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Serious Eye Damage/Eye Irritation	Category 2

Label Elements

Signal Word
Warning

Hazard Statements
Causes serious eye irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Calcium chloride, dihydrate	10035-04-8	>95
Calcium chloride	10043-52-4	-

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Hazardous Combustion Products
Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	1	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation. Wash hands before breaks and immediately after handling the product.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Beige - White
Odor	Odorless
Odor Threshold	No information available
pH	4.5-6.5 100 g/l aq. sol

Melting Point/Range	175 °C / 347 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	0.830
Solubility	1000 g/L @ 0 °C
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Ca Cl2 . 2 H2 O
Molecular Weight	147.02

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Calcium chloride	2301 mg/kg (Rat)	LD50 > 5000 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Calcium chloride, dihydrate	10035-04-8	Not listed	Not listed	Not listed	Not listed	Not listed
Calcium chloride	10043-52-4	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Calcium chloride, dihydrate	-	Lepomis macrochirus: LC50: 10650 mg/L/96h	-	EC50: 3005 mg/L/48h
Calcium chloride	Not listed	Lepomis macrochirus: LC50: 10650 mg/L/96h	Not listed	EC50: 52 mg/L/48h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Calcium chloride, dihydrate	0.05

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Calcium chloride, dihydrate	10035-04-8	-	-	-
Calcium chloride	10043-52-4	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Calcium chloride, dihydrate	10035-04-8	-	-	-	X	X	X	X	-
Calcium chloride	10043-52-4	X	-	233-140-8	X	X	X	X	KE-04496

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other Information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 14-Aug-2009
Revision Date 17-Jan-2018
Print Date 17-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information

relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

THE CLOROX COMPANY

SAFETY DATA SHEET

Issuing Date January 5, 2015 **Revision Date** June 12, 2015 **Revision Number** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name **Clorox® Regular-Bleach$_1$**

Other means of identification

EPA Registration Number 5813-100

Recommended use of the chemical and restrictions on use

Recommended use Household disinfecting, sanitizing, and laundry bleach

Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier Address
The Clorox Company
1221 Broadway
Oakland, CA 94612

Phone: 1-510-271-7000

Emergency telephone number

Emergency Phone Numbers For Medical Emergencies, call: 1-800-446-1014
For Transportation Emergencies, call Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

GHS Label elements, including precautionary statements

Emergency Overview

Signal word **Danger**

Hazard Statements
Causes severe skin burns and eye damage
Causes serious eye damage

Appearance Clear, pale yellow **Physical State** Thin liquid **Odor** Bleach

Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling.
Wear protective gloves, protective clothing, face protection, and eye protection such as safety glasses.

Precautionary Statements - Response

Immediately call a poison center or doctor.
If swallowed: Rinse mouth. Do NOT induce vomiting.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
Wash contaminated clothing before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Specific treatment (see supplemental first aid instructions on this label).
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Precautionary Statements - Storage

Store locked up.

Precautionary Statements - Disposal

Dispose of contents in accordance with all applicable federal, state, and local regulations.

Hazards not otherwise classified (HNOC)

Although not expected, heart conditions or chronic respiratory problems such as asthma, chronic bronchitis, or obstructive lung disease may be aggravated by exposure to high concentrations of vapor or mist.

Product contains a strong oxidizer. Always flush drains before and after use.

Unknown Toxicity
Not applicable.

Other information
Very toxic to aquatic life with long lasting effects.

Interactions with Other Chemicals
Reacts with other household chemicals such as toilet bowl cleaners, rust removers, acids, or products containing ammonia to produce hazardous irritating gases, such as chlorine and other chlorinated compounds.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %	Trade Secret
Sodium hypochlorite	7681-52-9	5 - 10	*

* The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice Call a poison control center or doctor immediately for treatment advice. Show this safety data sheet to the doctor in attendance.

Eye Contact Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Skin Contact 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.

Inhalation Move to fresh air. If breathing is affected, call a doctor.

Ingestion Have person sip a glassful of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person. Call a poison control center or doctor immediately for treatment advice.

Protection of First-aiders Avoid contact with skin, eyes, and clothing. Use personal protective equipment as required. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects Burning of eyes and skin.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically. Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
CAUTION: Use of water spray when fighting fire may be inefficient.

Specific Hazards Arising from the Chemical
This product causes burns to eyes, skin, and mucous membranes. Thermal decomposition can release sodium chlorate and irritating gases and vapors.

Explosion Data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Avoid contact with eyes, skin, and clothing. Ensure adequate ventilation. Use personal protective equipment as required. For spills of multiple products, responders should evaluate the MSDSs 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.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental Precautions This product is toxic to fish, aquatic invertebrates, oysters, and shrimp. Do not allow product to enter storm drains, lakes, or streams. See Section 12 for ecological Information.

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Absorb and containerize. Wash residual down to sanitary sewer. Contact the sanitary treatment facility in advance to assure ability to process washed-down material.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes, and clothing. Do not eat, drink, or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage Store away from children. Reclose cap tightly after each use. Store this product upright in a cool, dry area, away from direct sunlight and heat to avoid deterioration. Do not contaminate food or feed by storage of this product.

Incompatible Products Toilet bowl cleaners, rust removers, acids, and products containing ammonia.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium hypochlorite 7681-52-9	None	None	None

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Appropriate engineering controls

Engineering Measures
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/Face Protection If splashes are likely to occur: Wear safety glasses with side shields (or goggles) or face shield.

Skin and Body Protection Wear rubber or neoprene gloves and protective clothing such as long-sleeved shirt.

Respiratory Protection If irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Wash hands after direct contact. Do not wear product-contaminated clothing for prolonged periods. Remove and wash contaminated clothing before re-use. Do not eat, drink, or smoke when using this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical State	Thin liquid		
Appearance	Clear	**Odor**	Bleach
Color	Pale yellow	**Odor Threshold**	No information available

Property	**Values**	**Remarks/ Method**
pH	~12	None known
Melting/freezing point	No data available	None known
Boiling point / boiling range	No data available	None known
Flash Point	Not flammable	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limits in Air		
Upper flammability limit	No data available	None known
Lower flammability limit	No data available	None known
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Specific Gravity	~1.1	None known
Water Solubility	Soluble	None known
Solubility in other solvents	No data available	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known
Explosive Properties	Not explosive	
Oxidizing Properties	No data available	

Other Information

Softening Point	No data available
VOC Content (%)	No data available
Particle Size	No data available
Particle Size Distribution	No data available

10. STABILITY AND REACTIVITY

Reactivity
Reacts with other household chemicals such as toilet bowl cleaners, rust removers, acids, or products containing ammonia to produce hazardous irritating gases, such as chlorine and other chlorinated compounds.

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
None known based on information supplied.

Incompatible materials
Toilet bowl cleaners, rust removers, acids, and products containing ammonia.

Hazardous Decomposition Products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation Exposure to vapor or mist may irritate respiratory tract and cause coughing. Inhalation of high concentrations may cause pulmonary edema.

Eye Contact Corrosive. May cause severe damage to eyes.

Skin Contact May cause severe irritation to skin. Prolonged contact may cause burns to skin.

Ingestion Ingestion may cause burns to gastrointestinal tract and respiratory tract, nausea, vomiting, and diarrhea.

Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium hypochlorite 7681-52-9	8200 mg/kg (Rat)	>10000 mg/kg (Rabbit)	-

Information on toxicological effects

Symptoms May cause redness and tearing of the eyes. May cause burns to eyes. May cause redness or burns to skin. Inhalation may cause coughing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.

Mutagenic Effects No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Sodium hypochlorite 7681-52-9	-	Group 3	-	-

IARC (International Agency for Research on Cancer)
Group 3 - Not Classifiable as to Carcinogenicity in Humans

Reproductive Toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.
Chronic Toxicity Carcinogenic potential is unknown.
Target Organ Effects Respiratory system, eyes, skin, gastrointestinal tract (GI).

Aspiration Hazard No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)
54 g/kg
ATEmix (inhalation-dust/mist)
58 mg/L

12. ECOLOGICAL INFORMATION

Ecotoxicity
Very toxic to aquatic life with long lasting effects.

This product is toxic to fish, aquatic invertebrates, oysters, and shrimp. Do not allow product to enter storm drains, lakes, or streams.

Persistence and Degradability
No information available.

Bioaccumulation
No information available.

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Disposal methods
Dispose of in accordance with all applicable federal, state, and local regulations. Do not contaminate food or feed by disposal of this product.

Contaminated Packaging
Do not reuse empty containers. Dispose of in accordance with all applicable federal, state, and local regulations.

14. TRANSPORT INFORMATION

DOT	Not restricted.
TDG	Not restricted for road or rail.
ICAO	Not restricted, as per Special Provision A197, Environmentally Hazardous Substance exception.
IATA	Not restricted, as per Special Provision A197, Environmentally Hazardous Substance exception.
IMDG/IMO	Not restricted, as per IMDG Code 2.10.2.7, Marine Pollutant exception.

15. REGULATORY INFORMATION

Chemical Inventories

TSCA	All components of this product are either on the TSCA 8(b) Inventory or otherwise exempt from listing.
DSL/NDSL	All components are on the DSL or NDSL.

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium hypochlorite 7681-52-9	100 lb			X

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Sodium hypochlorite 7681-52-9	100 lb	-	RQ 100 lb final RQ RQ 45.4 kg final RQ

EPA Statement
This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

> **DANGER: CORROSIVE.** Causes irreversible eye damage and skin burns. Harmful if swallowed. Do not get in eyes, on skin, or on clothing. Wear protective eyewear and rubber gloves when handling this product. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the restroom. Avoid breathing vapors and use only in a well-ventilated area.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Sodium hypochlorite 7681-52-9	X	X	X	X	
Sodium chlorate 7775-09-9	X	X	X		

International Regulations

Canada
WHMIS Hazard Class
E - Corrosive material

16. OTHER INFORMATION

NFPA	**Health Hazard**	3	**Flammability**	0	**Instability**	0	**Physical and Chemical Hazards** -
HMIS	**Health Hazard**	3	**Flammability**	0	**Physical Hazard**	0	**Personal Protection** B

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Revision Date June 12, 2015

Revision Note Revision Section 14.

Reference 1096036/164964.159

General Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

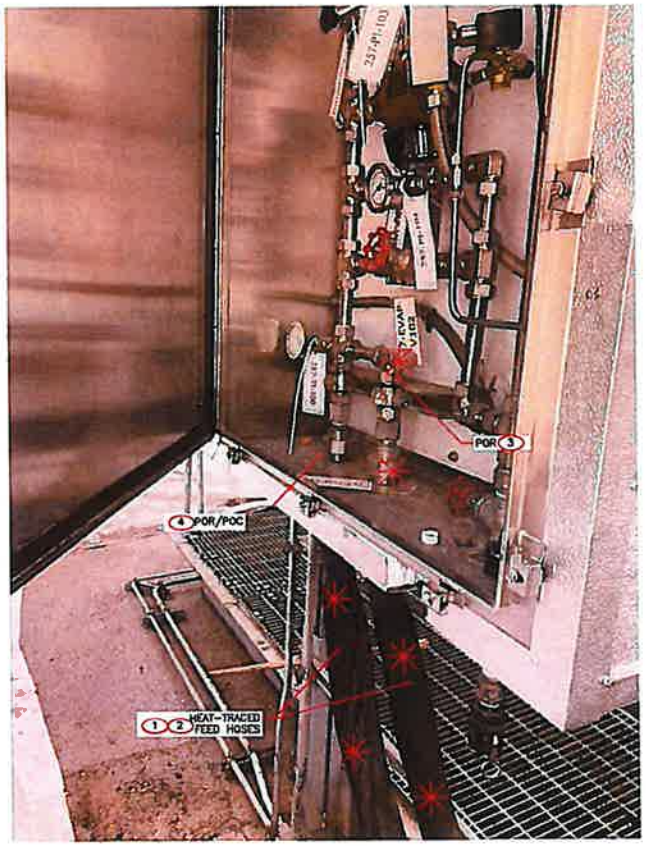
ATTACHMENT 3

Drawings for Improved Piping Modification to Route Aboveground Portion of Effluent Discharge Line into a Trench Box

EPC-DO: 21-075

LA-UR-21-21894

Date: FEB 25 2021



50-0257 FEED CABINET

5 34B HOSE ENTRIES

6 WM-2 EFFLUENT LINE

OUTDOOR DEMO REQUIREMENTS
SCALE: NONE

GENERAL NOTES:

1. DEMO ACTIVITIES SHALL NOT TAKE PLACE UNTIL NEW TRENCH BOXES ARE INSTALLED, ASSOCIATED PIPING IS IN PLACE AND NEW PIPING HAS SUCCESSFULLY PASSED BOTH HYDROSTATIC AND SENSITIVE LEAK TESTS.

KEYED NOTES:

1. DISCONNECT HOSE HEAT TRACE AT LOCAL JUNCTION BOX.
2. REMOVE BOTH EFFLUENT SUPPLY AND RETURN LINES FROM EVAPORATOR FEED CABINET BACK TO CONNECTION IN ROOM 349.
3. REMOVE PIPE AND FITTINGS ON RIGHT FEED LINE UP TO AND INCLUDING FIRST INTERNAL TEE. INSTALL CAP TO SEAL LINE. PLUG EXTERNAL OPENING IN BOTTOM OF CABINET.
4. DISCONNECT LEFT FEED HOSE AT UNION TO ALLOW INSTALLATION OF NEW FEED HOSE FROM 50-0257 OUTSIDE VALVE BOX.
5. REMOVE 50-0257 SUPPLY AND RETURN FEED HOSES. REMOVE STRUT STAND AND HOSE SUPPORT PLATE.
6. REMOVE 4" EFFLUENT FLEX HOSE BETWEEN 50-0001-34B AND WM-2. INSTALL CAM & GROOVE TYPE PLUG AT REMAINING OPENING.

RELEASED FOR PLANNING BY CM
Nicole M. Martinez

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE FOR DCF-19-50-0001-2955					

ENGINEERING SERVICES

34B EFFLUENT TRENCH

OUTDOOR DEMO REQUIREMENTS

TA-50 BLDG 0001

SUBMITTED P. STRINGFIELD

APPROVED FOR RELEASE C. DeVOVER

Los Alamos NATIONAL LABORATORY
PO Box 1663 Los Alamos, New Mexico 87545

D.C. UNCLASSIFIED

REVIEWER C. DeVOVER

DRAWN
DESIGN
CHECKED
DATE 8/10/19

E-ER MD-1

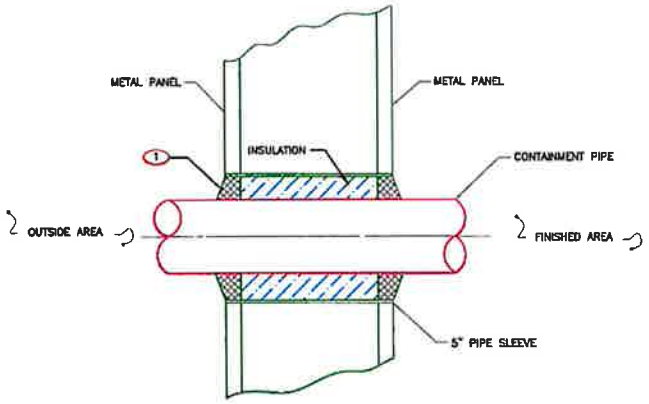
17 OF 19

PROJECT ID N/A

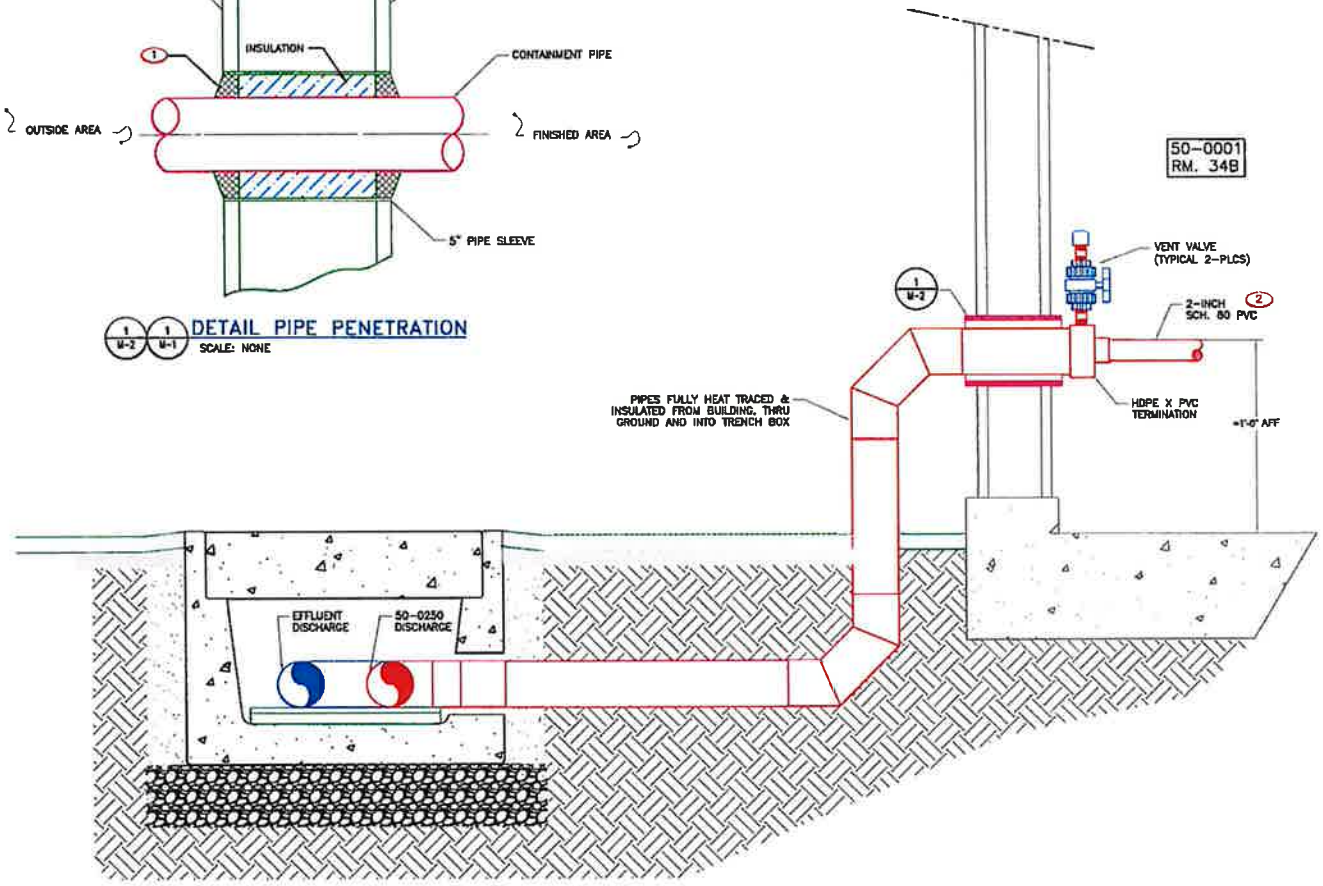
DRAWING NO DCF-19-50-0001-2955-SK-1

REV 0

Plotted By: 119873 Plot Date: January 21, 2020
DCF-19-50-0001-2955-SK1.DWG



1/M-2 1/M-1 DETAIL PIPE PENETRATION
SCALE: NONE



A/M-1 ROOM 34B PIPE ENTRIES--ELEVATION VIEW-
SCALE: NONE

GENERAL NOTES:

1. DUAL CONTAINMENT PIPING FULLY HEAT TRACED AND INSULATED TO INCLUDE SECTIONS EXITING TRENCH BOX TO BUILDING PENETRATIONS. NOT SHOWN THIS DRAWING FOR CLARITY.

KEYED NOTES:

1. NON-CREDITED WALL PENETRATION. CUT WALL AS NEEDED TO INSTALL 5" THROUGH-PIPE. INSTALL TRENCH BOX PIPING AND FILL VOID WITH FIBERGLASS INSULATION WITHIN 1/2" OF BOTH INTERIOR AND EXTERIOR WALL SURFACES. APPLY RESILIENT NON-HARDENING SEALER LEVEL TO BOTH INTERIOR WALL AND EXTERIOR WALL TO FILL REMAINING GAP.
2. PIPE CONNECTS TO MANIFOLD AT EAST END OF SOUTH FRAC TANK. SEE SHEET M-3 FOR CONTINUATION.

RELEASED FOR PLANNING BY CM
Nicole M. Martinez

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE FOR DCF-19-50-0001-2955					

ENGINEERING SERVICES

34B TRENCH BOX

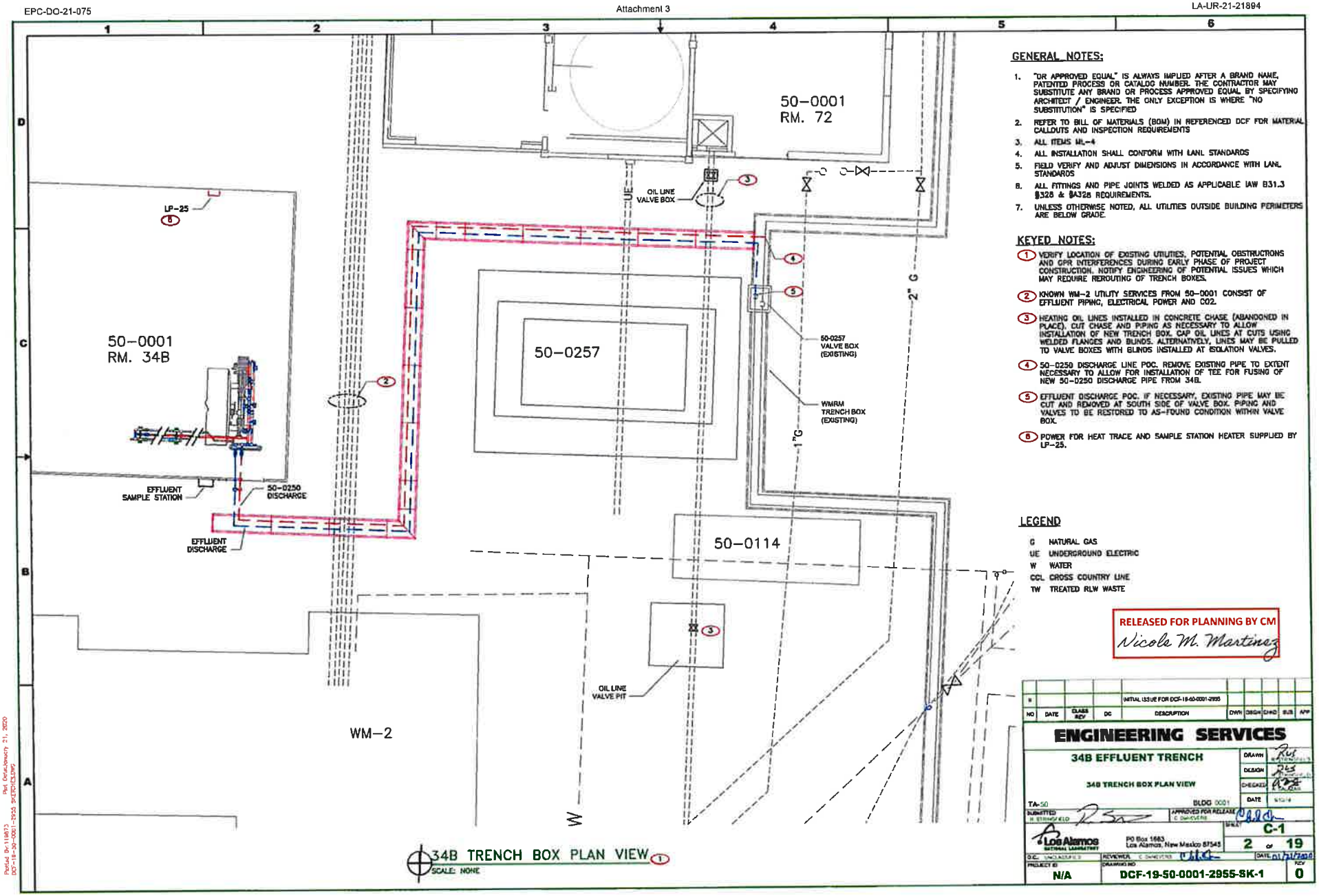
ROOM 34B PIPE ENTRIES
-ELEVATION VIEW-

TA-50 BLDG 0001

Los Alamos NATIONAL LABORATORY
PO Box 1663 Los Alamos, New Mexico 87545

DRAWN
DESIGN
CHECKED
DATE
SHEET M-2
6 OF 19
DATE
REV 0

G.C. UNCLASSIFIED
PROJECT ID N/A
DRAWING NO DCF-19-50-0001-2955-SK-1



34B TRENCH BOX PLAN VIEW (1)
SCALE: NONE

GENERAL NOTES:

1. "OR APPROVED EQUAL" IS ALWAYS IMPLIED AFTER A BRAND NAME, PATENTED PROCESS OR CATALOG NUMBER. THE CONTRACTOR MAY SUBSTITUTE ANY BRAND OR PROCESS APPROVED EQUAL BY SPECIFYING ARCHITECT / ENGINEER. THE ONLY EXCEPTION IS WHERE "NO SUBSTITUTION" IS SPECIFIED
2. REFER TO BILL OF MATERIALS (BOM) IN REFERENCED DCF FOR MATERIAL CALLOUTS AND INSPECTION REQUIREMENTS
3. ALL ITEMS ML-4
4. ALL INSTALLATION SHALL CONFORM WITH LANL STANDARDS
5. FIELD VERIFY AND ADJUST DIMENSIONS IN ACCORDANCE WITH LANL STANDARDS
6. ALL FITTINGS AND PIPE JOINTS WELDED AS APPLICABLE IAW B31.3 §328 & §328 REQUIREMENTS.
7. UNLESS OTHERWISE NOTED, ALL UTILITIES OUTSIDE BUILDING PERIMETERS ARE BELOW GRADE.

KEYED NOTES:

1. VERIFY LOCATION OF EXISTING UTILITIES, POTENTIAL OBSTRUCTIONS AND GPR INTERFERENCES DURING EARLY PHASE OF PROJECT CONSTRUCTION. NOTIFY ENGINEERING OF POTENTIAL ISSUES WHICH MAY REQUIRE REROUTING OF TRENCH BOXES.
2. KNOWN WM-2 UTILITY SERVICES FROM 50-0001 CONSIST OF EFFLUENT PIPING, ELECTRICAL POWER AND CO2.
3. HEATING OIL LINES INSTALLED IN CONCRETE CHASE (ABANDONED IN PLACE). CUT CHASE AND PIPING AS NECESSARY TO ALLOW INSTALLATION OF NEW TRENCH BOX. CAP OIL LINES AT CUTS USING WELDED FLANGES AND BLINDS. ALTERNATIVELY, LINES MAY BE PULLED TO VALVE BOXES WITH BLINDS INSTALLED AT ISOLATION VALVES.
4. 50-0250 DISCHARGE LINE POC. REMOVE EXISTING PIPE TO EXTENT NECESSARY TO ALLOW FOR INSTALLATION OF TEE FOR FUSING OF NEW 50-0250 DISCHARGE PIPE FROM 34B.
5. EFFLUENT DISCHARGE POC. IF NECESSARY, EXISTING PIPE MAY BE CUT AND REMOVED AT SOUTH SIDE OF VALVE BOX. PIPING AND VALVES TO BE RESTORED TO AS-FOUND CONDITION WITHIN VALVE BOX.
6. POWER FOR HEAT TRACE AND SAMPLE STATION HEATER SUPPLIED BY LP-25.

LEGEND

G	NATURAL GAS
UE	UNDERGROUND ELECTRIC
W	WATER
CCL	CROSS COUNTRY LINE
TW	TREATED RLW WASTE

RELEASED FOR PLANNING BY CM
Nicole M. Martinez

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE FOR DCF-19-50-0001-2955					

ENGINEERING SERVICES

34B EFFLUENT TRENCH

34B TRENCH BOX PLAN VIEW

DRAWN: RVS
DESIGN: RVS
CHECKED: MDS
DATE: 5/13/19

TA-50 BLDG 0001

SUBMITTED: H. STRAWN-KLO
APPROVED FOR RELEASE: C. DAVIS-EVS

Los Alamos NATIONAL LABORATORY
PO Box 1663, Los Alamos, New Mexico 87545

SHEET: C-1
2 of 19

QC: UNCLASSIFIED
REVIEWER: C. DAVIS-EVS
DATE: 05/21/2019

PROJECT ID: N/A
DRAWING NO: DCF-19-50-0001-2955-SK-1
REV: 0

Plotted On: 11/18/19 Plot Date: January 21, 2020
DCF-19-50-0001-2955 SKETCH.DWG