

**THIRD FIVE-YEAR REVIEW REPORT**

**FOR THE**

**VERTAC, INC. SUPERFUND SITE  
JACKSONVILLE, PULASKI COUNTY, ARKANSAS**

**November 2008**



**PREPARED BY:**

**United States Environmental Protection Agency  
Region 6  
Dallas, Texas**

**THIRD FIVE-YEAR REVIEW REPORT**  
**Vertac, Inc. Superfund Site**  
**EPA ID No. ARD000023440**  
**Jacksonville, Pulaski County, Arkansas**

This memorandum documents the United States Environmental Protection Agency's (EPA's) performance, determinations, and approval of the Vertac, Inc. Superfund Site (Vertac) third five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC § 9621(c), as provided in the attached Third Five-Year Review Report.

**Summary of Third Five-Year Review Findings**

This third five-year review focuses on data obtained during groundwater monitoring activities performed from 2003 through 2008. In general, the selected remedy appears to be performing as intended and is currently protective of human health and the environment. However, the issues discussed below, which do not affect the protectiveness of the remedy, are noted.

- Landfill cap issues—At the time of the five-year review site inspection a slope failure was noted on the north slope of the sedimentation vault (Mount Vertac) that was constructed as part of the 1984 court-ordered Resource Conservation and Recovery Act (RCRA) remedy. No exposed waste was observed. The site operator indicated that this had occurred previously in January 2005 and was repaired in August 2005. Due to the recurrence of the slope failure, it was determined that an alternate method to repair the area was required. The area was surveyed on June 25, 2008 and a letter providing the planned repairs for the slope was submitted to EPA and the Arkansas Department of Environmental Quality (ADEQ). The EPA remedial project manager (RPM) approved the plan for repairing the slope and the remediation activities were scheduled to commence during the period of August to October 2008.
- Unpermitted release of wastewater treatment plant (WWTP) influent water—An unpermitted release of untreated water from an equalization (EQ) tank at the WWTP occurred in February 2008 during a thunderstorm event. It was estimated that approximately 20,000 gallons of EQ tank water commingled with storm water runoff flowed off site and into the Rocky Branch Creek. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon Consultants, Inc. (Terracon) estimates approximately 3.5 pounds (lbs) of phenols and 14 lbs of herbicides may have been released. The cause of the release was determined to be a control panel dial that did not fully engage in the operating mode, causing the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate.
- Groundwater sample exceedances of Maximum Contaminant Levels (MCLs) and Plume Concentration Levels (PCLs)—The Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in three wells (MW-9, MW-77, and LW-5) located outside of the Technical Impracticability

(TI) zone and in two of the Rocky Branch Creek samples. The one exceedance noted in MW-77 was also above the PCL for 2,3,7,8-TCDD. In addition, the data indicated two wells (MW-36 and MW-100) were above the MCL for 2,3,7,8-TCDD, and one well (MW-101) was above the MCL for toluene. These three wells are located within the TI zone.

- WWTP discharge limitation exceedances—Low level exceedances in the discharge limitation of 2,3,7,8-TCDD have been identified in six of the discharge monitoring reports examined during this five-year review. The site operator stated that when this occurs, an additional discharge sample is obtained during the month in question. The data indicates that the resamples, with the exception of October and November of 2007, were below the limits of detection.
- Plan and progress report discrepancies—The second five-year review identified the need for the Site-Wide Groundwater Monitoring Plan to be updated to reflect continued monitoring on a semiannual basis and restoration of 2,3,7,8-TCDD to the groundwater monitoring analyte list as required by the OU 3 Record of Decision (ROD). The Site-Wide Groundwater Monitoring Plan has yet to be updated to reflect these changes. In addition, the annual progress reports are being submitted approximately every two years.
- Reevaluation of new technologies to treat and/or remove non-aqueous phase liquid (NAPL) from the contaminated bedrock aquifer—The ROD for OU 3 (groundwater) called for five-year reviews to evaluate the performance of the hydraulic containment system and to determine if any new technologies are available to remediate the contaminated groundwater to confirm the continued applicability of the TI waiver. This has been done for this third five-year review, but remains an issue to be addressed in future five-year reviews.
- Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto—In 2001 and 2003, the EPA recommended that the Arkansas Department of Health (ADH) review and assess re-imposition of a fishing ban or advisory on the lower Bayou Meto segment below the Highway 13 bridge, and that ADH consider adoption of an EPA recommended lower screening level for dioxin in fish tissue. ADH acknowledges communications with the EPA on this subject, but has indicated that after review of the matter, including discussions with legislators, community leaders and representatives, and the governor's office, and consideration of the potential for adverse economic impacts, it decided not to make the changes. The ADH has no funds, or plans, for further study of this issue. In addition, the Highway 13 bridge was dropped as a location for fish flesh sampling, and the responsible party site operator has recommended that the frequency of fish flesh sampling under the Off-Site remedy and Unilateral Administrative Order be reduced from every two years to every five years in view of declining concentrations of dioxin in fish tissue sampling events.

The following actions are recommended in response to these issues:

- The sedimentation vault slope failure was repaired in October 2008. The area was surveyed on June 25, 2008 and a letter providing the proposed slope repairs was submitted to the EPA RPM on July 25, 2008. The EPA RPM reviewed the repair plan and directed the site operator to proceed with the plan (EPA 2008b). In mid-October 2008, the repairs to the sedimentation vault slope were initiated. The top of the sedimentation vault and the north slope were cleared and subgrade clay material was graded. A non-woven geotextile was placed on the slope, followed by the placement of rip-rap. Upon completion of the slope repairs, disturbed areas were reseeded for a vegetative support layer. On October 28, 2008, EPA inspected the sedimentation vault slope modifications at the Vertac site and deemed the repairs adequate.
- The reason for the unpermitted release of WWTP influent water was a control panel dial that did not fully engage in the operating mode which caused the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate. In order to prevent future unpermitted releases, the site operator will conduct a system inspection after any significant thunderstorms. This O&M task must be adhered to and documented, in order to prevent future unpermitted releases.
- The recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek should be evaluated to determine the reason for the observed exceedances.
- The reason for the discharge limitation exceedances of 2,3,7,8-TCDD should be investigated and modifications should be implemented to eliminate this issue. Possible modifications may include additional treatment methods in the WWTP system and increasing quality control of sample collection techniques and/or analytical laboratory services. In addition, the ADEQ is currently monitoring this situation.
- The Site-Wide Groundwater Monitoring Plan should be updated in accordance with the current groundwater monitoring activities. In addition, progress reports should be submitted on an annual basis in order to keep the regulatory agencies up to date on the status of the site.
- The OU 3 ROD requirement for evaluation of the new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer was conducted during this third five-year review. No new technologies for remediation of the NAPL impacted bedrock were identified. This standing requirement should be conducted during the next five-year review.
- Instead of continuing to press the ADH to institute a change in its own fish tissue dioxin screening level to 0.7 parts per trillion, as recommended by EPA guidance, the EPA will require that fish tissue sampling taken for the site remedy be analyzed toward the recommended level, and it will continue to encourage by appropriate means, the ADH to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou

Meto, where it was suspended. The EPA will continue to require that the fish tissue dioxin sampling be performed every two years, including the sampling location on the Bayou Meto at the Highway 13 bridge, and will require a special sampling event below the bridge. EPA will also review the question of further restrictions on the consumption or taking of fish from the Bayou Meto below the Highway 13 bridge, as well as the appropriateness of the recommended fish flesh screening level as a To Be Considered (TBC) at this site.

### Determinations

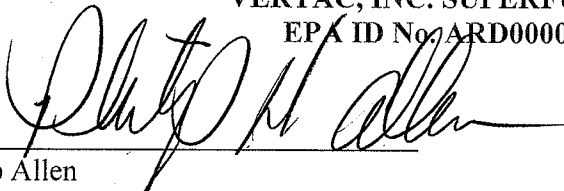
Based on the information available during the Third Five-Year Review, the selected remedy for the Vertac site is currently performing as intended. The recommendations and follow-up actions identified in this five-year review process should be addressed to ensure the long-term remedy will remain protective of human health and the environment. Because the completed remedial actions and O&M program for the Vertac site are considered protective for the short term, the overall remedy for the site is protective of human health and the environment for the short term, and will continue to be protective if the action items identified in this five-year review are addressed.

By: Samuel Coleman, P.E.  
Director, Superfund Division  
U.S. EPA, Region 6

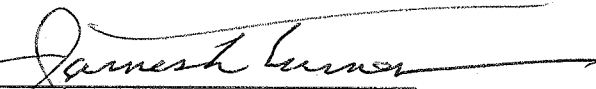
11/20/08  
Date

CONCURRENCES:

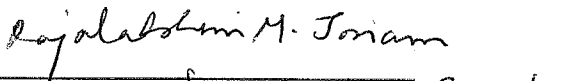
THIRD FIVE-YEAR REVIEW REPORT  
VERTAC, INC. SUPERFUND SITE  
EPA ID No. ARD000023440

By:   
Philip Allen  
Remedial Project Manager  
U.S. EPA, Region 6


Date: 11/17/08

By:   
James L. Turner  
Attorney, Office of Regional Counsel  
U.S. EPA, Region 6


Date: 11/17/08

By:   
Carlos A. Sanchez for Carlos Sanchez  
Chief, Arkansas/Texas Section Chief  
Superfund Division  
U.S. EPA, Region 6

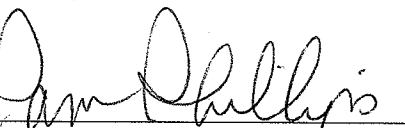
Date: 11/17/08

By:   
Mark A. Peycke  
Chief, Superfund Branch  
Office of Regional Counsel  
U.S. EPA, Region 6

Date: 11/17/08

By:   
Charles Faultry  
Associate Director, Remedial Branch  
Superfund Division  
U.S. EPA, Region 6

Date: 11/17/08

By:   
Pamela Phillips  
Deputy Director, Superfund Division  
U.S. EPA, Region 6

Date: 11/20/08

# CONTENTS

<b><u>Section</u></b>	<b><u>Page</u></b>
<b>LIST OF FIGURES</b> .....	iii
<b>LIST OF TABLES</b> .....	iii
<b>LIST OF ACRONYMS</b> .....	iv
<b>EXECUTIVE SUMMARY</b> .....	ES-1
<b>1.0 INTRODUCTION</b> .....	1
<b>2.0 SITE CHRONOLOGY</b> .....	2
<b>3.0 BACKGROUND</b> .....	2
3.1 PHYSICAL CHARACTERISTICS .....	3
3.2 LAND AND RESOURCE USE .....	4
3.3 HISTORY OF CONTAMINATION .....	5
3.4 INITIAL RESPONSE.....	6
3.5 BASIS FOR RESPONSE .....	9
<b>4.0 REMEDIAL ACTIONS</b> .....	10
4.1 REMEDY OBJECTIVES .....	10
4.2 REMEDY SELECTION .....	11
4.3 REMEDY IMPLEMENTATION.....	17
4.4 OPERATION AND MAINTENANCE.....	21
<b>5.0 PROGRESS SINCE THE SECOND FIVE-YEAR REVIEW</b> .....	23
5.1 PROTECTIVENESS STATEMENT FROM THE SECOND FIVE-YEAR REVIEW .....	23
5.2 SECOND FIVE-YEAR REVIEW RECOMMENDATIONS AND FOLLOW-UP ACTIONS .....	23
5.3 STATUS OF RECOMMENDED ACTIONS.....	25
<b>6.0 THIRD FIVE-YEAR REVIEW PROCESS</b> .....	28
6.1 ADMINISTRATIVE COMPONENTS .....	29
6.2 COMMUNITY INVOLVEMENT .....	29
6.3 DOCUMENT REVIEW .....	29
6.4 DATA REVIEW.....	30
6.5 ARAR REVIEW.....	36
6.5.1 Chemical-Specific ARARs .....	37

<u>Section</u>	<u>Page</u>
6.5.2 Location-specific ARARs.....	38
6.5.3 Action-specific ARARs .....	39
6.5.4 To Be Considered .....	40
6.6 SITE INSPECTION.....	42
6.7 SITE INTERVIEWS.....	46
<b>7.0 TECHNICAL ASSESSMENT.....</b>	<b>46</b>
7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS? .....	47
7.2 QUESTION B: ARE THE ASSUMPTIONS USED AT THE TIME OF REMEDY SELECTION STILL VALID?.....	49
7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?.....	50
7.4 TECHNICAL ASSESSMENT SUMMARY .....	50
<b>8.0 ISSUES.....</b>	<b>52</b>
<b>9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS .....</b>	<b>53</b>
<b>10.0 PROTECTIVENESS STATEMENT .....</b>	<b>55</b>
<b>11.0 NEXT REVIEW .....</b>	<b>57</b>

**ATTACHMENTS**

ATTACHMENT 1	FIGURES AND TABLES
ATTACHMENT 2A	DOCUMENTS REVIEWED
ATTACHMENT 2B	RELEVANT CORRESPONDENCE
ATTACHMENT 3	SITE INSPECTION CHECKLIST
ATTACHMENT 4	SITE INSPECTION PHOTOGRAPHS
ATTACHMENT 5	INTERVIEW RECORDS
ATTACHMENT 6	COUNTY CLERK’S OFFICE DOCUMENTS
ATTACHMENT 7	PUBLIC NOTICES

## LIST OF FIGURES

<b><u>NUMBER</u></b>	<b><u>TITLE</u></b>
1	SITE LOCATION MAP
2	SITE LAYOUT MAP
3	SPATIAL EXTENT OF THE TECHNICAL IMPRACTICABILITY ZONE
4	EXISTING BAYOU METO FISH CONSUMPTION ADVISORY
5	SAMPLING STATIONS FOR THE BAYOU METO FISH FLESH MONITORING PROGRAM

## LIST OF TABLES

<b><u>NUMBER</u></b>	<b><u>TITLE</u></b>
1	CHRONOLOGY OF SITE EVENTS
2	SUMMARY OF RESPONSE ACTIONS
3	PLUME CONTAMINANT LEVELS
4	ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK
5	FISH MONITORING DATA FOR BAYOU METO AND ROCKY BRANCH CREEK
6	DETECTED CONCENTRATIONS FOR WELLS LOCATED OUTSIDE OF THE TECHNICAL IMPRACTICABILITY ZONE
7	DETECTED CONCENTRATIONS FOR WELLS LOCATED INSIDE OF THE TECHNICAL IMPRACTICABILITY ZONE
8	LIST OF INTERVIEWEES
9	ISSUES IDENTIFIED
10	RECOMMENDATIONS AND FOLLOW-UP ACTIONS

## LIST OF ACRONYMS AND ABBREVIATIONS

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
ACM	Asbestos containing materials
ADPC&E	Arkansas Department of Pollution Control and Ecology
ADEQ	Arkansas Department of Environmental Quality
ADH	Arkansas Department of Health
AOC	Area of contamination
ARAR	Applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BAT	Best Available Technology
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
CWA	Clean Water Act
DDT	1,1,1-trichloro-2,2- <i>bis</i> -( <i>p</i> -chlorophenyl)ethane
EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
EQ	Equalization
ERM	Environmental Resources Management
ESD	Explanation of Significant Difference
FDA	Federal Drug Administration
FRTR	Federal Remediation Technologies Roundtable
FS	Feasibility study
ft	Feet
GEC	Genesis Environmental Consulting, Inc.
Hercules	Hercules Incorporated
LDR	Land Disposal Restrictions
MCL	Maximum Contaminant Level
mg/kg	Milligrams per kilogram
NAPL	Non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ng/L	Nanograms per liter
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List

## LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

O&M	Operation and maintenance
Old STP	City of Jacksonville's sewage treatment plant
OU	Operable unit
PCB	Polychlorinated biphenyl
PCL	Plume Concentration Levels
ppb	Parts per billion
ppm	Parts per million
ppt	Parts per trillion
PRP	Potentially responsible party
RA	Remedial action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial investigation
ROD	Record of Decision
RPM	Remedial project manager
SARA	Superfund Amendments and Reauthorization Act
Silvex	2,4,5-trichlorophenoxypropionic acid
SMCL	Secondary Maximum Contaminant Level
SOW	Statement of Work
STP	Sewage treatment plant
TBC	To Be Considered
TCB	Tetrachlorobenzene
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TDS	Total dissolved solids
TEQ	Toxicity equivalents
Terracon	Terracon Consultants, Inc.
TI	Technical Impracticability
Transvaal	Transvaal, Inc.
TSD	Treatment, storage, or disposal
UAO	Unilateral Administrative Order
µg/L	Microgram(s) per liter
Vertac	Vertac, Inc., Superfund Site
WWTP	Wastewater treatment plant
yd <sup>3</sup>	Cubic yards

## EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) Region 6 has conducted the third five-year review of the remedial action (RA) implemented at the Vertac, Inc., Superfund Site (Vertac) in Jacksonville, Pulaski County, Arkansas. The purpose of this third five-year review is to determine whether the selected remedy for the site continues to remain protective of human health and the environment. This statutory review was conducted from June to September 2008 and its findings and conclusions are documented in this report. The Second Five-Year Review Report of the RA was signed on November 20, 2003; this established the third five-year review period of 2003 to 2008.

Due to the complex nature of contamination associated with the Vertac site, remediation was handled through various actions, beginning with the court-ordered Resource Conservation and Recovery Act (RCRA) remedy in 1984. Four Operable Units (OUs) were delineated for the site. The four OUs include: (a) the off-site areas, (b) OU 1 (on-site above-ground media), (c) OU 2 (on-site soil, curbs, foundations, and underground utilities), and (d) OU 3 (groundwater). A removal action including the incineration of about 28,500 drums was conducted (about 25,500 drums were incinerated on-site and nearly 3,000 drums were incinerated off-site), and Records of Decision (ROD) were signed for each of the OUs, as modified by one ROD amendment, and two Explanations of Significant Differences (ESD). Following the incineration removal action, the resultant ash, and non-recyclable structures, debris, and soil were disposed in a RCRA Subtitle C compliant landfill (OU 1 landfill) constructed on-site. Most of the incinerator was decontaminated and sold for future use off-site. Residual incineration salt residue was disposed off-site at a facility near Deer Trail, Colorado.

Through the various response actions defined by the residential areas removal action and the Off-Site, OU 1 and OU 2 remedial actions, off-site contaminated soil in the Rocky Branch Creek flood plain and residential areas was excavated to an action level of 1 part per billion (ppb) for dioxins. In addition, contaminated portions of the City of Jacksonville's Old Sewage Treatment Plant and West Wastewater Treatment Plant were demolished and capped, and sludge and sediments from both plants were removed and disposed of in the on-site OU 1 landfill. Two

sewer interceptor lines were decontaminated, and one was grouted and abandoned. Plant buildings, process vessels, and process equipment were demolished, treated, and either recycled or disposed in the on-site OU 1 landfill. Process vessel contents were removed and treated or disposed off-site. On-site soil in the northern portion of the site was excavated to an action level of 1 ppb for dioxins, while soil in the southern portion of the site was excavated to an action level of between 5 and 50 ppb for dioxins; this area was backfilled with 1 foot (ft) of clean soil cover. All excavated soil was disposed in the on-site OU 1 landfill. Based in part on a technical impracticability (TI) waiver, the ROD for OU 3 determined that given the current level of applicable remedial technology, the groundwater could not be effectively remediated due to the presence of non-aqueous phase liquids (NAPLs) and the nature of the site hydrogeology. A hydraulic containment system, which includes groundwater extraction wells and a French drain constructed as part of the 1984 court-ordered remedy, was implemented as the OU 3 remedy in order to prevent the off-site migration of contaminated groundwater above the National Primary Drinking Water Standards, Maximum Contaminant Levels (MCLs).

Under the statutory requirements of Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the subordinate provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR 300.430(f)(4)(ii), performance of five-year reviews are required for sites where hazardous substances remain on-site above levels that allow for unrestricted use and unrestricted exposure. In November 1993, the Unilateral Administrative Order (UAO) for the off-site areas was initiated which triggered the action date for the first five-year review to be completed by November 1998. Following a citizen suit against the Administrator of the EPA settled in October 2000 in *Shelton v. Browner* (E.D. Ark.), the first CERCLA five-year review was completed for the Vertac site in July 2001. The second five-year review was completed in November 2003 in order to bring the five-year review process back on schedule.

During the third five-year review period, Operations and Maintenance (O&M) activities at the site have continued. O&M activities include pumping affected groundwater from the groundwater extraction system along the eastern portion of the site, collection of affected groundwater from the French drain system that intercepts groundwater flow along the western

and southern boundaries of the burial areas at the site, treatment and discharge of the extracted groundwater, maintenance of the capped burial areas and the OU 1 landfill, groundwater and surface water monitoring, and maintenance of the groundwater extraction system, French drain, and the wastewater treatment plant. Site O&M is implemented by Hercules Incorporated (Hercules), the site operator, as the Respondent under EPA CERCLA UAOs. Hercules has employed a remedial contractor, Terracon Consultants, Inc. (Terracon) (formally Genesis Environmental Consulting, Inc.), to carry out site O&M activities. Terracon staffs the site with two employee operators and the site is generally well-maintained. Approximately 9-12 million gallons of groundwater are extracted and collected each year by the French drain and the groundwater extraction system. This water is then treated and discharged into Rocky Branch Creek, while the filtrate media is containerized and regenerated at an off-site facility. The actual amount of water and leachate collected and treated is primarily dependent upon rainfall amounts for each year.

Documents reviewed for this five-year review included, but were not limited to, the following documents: (1) RODs, (2) ESD, (3) Site-Wide O&M Manual, (4) Site-Wide Groundwater Monitoring Plan, (5) Annual Progress Reports, (6) Fish Flesh Monitoring Reports, and (7) Previous Five-Year Review Reports.

In accordance with the community involvement requirements of the five-year review process, EPA identified eight key individuals to be interviewed. These individuals were interviewed during the Vertac site visit which occurred on June 24 – 25, 2008. The interview records are included in Attachment 5 of this report.

The third five-year review focuses on the data obtained during routine inspections, groundwater monitoring events, and the fish flesh monitoring conducted at the Vertac site during 2003 through 2008. At this time, the selected remedy is performing as intended, with the following issues noted:

- Landfill cap issues—At the time of the five-year review site inspection a slope failure was noted on the north slope of the sedimentation vault (Mount Vertac) that was constructed as part of the court-ordered 1984 RCRA remedy. No exposed waste was

observed. The site operator indicated that this had occurred previously in January 2005 and was repaired in August 2005. Due to the recurrence of the slope failure, it was determined that an alternate method to repair the area was required. The area was surveyed on June 25, 2008 and a letter providing the planned repairs for the slope was submitted to EPA and the Arkansas Department of Environmental Quality (ADEQ). The EPA remedial project manager (RPM) approved the plan for repairing the slope and the remediation activities were scheduled to commence during the period of August to October 2008.

- Unpermitted release of wastewater treatment plant (WWTP) influent water—An unpermitted release of untreated water from an equalization (EQ) tank at the WWTP occurred in February 2008 during a thunderstorm event. It was estimated that approximately 20,000 gallons of EQ tank water commingled with storm water runoff flowed off site and into the Rocky Branch Creek. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon Consultants, Inc. (Terracon) estimates approximately 3.5 pounds (lbs) of phenols and 14 lbs of herbicides may have been released. The cause of the release was determined to be a control panel dial that did not fully engage in the operating mode, causing the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate.
- Groundwater sample exceedances of Maximum Contaminant Levels (MCLs) and Plume Concentration Levels (PCLs)—The Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in three wells (MW-9, MW-77, and LW-5) located outside of the Technical Impracticability (TI) zone and in two of the Rocky Branch Creek samples. The one exceedance noted in MW-77 was also above the PCL for 2,3,7,8-TCDD. In addition, the data indicated two wells (MW-36 and MW-100) were above the MCL for 2,3,7,8-TCDD, and one well (MW-101) was above the MCL for toluene. These three wells are located within the TI zone.
- WWTP discharge limitation exceedances—Low level exceedances in the discharge limitation of 2,3,7,8-TCDD have been identified in six of the discharge monitoring reports examined during this five-year review. The site operator stated that when this occurs, an additional discharge sample is obtained during the month in question. The data indicates that the resamples, with the exception of October and November of 2007, were below the limits of detection.
- Plan and progress report discrepancies—The second five-year review identified the need for the Site-Wide Groundwater Monitoring Plan to be updated to reflect continued monitoring on a semiannual basis and restoration of 2,3,7,8-TCDD to the groundwater monitoring analyte list as required by the OU 3 Record of Decision (ROD). The Site-Wide Groundwater Monitoring Plan has yet to be updated to reflect these changes. In addition, the annual progress reports are being submitted approximately every two years.
- Reevaluation of new technologies to treat and/or remove non-aqueous phase liquid (NAPL) from the contaminated bedrock aquifer —The ROD for OU 3 (groundwater)

called for five-year reviews to evaluate the performance of the hydraulic containment system and to determine if any new technologies are available to remediate the contaminated groundwater to confirm the continued applicability of the TI waiver. This has been done for this third five-year review, but remains an issue to be addressed in future five-year reviews.

- Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto—In 2001 and 2003, the EPA recommended that the Arkansas Department of Health (ADH) review and assess re-imposition of a fishing ban or advisory on the lower Bayou Meto segment below the Highway 13 bridge, and that ADH consider adoption of an EPA recommended lower screening level for dioxin in fish tissue. ADH acknowledges communications with the EPA on this subject, but has indicated that after review of the matter, including discussions with legislators, community leaders and representatives, and the governor's office, and consideration of the potential for adverse economic impacts, it decided not to make the changes. The ADH has no funds, or plans, for further study of this issue. In addition, the Highway 13 bridge was dropped as a location for fish flesh sampling, and the responsible party site operator has recommended that the frequency of fish flesh sampling under the Off-Site remedy and Unilateral Administrative Order (UAO) be reduced from every two years to every five years in view of declining concentrations of dioxin in fish tissue sampling events.

The following actions are recommended in response to these issues:

- The sedimentation vault slope was repaired in October 2008. The area was surveyed on June 25, 2008 and a letter providing the proposed slope repairs was submitted to the EPA RPM on July 25, 2008. The EPA RPM reviewed the repair plan and directed the site operator to proceed with the plan (EPA 2008b). In mid-October 2008, the repairs to the sedimentation vault slope were initiated. The top of the sedimentation vault and the north slope were cleared of vegetation and the subgrade clay material was graded. A non-woven geotextile was placed on the slope, followed by the placement of rip-rap. Upon completion of the slope repairs, disturbed areas were prepared and seeded for a vegetative support layer. On October 28, 2008, EPA inspected the sedimentation vault slope modifications at the Vertac site and deemed the repairs adequate.
- The reason for the unpermitted release of WWTP influent water was a control panel dial that did not fully engage in the operating mode which caused the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate. In order to prevent future unpermitted releases, the site operator will conduct a system inspection after any significant thunderstorms. This O&M task must be adhered to and documented, in order to prevent future unpermitted releases.
- The recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek should be evaluated to determine the reason for the observed exceedances.

- The reason for the discharge limitation exceedances of 2,3,7,8-TCDD should be investigated and modifications should be implemented to eliminate this issue. Possible modifications may include additional treatment methods in the WWTP system and increasing quality control of sample collection techniques and/or analytical laboratory services. In addition, the ADEQ is currently monitoring this situation.
- The Site-Wide Groundwater Monitoring Plan should be updated in accordance with the current groundwater monitoring activities. In addition, progress reports should be submitted on an annual basis in order to keep the regulatory agencies up to date on the status of the site.
- The OU 3 ROD requirement for evaluation of the new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer was conducted during this third five-year review. No new technologies for remediation of the NAPL impacted bedrock were identified. This standing requirement should be conducted during the next five-year review.
- Instead of continuing to press the ADH to institute a change in its own fish tissue dioxin screening level to 0.7 parts per trillion (ppt), as recommended by EPA guidance, the EPA will require that fish tissue sampling taken for the site remedy be analyzed toward the recommended level, and it will continue to encourage by appropriate means, the ADH to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto, where it was suspended. The EPA will continue to require that the fish tissue dioxin sampling be performed every two years, including the sampling location on the Bayou Meto at the Highway 13 bridge, and will require a special sampling event below the bridge. EPA will also review the question of further restrictions on the consumption or taking of fish from the Bayou Meto below the Highway 13 bridge, as well as the appropriateness of the recommended fish flesh screening level as a To Be Considered (TBC) at this site.

Based on the information available during the Third Five-Year Review, the selected remedy for the Vertac site is currently performing as intended. The recommendations and follow-up actions identified in this five-year review process should be addressed to ensure the long-term remedy will remain protective of human health and the environment.

### Five-Year Review Summary Form

#### SITE IDENTIFICATION

**Site Name (from WasteLAN):** Vertac Superfund Site

**EPA ID (from WasteLAN):** ARD000023440

**Region:** 6

**State:** Arkansas

**City/County:** Jacksonville/ Pulaski County

#### SITE STATUS

**NPL Status:**  Final  Deleted  Other (specify) \_\_\_\_\_

**Remediation Status (choose all that apply):**  Under Construction  Operating  Complete

**Multiple OUs?\***  YES  NO

**Construction Completion Date:** June 1998

**Has site been put into reuse?**

YES  NO (Parcel 2 – Maintenance/recycle facility for the City of Jacksonville)

#### REVIEW STATUS

**Reviewing Agency:**  EPA  State  Tribe  Other Federal Agency \_\_\_\_\_

**Author Name:** Philip Allen

**Author Title:** Remedial Project Manager

**Author Affiliation:** U.S. EPA Region 6

**Review Period:\*\*** 2003 to 2008

**Date(s) of Site Inspection:** April 16, 2008 and June 24-25, 2008

**Type of Review:**  Statutory  
 Policy  Post-SARA  Pre-SARA  NPL-Removal only  
 Non-NPL Remedial Action Site  NPL State/Tribe-lead  
 Regional Discretion

**Review Number:**  1 (first)  2 (second)  3 (third)  Other (specify) \_\_\_\_\_

**Triggering Action:**

Actual RA On-site Construction at OU  Actual RA Start  
 Construction Completion  Previous Five-Year Review Report  
 Other (specify) \_\_\_\_\_

**Triggering Action Date (from WasteLAN):** November 20, 2003

**Due Date (Five Years After Triggering Action Date):** November 20, 2008

\* "OU" refers to operable unit.

\*\* The review period refers to the period during which the five-year review was conducted.

## Five-Year Review Summary Form (Continued)

### Issues:

- Landfill cap issues—At the time of the five-year review site inspection a slope failure was noted on the north slope of the sedimentation vault. No exposed waste was observed. The site operator indicated that this had occurred previously in January 2005 and was repaired in August 2005. Due to the recurrence of the slope failure, it was determined that an alternate method to repair the area was required. The area was surveyed on June 25, 2008 and a letter providing the planned repairs for the slope was submitted to EPA and the Arkansas Department of Environmental Quality (ADEQ). The EPA remedial project manager (RPM) approved the plan for repairing the slope and the remediation activities commenced in October 2008.
- Unpermitted release of wastewater treatment plant (WWTP) influent water—An unpermitted release of untreated water from an equalization (EQ) tank at the WWTP occurred in February 2008 during a thunderstorm event. It was estimated that approximately 20,000 gallons of EQ tank water commingled with storm water runoff flowed off site and into the Rocky Branch Creek. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon Consultants, Inc. (Terracon) estimates approximately 3.5 pounds (lbs) of phenols and 14 lbs of herbicides may have been released. The cause of the release was determined to be a control panel dial that did not fully engage in the operating mode, causing the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate.
- Groundwater sample exceedances of Maximum Contaminant Levels (MCLs) and Plume Concentration Levels (PCLs)—The Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in three wells (MW-9, MW-77, and LW-5) located outside of the Technical Impracticability (TI) zone and in two of the Rocky Branch Creek samples. The one exceedance noted in MW-77 was also above the PCL for 2,3,7,8-TCDD. In addition, the data indicated two wells (MW-36 and MW-100) were above the MCL for 2,3,7,8-TCDD, and one well (MW-101) was above the MCL for toluene. These three wells are located within the TI zone.
- WWTP discharge limitation exceedances—Low level exceedances in the discharge limitation of 2,3,7,8-TCDD have been identified in six of the discharge monitoring reports examined during this five-year review. The site operator stated that when this occurs, an additional discharge sample is obtained during the month in question. The data indicates that the resamples, with the exception of October and November of 2007, were below the limits of detection.

### **Five-Year Review Summary Form (Continued)**

- Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto—In 2001 and 2003, the EPA recommended that the Arkansas Department of Health (ADH) review and assess re-imposition of a fishing ban or advisory on the lower Bayou Meto segment below the Highway 13 bridge, and that ADH consider adoption of an EPA recommended lower screening level for dioxin in fish tissue. ADH acknowledges communications with the EPA on this subject, but has indicated that after review of the matter, including discussions with legislators, community leaders and representatives, and the governor's office, and consideration of the potential for adverse economic impacts, it decided not to make the changes. The ADH has no funds, or plans, for further study of this issue. In addition, the Highway 13 bridge was dropped as a location for fish flesh sampling, and the responsible party site operator has recommended that the frequency of fish flesh sampling under the Off-Site remedy and Unilateral Administrative Order (UAO) be reduced from every two years to every five years in view of declining concentrations of dioxin in fish tissue sampling events.
- Plan and progress report discrepancies—The second five-year review identified the need for the Site-Wide Groundwater Monitoring Plan to be updated to reflect continued monitoring on a semiannual basis and restoration of 2,3,7,8-TCDD to the groundwater monitoring analyte list as required by the OU 3 Record of Decision (ROD). The Site-Wide Groundwater Monitoring Plan has yet to be updated to reflect these changes. In addition, the annual progress reports are being submitted approximately every two years.
- Reevaluation of new technologies to treat and/or remove non-aqueous phase liquid (NAPL) from the contaminated bedrock aquifer —The ROD for OU 3 (groundwater) called for five-year reviews to evaluate the performance of the hydraulic containment system and to determine if any new technologies are available to remediate the contaminated groundwater to confirm the continued applicability of the TI waiver. This has been done for this third five-year review, but remains an issue to be addressed in future five-year reviews.

#### **Recommendations and Follow-up Actions:**

- The sedimentation vault slope failure was repaired in October 2008. The area was surveyed on June 25, 2008 and a letter providing the proposed slope repairs was submitted to the EPA RPM on July 25, 2008. The EPA RPM reviewed the repair plan and directed the site operator to proceed with the plan (EPA 2008b). Upon completion of the slope repairs, EPA inspected the modifications on October 28, 2008 and deemed the repairs adequate.
- The reason for the unpermitted release of WWTP influent water was a control panel dial that did not fully engage in the operating mode which caused the sand filter

### Five-Year Review Summary Form (Continued)

valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate. In order to prevent future unpermitted releases, the site operator will conduct a system inspection after any significant thunderstorms. This O&M task must be adhered to and documented, in order to prevent future unpermitted releases.

- The recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek should be evaluated to determine the reason for the observed exceedances.
- The reason for the discharge limitation exceedances of 2,3,7,8-TCDD should be investigated and modifications should be implemented to eliminate this issue. Possible modifications may include additional treatment methods in the WWTP system and increasing quality control of sample collection techniques and/or analytical laboratory services. In addition, the ADEQ is currently monitoring this situation.
- The Site-Wide Groundwater Monitoring Plan should be updated in accordance with the current groundwater monitoring activities. In addition, progress reports should be submitted on an annual basis in order to keep the regulatory agencies up to date on the status of the site.
- The OU 3 ROD requirement for evaluation of the new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer was conducted during this third five-year review. No new technologies for remediation of the NAPL impacted bedrock were identified. This standing requirement should be conducted during the next five-year review.
- Instead of continuing to press the ADH to institute a change in its own fish tissue dioxin screening level to 0.7 parts per trillion, as recommended by EPA guidance, the EPA will require that fish tissue sampling taken for the site remedy be analyzed toward the recommended level, and it will continue to encourage by appropriate means, the ADH to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto, where it was suspended. The EPA will continue to require that the fish tissue dioxin sampling be performed every two years, including the sampling location on the Bayou Meto at the Highway 13 bridge, and will require a special sampling event below the bridge. EPA will also review the question of further restrictions on the consumption or taking of fish from the Bayou Meto below the Highway 13 bridge, as well as the appropriateness of the recommended fish flesh screening level as a To Be Considered at this site.

**Five-Year Review Summary Form (Continued)**

**Protectiveness Statement:**

Based on the information available during the third five-year review, the selected remedy for the Vertac site is currently protective of human health and the environment and current human exposure is controlled.

**Long-Term Protectiveness:**

The third five-year review found that the selected remedy is performing as intended and is protective of human health and the environment. The recommendations and follow-up actions identified in this five-year review process should be addressed to ensure the long-term remedy will remain protective of human health and the environment.

## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 6 has conducted a third five-year review of the remedial action (RA) implemented at the Vertac, Inc., Superfund Site (Vertac) in Jacksonville, Pulaski County, Arkansas. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment and to document the methods, findings, and conclusions of the five-year review process in a report. The report will identify issues found during each review, if any, and make recommendations to address the issues. This Third Five-Year Review Report documents the results of the review for the Vertac site, conducted in accordance with EPA guidance (EPA 2001) on five-year reviews.

The five-year review process is required by federal statute. The EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121(c), 42 U.S.C. § 9621 (c), states the following:

“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.”

NCP Section 300.430(f)(4)(ii) states the following:

“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.”

Because hazardous substances, pollutants, or contaminants remain at the Vertac site above levels that allow for unlimited use and unrestricted exposure, a statutory five-year review is required.

Since the Second Five-Year Review Report was signed on November 20, 2003, the period addressed by this five-year review for the Vertac site extended from 2003 to 2008. The triggering action for this review was the Second Five-Year Review Report completed in November 2003. This third five-year review was conducted from June through November 2008; its methods, findings, conclusions, and recommendations are documented in this report.

This report documents the five-year review for the Vertac site by providing the following information: site chronology (Section 2.0), background information (Section 3.0), overview of the RAs (Section 4.0), progress since the second five-year review (Section 5.0), discussion of the third five-year review process (Section 6.0), technical assessment of the site (Section 7.0), issues (Section 8.0), recommendations and follow-up activities (Section 9.0), protectiveness statement (Section 10.0), and discussion of the next review (Section 11.0). Attachment 1 provides the site related figures and tables. Attachment 2 provides a list of documents reviewed (Attachment 2A) and copies of relevant correspondence (Attachment 2B). Attachment 3 provides the site inspection checklist. Attachment 4 provides the site inspection photographs. Attachment 5 provides the interview records. Attachment 6 provides the relevant county clerk's office documents. Attachment 7 provides copies of public notices.

## **2.0 SITE CHRONOLOGY**

Table 1 presents a chronology of events for the Vertac site. Additional historical information for the site is available online at: <http://www.epa.gov/earth1r6/6sf/pdffiles/0600023.pdf> (EPA 2008a).

## **3.0 BACKGROUND**

This section describes the physical setting of the site, including a description of the land use, resource use, and environmental setting. This section also describes the history of contamination associated with the site, the initial response actions taken at the site, and the basis for each of the initial response actions. Remedial actions (RAs) performed subsequent to the initial response actions for each of the operable units (OUs) defined for the site are described in Section 4.

### **3.1 PHYSICAL CHARACTERISTICS**

The Vertac site is located at 1907 Hill Road near the western edge of Jacksonville, Pulaski County, Arkansas, about 15 miles northeast of Little Rock (Figure 1). The overall Vertac site is about 193 acres in size (EPA 1996a). The Vertac Chemical Corporation, the successor company to Vertac Incorporated, is currently in receivership as ordered by the U.S. District Court. This includes control of Vertac assets, such as the site. The contamination at the site resulted from poor waste management practices, plant operations, and discharges of process wastewater to Rocky Branch Creek and the City of Jacksonville's wastewater treatment systems (EPA 1996a). The site is associated with the nearby Jacksonville Landfill and Rogers Road Municipal Landfill Superfund Sites (some wastes generated at the Vertac site were disposed in the landfills).

The overall site consists of two main parcels of land, consisting of smaller tracts acquired at different times during historical plant operations. Parcel 1, in the southern portion of the site, is about 93 acres in size. This is the original industrial parcel developed during the 1930s including the central process area where facility operations occurred. This is also the area, along with any contaminated contiguous off-site areas, that is considered the Vertac site for purposes of this five-year review.

Parcel 2 includes about 100 acres in the northern part of the greater site; and, as noted below, the City of Jacksonville has taken possession of much of this area and put it to productive re-use. This parcel was purchased by Vertac in 1978, but it was never used for facility operations by Vertac and its predecessors companies, or other site owners and operators (EPA 1990b).

The Vertac site is located in the transition zone between the Gulf Coastal Plain and the Interior Highlands Physiographic Provinces. The land at the site has moderate topographic relief, sloping from approximately 310 feet (ft) above mean sea level in the north to approximately 260 ft above mean sea level in the southwest portion of the site. Soils in the area of the site are classified as the Leadvale-Urban land complex with 1 to 3 percent slope. Because of extensive development and earth-moving activities at the site, natural soil characteristics have been

obscured. Surface water at the site drains into Rocky Branch Creek, which flows through the western portion of the site (EPA 2003b).

Contaminated groundwater at the site occurs within unconsolidated surface soils and weathered and unweathered portions of the Atoka Formation. The Atoka Formation consists of alternating beds of highly consolidated and fractured sandstone, siltstone, and shale. Groundwater flow primarily occurs within the intergranular pore spaces in the unconsolidated surface soils and within fractures and partings within the sandstone layers of the bedrock. The Atoka Formation has a low yield due to its low porosity and permeability. At the site, groundwater flows outward from the central process area towards the east, south, and west (EPA 1996a).

### **3.2 LAND AND RESOURCE USE**

Land use in the vicinity of the site is varied. Residential areas border the site to the south and east. The western side of the site is bounded by an industrial area, and the northern side of the site is bounded by the Little Rock Air Force Base. The site itself is currently zoned for industrial use. Approximately 1,000 people live within 1 mile of the site, and approximately 30,500 people (estimate 2006) live in the city of Jacksonville. Rocky Branch Creek flows through the western side of the site, and it discharges into Bayou Meto approximately 1 mile south of the site. Groundwater under the site is found within both unconsolidated surface deposits and the fractured bedrock of the Atoka Formation. Groundwater at the site is not currently used, and no groundwater supply wells are located within 0.5 mile of the site (EPA 1996a). Land and resource use have not changed significantly since completion of the second five-year review. The northern portion of the site (Parcel 2) continues to be operated by the City of Jacksonville with a drive-through recycling facility. In addition, the Sanitation Department is housed in some of the former drum storage sheds EPA constructed on the northern portion of the property during the incineration process described in Section 4. This property was released by EPA for reuse following completion of remedial actions. The City of Jacksonville anticipates in the near future utilizing additional portions of Parcel 2 for the development of a Police and Fire Department training facility and shooting range.

### 3.3 HISTORY OF CONTAMINATION

The first industrial facilities at the site were built in the central process area by the federal government during the 1930s and 1940s as part of a munitions complex that extended beyond the present site boundaries. In 1948, the site was purchased by the Reasor-Hill Company and converted for manufacture of insecticides such as 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane (DDT), aldrin, dieldrin, and toxaphene. During the 1950's, Reasor-Hill manufactured herbicides such as 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), and 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP, or "Silvex"). A major impurity is formed during the production of 2,4,5-T is 2,3,7,8- tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) which is often referred to generally as dioxin. Dioxins are a group of similar chemicals of which 2,3,7,8-TCDD is the most toxic, and they represent the major contaminants of concern at the site. Reasor-Hill also stored drums of organic waste in an open field southwest of the central process area. Untreated process water was discharged from the western end of the plant directly into Rocky Branch Creek (EPA 1990b).

In 1961, the City of Jacksonville's sewage treatment plant (also known as the Old STP) was upgraded by adding a sludge digester, sludge-drying beds, and two 22-acre oxidation ponds. At this time, the city agreed to accept and treat wastewater from the Reasor-Hill facility, and Reasor-Hill began discharging some of its process wastewater to the city sewage treatment plant (EPA 1990a).

Hercules Powder Company, now known as Hercules Incorporated (Hercules), purchased the facility (consisting of Parcel 1 at that time) in 1961 and continued the manufacture and formulation of herbicides. From 1964 to 1968, Hercules also produced the herbicide Agent Orange (EPA 1996b), which was a formulation of equal parts of 2,4-D and 2,4,5-T, for the Department of Defense. The drums that were left by Reasor-Hill in the open field southwest of the central process area were buried by Hercules in what is now known as the Reasor-Hill Landfill. In 1964, Hercules built a pretreatment facility for its process wastewater that consisted of equalization basins and neutralization systems. Shortly after it took over the facility, Hercules changed the manufacturing process, which resulted in the generation of additional liquid and

solid wastes contaminated with dioxins. These wastes were stored in drums and disposed of in the North Landfill (also known as the Hercules-Transvaal Landfill). In 1969, Hercules and the City of Jacksonville constructed a 3-acre aerated lagoon upstream from the oxidation ponds, and Hercules began discharging all of its process wastewater to city wastewater treatment facilities (the West Wastewater Treatment Facility) at that time (EPA 1990a).

From 1971 to 1976, Hercules leased the facility to Transvaal, Inc. (Transvaal), a predecessor company of Vertac. Transvaal produced 2,4-D and intermittently produced 2,4,5-T. Transvaal continued the practice of burying drums of organic wastes in the North Landfill until 1974, when Transvaal began storing the drums of waste above ground. Transvaal purchased the facility from Hercules in 1976. In 1976, Transvaal reorganized as Vertac, Inc., and was eventually renamed the Vertac Chemical Corporation. Vertac produced 2,4-D on the same equipment used to manufacture 2,4,5-T, which was made by Vertac until 1979. Vertac purchased Parcel 2 (the northern portion of the site) in 1978 but never used it in the herbicide formulation operations. Vertac operated the site until January 1987, when Vertac became insolvent and abandoned the site (EPA 1996b).

### **3.4 INITIAL RESPONSE**

Six different phases of response action were conducted at the Vertac site to address the contamination resulting from past facility operations and disposal practices. The first two response phases performed at the site are discussed in this section as part of the initial response. The site was later separated into four OUs to address the hazards posed by the site, and the four phases of remediation conducted for each of these four OUs are described under Section 4. A summary of each of the remedial actions performed at the site is provided in Table 2.

The Arkansas Department of Pollution Control and Ecology (ADPC&E, now the Arkansas Department of Environmental Quality [ADEQ]) issued an order in 1979 that required Vertac to improve its hazardous waste practices. In 1980, EPA and ADPC&E jointly filed suit against Vertac and Hercules in the United States District Court for the Eastern District of Arkansas

under the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §690 1 *et seq.* The parties signed a Consent Decree in January 1982 which required an independent consultant to assess the site conditions and propose a remedial plan for the on-site wastes. The remedial plan proposed by Vertac under the 1982 Consent Decree included leaving hazardous wastes buried on-site in unlined pits, which was deemed unsatisfactory by EPA. The site was placed on the initial National Priorities List (NPL) on September 8, 1983; and EPA returned to court in 1984, opposing the Vertac remedial plan and seeking an order approving an EPA alternative remedial plan, which would have required excavation of buried wastes and disposal in a lined landfill compliant with RCRA Subtitle C. The Court generally decided in favor of the remedy proposed by Vertac in July 1984. The Court-ordered remedy, also known as the Vertac Remedy, was implemented from mid-1984 to July 1986 (EPA 1990b).

The 1984 court-ordered Vertac Remedy, implemented over EPA opposition under the 1982 Consent Decree, is now considered the first phase of remediation (an initial response action). The response action included the closing and capping of the plant cooling water pond and equalization basin. Sediments from these units were removed and land filled within an area where earlier site operators had buried drums of waste. This sediment vault or landfill is commonly referred to as “Mount Vertac”.

The land filled area was capped, and a French drain, slurry wall, and leachate collection system were installed around the burial area (Figure 2). Improvements were also made to the surface water collection system at that time. The remedy also included the installation of groundwater monitoring wells and the initiation of a groundwater monitoring program. Contaminated leachate, groundwater, and surface water was pumped from a series of sumps to an on-site wastewater treatment plant (WWTP), and subsequently discharged directly into Rocky Branch Creek (after meeting discharge limits established by ADPC&E) (EPA 1990b). For reasons related to the timing and manner of its selection and implementation, as well as to the non-CERCLA statutory and regulatory authority underlying its selection, response measures that were undertaken as part of the Vertac Remedy are not specifically subject to this five-year review as such. However, since the units, components, and elements of the Vertac Remedy were

incorporated into the CERCLA site remedy selected for OU 3 (discussed below), they are considered as a part of OU 3 and thus part of the overall CERCLA site five-year review.

On or about January 31, 1987, Vertac shut down operations, abandoned the site, and declared bankruptcy. The plant was “mothballed,” which consisted of flushing the process lines and draining several process vessels. Approximately 28,500 drums of 2,4-D (D-wastes) and 2,4,5-T (T-wastes) herbicide still bottom wastes were left on-site. Many of the drums were corroded and leaking. After the site was abandoned, EPA initiated an emergency removal action to stabilize and secure the site (EPA 2003b).

The second phase of environmental response was the incineration of drums left on-site when Vertac abandoned the site. As part of this response action, ADPC&E signed a contract in 1989 to have the approximately 28,500 drums of D-waste and T-wastes incinerated on-site. To accomplish the incineration, the State of Arkansas utilized a trust fund that was established by Vertac. Incineration of the D-wastes began in January 1992. In June 1993, funding for the project was becoming depleted, and EPA assumed responsibility for incinerating the remaining drums as a time critical removal action under CERCLA, Section 104, 42 U.S.C. §9604. In late September 1994, the incineration of the dioxin contaminated D-waste was completed at the site. In July 1994, EPA had announced that it would pursue off-site incineration of the dioxin-contaminated “T” waste located at the site. On or about November 9, 1994, a contract was signed between Aptus commercial incineration facility in Coffeyville, Kansas, and EPA’s prime contractor, URS Consultants. Aptus accepted the T-wastes remaining in drums at the Vertac site. The first shipment went to Aptus in November 1994, and the last shipment was sent off-site on March 29, 1996 (EPA 1996b).

Approximately 28,500 drums containing D-wastes and T-wastes had been left at the site by the former owners and operators in various conditions. All drummed wastes were treated as F-listed (dioxin containing) wastes pursuant to RCRA, 42 U.S.C. §6901 et seq. (EPA, 1996b). Wastes from the production of 2,4,5-T at Vertac have been found to contain up to 50 parts per million (ppm) of dioxin, while wastes from the production of 2,4-D generally contain dioxin in the low part per billion (ppb) range. The second phase of remediation included the overpacking

of deteriorating and leaking drums, the on-site incineration of D-wastes, the off-site incineration of T-wastes, and the dismantling, decontamination, and disposal/recycling of the incinerator, associated structures, and debris. Overall, the action resulted in the incineration of approximately 25,179 drums of D-waste and 3,200 drums of T-waste (EPA 1998).

On December 31, 1996, EPA issued a Unilateral Administrative Order (UAO) to Hercules requiring the demolition, decontamination, and disposal of the on-site incinerator, associated structures, and debris. Parts of the incinerator, structures, debris, and contaminated soil were disposed in the on-site landfill that is compliant with the requirements of RCRA, Subtitle C (hazardous waste), constructed as part of the remedy for OU 1 (hereinafter referred to as the “OU 1 Landfill”). The majority of the incinerator was decontaminated, and sold to a third party for future use elsewhere. All response activities associated with the demolition of the on-site incinerator were completed in early 1998 (EPA 2003b). This removal action resulted in clean closure of the northern portion of the site. Operation and maintenance (O&M) activities are not required for this portion of the site, and this land is available for reuse (EPA 1998).

### **3.5 BASIS FOR RESPONSE**

The purpose of the response actions conducted at the Vertac site was to protect public health and welfare and the environment from releases or threatened releases of hazardous substances from the site. Exposure to drummed wastes, contaminated building structures and utilities, affected soil, groundwater, surface water, and sediment was determined to be associated with human health risks higher than the acceptable range. The primary threats that the Vertac site posed to public health and safety were: potential releases of contamination from drummed wastes; direct contact with contaminated soils in nearby residential yards; transport and direct contact with contaminated flood plain soils and sediments; consumption of dioxin-contaminated fish in Rocky Branch Creek and Bayou Meto; transport of on-site contaminated soils and sediments to nearby populated areas, Rocky Branch Creek, and Bayou Meto by surface runoff; transport of on-site contaminated soils and sediments along sewer lines to the City of Jacksonville’s wastewater treatment plant; direct contact with contaminated site buildings, other structures, and soils; and the migration of contaminated groundwater off-site.

## 4.0 REMEDIAL ACTIONS

This section provides a description of the remedy objectives, selection, and implementation for each of the four OUs delineated by EPA for the site. It also describes the ongoing O&M activities performed at the site in the period since the second five-year review. The four OUs are: (a) the off-site areas, (b) OU 1 (on-site above-ground media), (c) OU 2 (on-site soil, curbs, foundations, and underground utilities), and (d) OU 3 (groundwater).

### 4.1 REMEDY OBJECTIVES

The specific remedial objectives of the Off-Site Areas OU remedial action were:

- Remediate residential and agricultural areas to 1.0 ppb 2,3,7,8-TCDD.
- Prevent direct public contact with soil containing 2,3,7,8-TCDD concentrations above 1.0 ppb through soil capping.
- Prevent migration of 2,3,7,8-TCDD contaminated soil into waterways and surrounding flood plains.
- Prevent the migration of 2,3,7,8-TCDD contaminated sediments through sewage collection lines to the new Jacksonville sewage treatment facility.
- The carcinogenic risk after remedy implementation would range between  $10^{-5}$  and  $10^{-6}$ . It was determined that remediation for 2,3,7,8-TCDD contamination would also eliminate risks associated with any other contaminants (EPA 1990a).

The specific remedial objectives of the OU 1 (above ground media) remedial actions were:

- Treat principle threat wastes (such as process vessel contents, spent carbon, shredded trash and pallets, polychlorinated biphenyl (PCB) transformer oils, and miscellaneous drummed wastes).
- Decontaminate and recycle/reuse process equipment where practicable.
- Contain low level threat wastes (demolition debris) in the on-site RCRA Subtitle C landfill.
- The carcinogenic risk after remedy implementation would be reduced to less than  $10^{-6}$  (EPA 1993).

The specific remedial objectives of the OU 2 (soils, foundations, curbs, and underground utilities) remedial actions were:

- Remediate dioxins and furans to 5 ppb, expressed as toxicity equivalents (TEQs) of 2,3,7,8-TCDD (toxicity equivalents use a toxicity equivalency factor for particular dioxin-like compounds to compare each compound's relative toxicity to that of 2,3,7,8-TCDD).
- Remediate tetrachlorobenzene (TCB) contaminated soils to 500 ppm and treat

- through off-site incineration.
- Prevent water migration along underground utilities through the installation of cut-off barriers.
- Return as much land as possible to beneficial use (EPA 1996a).

The specific remedial objectives of the OU 3 (groundwater) remedial action were:

- Prevent potential contamination of off-site groundwater by controlling groundwater migration through the use of groundwater extraction wells and the existing French drain system.
- Prevent off-site human and environmental receptors from potential exposure to contaminated groundwater discharges that would result in an adverse toxic response or a carcinogenic risk greater than  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  through treatment of extracted groundwater at the on-site WWTP.
- Use institutional controls to prevent the installation of wells on site and prevent exposure of site workers to use of the contaminated groundwater (EPA 1996c).

## **4.2 REMEDY SELECTION**

Four Records of Decision (RODs) were issued by EPA for the Vertac site, for each of the four OUs. The Off-Site Areas OU ROD addressed the clean-up of releases to areas off the Vertac plant site. The ROD for OU 1 addressed the site buildings and other above-ground contaminated media. The ROD for OU 2 dealt with the remedy for subsurface contamination at the site, and the ROD for OU 3 addressed the clean-up of groundwater contamination at the site. The site was also addressed through other response actions (the 1984 court imposed “Vertac Remedy” and the drum incineration time critical removal action) as described in Section 3.4.

The ROD for the Off-Site Areas OU was signed on September 27, 1990, to address the cleanup of contiguous off-site areas that were contaminated as a result of untreated and partially-treated surface and underground discharges of plant wastewater and other releases. Elements of this OU included an active sewer interceptor and an abandoned sewer interceptor, portions of the Old STP, the active West Wastewater Treatment Plant, and the Rocky Branch Creek flood plain (EPA 1990a).

The remedy described in the 1990 ROD for the Off-Site Areas OU consisted of the following elements:

- Sediments were to be removed from the active sewage collection lines and stored and incinerated on-site. Pipe-liners were to be installed in the active line, and the abandoned line was to be filled with grout.
- At the Old STP, sludge was to be removed from the sludge digester and stored and incinerated on-site. The sludge drying beds were to be capped with 1 ft of clean soil. Accumulated water in the treatment units was to be treated and discharged, and the treatment units were to be demolished and capped with 1 ft of clean soil. EPA was to negotiate with the City of Jacksonville to place a restriction on the deed to keep the site zoned as commercial/industrial and to restrict access.
- The aeration basin at the West Wastewater Treatment Plant was to be drained, the dikes demolished, and the basin capped with 1 ft of clean soil. A notice was to be placed in the deed that recommended the site zoning remain as commercial/industrial and access restricted.
- Residentially zoned areas of the Rocky Branch Creek and Bayou Meto flood plains with 2,3,7,8-TCDD concentrations above 1.0 ppb were to be excavated and the soil incinerated on-site.
- The fish in Rocky Branch Creek and Bayou Meto were to be monitored for dioxin, and the ban on commercial fishing and advisory discouraging sport fishing should continue as long as fish tissue dioxin levels remain above the Food and Drug Administration (FDA) alert level of 25 parts per trillion (ppt) (EPA 1990a).

Amendments to the Off-Site Areas OU ROD and the ROD for OU 2 were signed on September 17, 1996, which allowed the excavated media from the Vertac Off-Site Areas OU to be disposed in the on-site RCRA Subtitle C landfill. The reasons for this change were: (1) the on-site incinerator had been permanently shut down, (2) the citizens of Jacksonville had expressed opposition to further on-site incineration, and (3) similar site media should be disposed in a consistent manner (EPA 1996b).

The ROD for OU 1, the on-site above-ground media, was signed on June 30, 1993. The above-ground media included buildings, process equipment, leftover chemicals in the process vessels, spent activated carbon, shredded trash and pallets, and miscellaneous drummed wastes at the site (EPA 2003b).

The remedy described in the ROD for OU 1 (on-site above ground media) included the following elements:

- On-site construction of the OU 1 landfill meeting RCRA Subtitle C substantive requirements.
- On-site incineration of F-listed wastes.
- Off-site treatment/disposal and/or on-site incineration of demonstrated non-F-listed wastes.
- Demonstrated uncontaminated raw materials were to be shipped off-site for recycle/reuse or off-site treatment/disposal, and/or on-site incineration.
- Spent carbon could be regenerated/reused in the on-site leachate collection/treatment system and/or incinerated on-site.
- On-site incineration of drummed French drain oily leachate, spent butyl-T recovery waste, 2,4-D drum wash waste, and used filters.
- On-site disposal of drummed remedial investigation (RI) wastes in the on-site OU 1 landfill.
- Deferment of a remedy for containerized mud and sediments collected from manholes, drains, leaf filters, drilling, and bagged soil until the ROD for OU 2.
- Off-site incineration of PCB transformer oils.
- On-site incineration of shredded trash and pallets.
- Demolition of on-site buildings and disposal of the debris in the on-site OU 1 landfill.
- Process equipment was to be decontaminated to the treatment standards for hazardous debris and shipped off-site for recycle/reuse. Any equipment not meeting decontamination standards would be demolished, and the debris was to be disposed of in the on-site OU 1 landfill.
- Friable asbestos containing materials (ACM) were to be removed following the National Emissions Standards for Hazardous Air Pollutants regulations, and the resultant media was to be disposed of in the on-site OU 1 landfill.
- Spent solvents generated during decontamination activities were to be incinerated on-site. Wastewater generated during decontamination activities was to be treated in the on-site wastewater treatment facility and discharged to Rocky Branch Creek.
- Deferral of a decision for disposal of ash and salt generated by on-site incineration of OU 1 media to be consistent with the ash and salt generated from the incineration of the drummed D-waste and T-waste (EPA 1993a).

A UAO was issued to Hercules in March 1994 requiring it to perform remedial design (RD) and RA under the ROD for OU 1. Hercules' remedial design work plan expressed interest in pursuing off-site incineration as a means to perform some actions under the ROD. EPA agreed, and subsequently, an Explanation of Significant Differences (ESD) was issued in May 1995 by EPA to allow off-site incineration of F-listed process vessel contents, shredded trash and pallets, miscellaneous drummed wastes (except for RI wastes), spent carbon, and decontamination residues (EPA 1995b). Hercules later signed a contract with Aptus for the off-site incineration of contaminated media required by the ROD for OU 1. Hercules completed all aspects of the OU 1 remedy in May 1998 (ERM 1998).

A ROD for OU 2, the soil, foundations and curbs, and underground utilities, was signed on September 17, 1996. This ROD also focused on pads, and it addressed both surface and subsurface soil (EPA 1996a). As part of the remedy for OU 2, a treatability variance from the Land Disposal Restrictions (LDRs) was granted by the Regional Administrator on July 18, 1996. The variance granted a change in the LDR treatability standard for dioxin-contaminated wastes (i.e., incinerator ash and salt residuals) from 1 ppb to 5 ppb (EPA 1998). As noted above, the OU 2 ROD allowed certain Off-Site OU waste to be consolidated on-site in the OU 1 landfill. This standard would apply should placement of wastes be determined to have occurred in the on-site OU 1 landfill.

The remedy for OU 2 as described in the 1996 ROD included the following elements:

- On-site soils containing dioxin concentrations at or above 5 ppb were to be excavated and disposed in the on-site OU 1 landfill. All excavated areas were to be backfilled with clean soil and re-vegetated, and drainage modifications were to be made to control run on and runoff.
- Excavation and off-site incineration of soil containing TCB concentrations above the 500 ppm health-based action level. All excavated areas were to be backfilled with clean soil, graded, and re-vegetated.
- Consolidation in the OU 1 landfill of approximately 2,770 cubic yards (yd<sup>3</sup>) of dioxin contaminated soil excavated from residential yards by Hercules in 1989.
- Consolidation in the OU 1 landfill of contaminated soil to be excavated from the Rocky Branch Creek and Bayou Meto floodplains.
- Consolidation in the OU 1 landfill of approximately 890 yd<sup>3</sup> of digester sludge from the Old STP and about 2 yd<sup>3</sup> of sediment removed from the interceptor lines as part of the Off-Site Areas OU.
- Cleaning and removal of solids from underground chemical sewer lines. The lines would then be filled with grout, and cut-off barriers would be installed around various underground utility lines to prevent shallow water migration.
- Foundations and curbs were to be cleaned through scarification, and surface sealing was to be employed for areas where staining is persistent. The foundations and curbs were to be covered with enough soil to support vegetative growth and graded to prevent erosion and the ponding of water.
- During the RA, air monitoring and dust suppression were to be conducted to prevent airborne migration of contaminants off-site.
- EPA would work with the City of Jacksonville and the Vertac receiver to impose deed restrictions and/or land use restrictions to limit the use of the property.
- Long-term O&M measures were to be implemented to ensure that the integrity of the OU 1 landfill is maintained.

- A phased-fencing approach was to be used for the southern parcel, to allow the maximum amount of property possible to be available for potential commercial redevelopment (EPA 2003b).

In 1997, studies by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Arkansas Department of Health (ADH) determined that a resident near the Vertac site had elevated levels of dioxin in blood. ATSDR and ADH recommended that the soil in the area be further investigated (EPA 2003b). EPA and Hercules both collected additional soil samples, and the results showed that four residential properties east of the Vertac site contained soil contaminated with 2,3,7,8-TCDD above the 1 ppb residential action level. These yards were designated the Jacksonville Residential Areas Superfund Site. On January 8, 1998, EPA issued an action memorandum for a time critical removal action to address the residential yard contamination. EPA then signed an ESD for the OU 2 ROD on January 12, 1998. This ESD determined that the Jacksonville Residential Areas Superfund Site was part of an “area of contamination” under OU 2 of the Vertac Superfund Site, and it stipulated that soils excavated from the residential yards were to be disposed in the on-site OU 1 landfill (EPA 1998). On January 15, 1998, the EPA issued an Administrative Order on Consent to Hercules Incorporated requiring it to perform the necessary sampling, analytical, removal, and disposal work called for under the action memo. Response activities performed by Hercules’ contractor and overseen by the EPA eventually affected nine residences and a portion of the Vertac site east of Marshall Road. All activities associated with the removal action for the Jacksonville Residential Areas Superfund Site and the ESD for the OU 2 RA were completed in May 1998 (EPA 1998).

The ROD for OU 3, groundwater, was signed on September 17, 1996. This ROD called for the use of a new groundwater extraction system and the existing French drain system (Vertac Remedy) to impede the off-site migration of contaminated groundwater, and invoked a Technical Impracticability (TI) Waiver for non-aqueous phase liquids (NAPLs) identified in the tilted, fractured bedrock system. The presence of NAPL in the bedrock system precluded the cleanup of contaminated groundwater using existing technology, and thus the Maximum Contaminant Levels (MCLs) specified in 40 Code of Federal Regulations (CFR) § 141.11-26 were waived as unachievable (EPA 1996c). The ROD also called for five-year reviews to evaluate the performance of the hydraulic containment system and to determine if any new

technologies are available to remediate the contaminated groundwater to confirm the continued applicability of the TI waiver (EPA 1996c).

The remedy described in the 1996 ROD for OU 3 included the following elements:

- Installation of extraction wells in the central process area to hydraulically control the off-site migration of groundwater to the east.
- Continued operation of the French drain to impede contaminant migration to the south and west.
- Proposed use of the Reasor-Hill well and MW-92 as additional extraction wells to help remove contaminants from the center of mass.
- Treatment of extracted groundwater in the on-site wastewater treatment facility.
- TI waiver granted establishing a TI zone within the central process area where the MCLs are unachievable due to the presence of NAPL in the fractured, tilted bedrock system.
- Established Plume Concentration Levels (PCLs) for contaminants that were to be monitored at the edge of the TI zone (Figure 3). The PCLs act as a trigger level. If a PCL is exceeded, additional actions would be required to ensure the protectiveness of the remedy.
- Established a semi-annual groundwater monitoring program to assess the effectiveness of the remedy at containing the contaminant plume, including monitor wells that were already installed in connection with the Vertac Remedy.
- Restrictions should be imposed on the use of the groundwater at the site (EPA 1996c).

EPA determined that containment, rather than treatment, of the contaminated groundwater was an appropriate approach for OU 3. This decision was based on the presence of NAPLs in the groundwater system that could not be remediated effectively using existing technologies. Also, the Atoka Formation underlying the site has limited potential as a water resource, and there was no anticipated future use of the groundwater at the site (EPA 1996c).

The remedial action goals were to prevent the off-site migration of contaminated groundwater and to prevent off-site receptors from potential exposure to contaminated groundwater discharges. The PCLs were established for selected compounds in order to monitor the boundaries of the plume. These levels were established based on both carcinogenic and non-carcinogenic risks ranging from  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .

The PCLs are listed in Table 3. The ROD states that if the PCLs are initially exceeded, then monitoring would increase from semi-annually to quarterly. Additional actions that may be

required to contain the plume could include changing the pumping rates on the existing extraction system and/or installing new wells or reworking existing wells to provide better containment, capture, and control (EPA 1996c).

### **4.3 REMEDY IMPLEMENTATION**

The selected remedies for the Vertac site have been implemented through various UAOs issued by EPA from 1993 to 1996 to the remaining Potentially Responsible Parties (PRPs) for the site: Hercules, Inc., Uniroyal Chemical Ltd., and Vertac Chemical Corporation. The UAOs instructed the PRPs to implement the RD/RA for the selected remedies, however, only Hercules complied with the UAOs. A Statement of Work (SOW) defining the RAs was attached to each UAO.

A UAO was signed by EPA on June 22, 1993, instructing the PRPs, including Hercules, to implement the remedies selected in the ROD for the Off-Site Areas OU (EPA 1993). RAs conducted for the Off-Site Areas OU ROD included the cleaning of the two interceptor lines, removal of sludge from the sludge digester and capping of the sludge drying beds at the Old STP, the demolition and capping of the aeration basin at the West Wastewater Treatment Plant, and the excavation of contaminated sediments from residential areas in the Rocky Branch Creek and Bayou Meto floodplains (ERM 1998b).

The 1993 UAO SOW required the following for the excavation of floodplain soil:

- Soil containing 2,3,7,8-TCDD concentrations greater than 1.0 ppb be excavated to 12 inches (in.).
- Soil containing 2,3,7,8-TCDD concentrations greater than 10.0 ppb be excavated to 4 ft or to bedrock.
- Excavated areas where 2,3,7,8-TCDD concentrations were between 1.0 and 10.0 ppb should be backfilled with 12 in. of clean soil.
- Excavated areas where 2,3,7,8-TCDD concentrations exceeded 10.0 ppb should be backfilled with 4 ft of clean fill or returned to original grade, whichever is less.
- All excavated areas were to be re-graded and re-vegetated.

Hercules was instructed in the UAO to plan the excavation to coincide with the issuance of the ROD for OU 2 to avoid long-term storage of the soil at the site (EPA 1993). On June 27, 1997,

Hercules awarded the RA contract and mobilization to the site began during the week of July 7, 1997. RA activities began with the clearing of vegetation to allow access to grids established for the purposes of sampling and excavation. Samples were collected prior to excavation, except for those grids immediately next to Rocky Branch Creek, which were known to be contaminated. Excavation occurred in 6- to 12-in. intervals. After each interval, confirmation samples were collected to determine if further excavation was required. Eight grids on the west side and ten grids on the east side of Rocky Branch Creek were excavated. Excavation of the floodplain soil was completed in October of 1997, and the backfilling, grading, and seeding were completed by early April 1998 (EPA 2003b). A UAO was issued on March 24, 1994, requiring the implementation of the RD/RA for OU 1 (EPA 1994). Another UAO for the implementation of the RD/RA for OU 2 was issued on December 10, 1996 (EPA 1996d). With EPA concurrence, Hercules modified the OU 1 RD documents to incorporate the work required for OU 2. This allowed for the administration of a comprehensive remedial action for both OUs (EPA 2003b).

While completing the RD, several site stabilization activities were completed in advance to better facilitate work during the RA. These activities included the removal of process vessel contents, storage tank contents, and drummed wastes, asbestos abatement and storage of ACM, the removal of TCB and TCB contaminated soil, and the construction of the OU 1 landfill. Liquid and solid wastes from process vessels were separated into F-listed wastes and non-F-listed wastes. All F-listed wastes were sent to the Aptus incinerator in Coffeyville, Kansas, and all non-F-listed wastes were sent to the Chemical Waste Management Facility incinerator in Port Arthur, Texas. The removal of the process vessel contents was conducted between August 1995 and July 1996. Approximately 1,353,720 pounds of spent carbon were also removed from the site and sent to the Aptus incinerator between August 1996 and February 1997. In January and February 1996, Environmental Resources Management (ERM) performed an asbestos assessment to prepare for ACM abatement activities at the site. Asbestos was found in both friable and non-friable forms in insulation for buildings, vessels, piping, and fittings, as well as in roofing and siding shingles, tar paper, and floor tiles. Abatement activities occurred during April and May 1996, and all materials were wrapped in plastic and stored for disposal in the on-site OU 1 landfill. The excavation of TCB and TCB-contaminated soil began in May 1997.

These contaminated media were sent to Aptus for incineration. Progress was dependent upon the availability of incinerator capacity, and the work was completed in October 1997.

Approximately 2.2 million pounds of TCB-contaminated material was sent to Aptus. Mobley Contractors was awarded the contract to construct the on-site OU 1 landfill. Construction work began in August of 1996. The OU 1 landfill was completed in June 1997 (EPA 2003b).

Mobilization for the comprehensive RA for OU 1 and OU 2 began on July 9, 1997. ENSR was awarded the RA contract by Hercules, and ERM performed quality assurance for Hercules during the RA. The U.S. Army Corps of Engineers performed oversight for EPA during this RA. Activities completed for the OU 1 and OU 2 RA included the demolition of plant buildings, removal and off-site incineration of PCB transformers, transportation and off-site incineration of shredded trash and pallets, excavation of on-site 2,3,7,8-TCDD contaminated soil, cleaning and grouting of underground chemical sewers, installation of trench cutoff barriers along underground utility lines, cleaning of exposed surfaces of building foundations and curbs, decontamination of process equipment and associated materials suitable for recycle/reuse, backfilling of site to final grade, consolidation of materials into the on-site OU 1 landfill, and capping and closure of the on-site OU 1 landfill. All activities were completed in June 1998. As a result of RA activities, 952 tons of equipment, scrap tin, and scrap steel were shipped off-site for recycle/reuse. Approximately 2 million pounds of shredded trash and pallets and four PCB transformers were shipped to Aptus for incineration. Efforts to recycle/reuse site materials resulted in a redesign of the final grade for the cap of the OU 1 landfill. The final elevation was lower than originally designed. Materials disposed of in the on-site OU 1 landfill included demolished site buildings, structures, process equipment, debris, ACM, RI derived wastes, bagged residential soil, drainage ditch soil, Rocky Branch Creek floodplain soil, site soil, drummed sludge and sewer solids, on-site 2,3,7,8-TCDD contaminated soil, and wastes, and debris and soil from remediation of the northern parcel of land (EPA 2003b).

For the removal of on-site 2,3,7,8-TCDD contaminated soil, an approach similar to that for the Rocky Branch Creek floodplain soil was employed. Additional soil sampling had determined that 2,3,7,8-TCDD represented 70 percent of the dioxin TEQ results. Therefore, the clean-up goal of 3.5 ppb 2,3,7,8-TCDD was used for the RA. Grids containing between 3.5 and 35 ppb

of 2,3,7,8-TCDD after the initial excavation required no additional excavation provided that the grid was covered with 1 ft of clean backfill (EPA 2003b).

On December 31, 1996, EPA signed a UAO requiring Hercules to perform a Non-Time Critical Removal action for the dismantling, decontamination, and demolition of the on-site incinerator, associated structures, and debris (EPA 1996f). Activities associated with this action included the demolition and decontamination of the on-site incinerator facility and associated structures, shipment of some materials off-site for recycle/reuse, excavation of soil contaminated above 1 ppb 2,3,7,8-TCDD, stabilization of excavated soil and incinerator ash, and on-site disposal in the OU 1 landfill of soil, incinerator ash, shredded pallets, and all equipment that could not be recycled or reused. As part of this removal action, several buildings on the northern parcel were decontaminated and left in place for potential reuse if the site is redeveloped. Removal activities began in early July 1997 and were completed in March 1998 (EPA 2003c).

On December 10, 1996, EPA signed a UAO requiring Hercules to perform the RA for OU 3 (EPA 1996d). The objective of the RA for OU 3 is to hydraulically contain the flow of the shallow contaminated groundwater at the site through the use of extraction wells and the French drain. Prior to construction of the remedy for OU 3, a new wastewater treatment facility was constructed by Hercules at the site. This construction occurred between January and June of 1997. Activities conducted as part of the RA for OU 3 included the construction of the groundwater recovery building, installation of additional monitor wells, installation of the extraction wells, and the development of a Site-Wide Groundwater Monitoring Plan. Construction of the remedy for OU 3 began in December 1997. The extraction wells were connected to a collection/transfer tank in the groundwater recovery building through underground piping, and the collection/transfer tank was connected to the new wastewater treatment facility through underground piping. The groundwater extraction system was put into operation on May 19, 1998, and all RA activities for OU 3 were completed in June 1998. The ROD had proposed the use of the Reasor-Hill well as an additional extraction well to remove NAPL in the central process area. During excavation activities associated with the RA for OU 2, the well was buried. Attempts to locate the well were unsuccessful, and the well has not been plugged and abandoned (EPA 2003b).

#### **4.4 OPERATION AND MAINTENANCE**

As the Respondent under several EPA CERCLA UAOs, Hercules is the site operator and is responsible for O&M activities at the site. Due to the complexity of the Vertac site, the remediation occurred in several phases, and several O&M plans were initially prepared and implemented at the site. In the time since completion of the second five-year review, the Site Wide O&M Manual (Terracon 2008c) for the Vertac site has been updated based on EPA's and ADEQ's comments. Hercules provided a written response letter to EPA and ADEQ on December 28, 2004. A copy of the response letter is provided in Attachment 2B. The latest revision of the manual was conducted in March 2008.

Hercules' contractor, Terracon, currently staffs the site with two operator personnel. Terracon reported at the third five-year review site inspection that current O&M activities are conducted in accordance with this manual.

O&M activities at the site include the continued operation and upkeep of the French drain and groundwater extraction system, operation and upkeep of the WWTP, inspections and upkeep of the OU 1 landfill, inspections and maintenance of the fences at the site, maintenance of the groundwater monitor wells, semi-annual groundwater monitoring, biannual (every other year) fish monitoring in Bayou Meto, Rocky Branch Creek, and Lake Dupree, sampling of the effluent from the WWTP, sampling of stormwater along Rocky Branch Creek, and mowing of the capped burial areas at the site. O&M activities are conducted by on-site personnel, and routine maintenance and monitoring of the various components of the remedy are conducted on a weekly and monthly basis as described by the March 2008 Site Wide O&M Manual (Terracon 2008c) and summarized in the following paragraphs.

The OU 1 landfill is visually inspected once a month to verify the integrity of the landfill cap and associated components. The leachate collection system and leachate detection system are monitored every two weeks, and leachate is extracted on an as needed basis. The site operator indicated during the third five-year review site inspection that leachate is generally removed from the leachate collection system of the north cell about every two weeks,

depending upon rainfall. The site operator also indicated that leachate rarely needs to be removed from the leachate collection system of the south cell. This condition was noted during the second five-year review and appears to be continuing. Additional information regarding this condition is provided in Section 5.0.

The French drain and groundwater extraction system are monitored remotely from the wastewater treatment facility, and repairs are made as necessary to both systems. The French drain sumps and groundwater extraction and monitor wells are inspected monthly. Water levels are collected on a monthly basis to verify that the groundwater flow gradients indicate the contaminant plume is still contained. Groundwater sampling is currently conducted on a semi-annual basis and the results of groundwater sampling events since November 2003 are presented in Table 4.

Biannual (every other year) monitoring of fish tissue in Rocky Branch Creek and Bayou Meto has occurred since 1994 (sample locations are illustrated in Figure 5). Samples have also been collected in certain events at Lake Dupree (which is outside the scope of the site CERCLA remedy). The most recent sampling event occurred in the summer of 2006 (GBMc 2006), however, another event is planned for later this year. Results of the fish monitoring events conducted since 1994 are presented in Table 5.

The fences at the site are inspected monthly. The site operator inspects the signs on the fence and condition of the fence. In addition, each gate is inspected to verify that it is still locked, and observations are made to determine if obvious signs of trespassing are present along the site fence.

The WWTP is inspected monthly to verify that all equipment is operational and no leaks are present. In addition, the system has been automated. Operators can access the system remotely via computer to determine the operational status of the WWTP, amounts of water stored in tanks, and the daily pumping and status of the French drain and groundwater extraction well pumps. The WWTP effluent is sampled in accordance with discharge requirements, and the results are submitted to the ADEQ monthly. In addition, water samples are collected and

analyzed prior to entry into the first carbon treatment unit, after exiting the first carbon treatment unit, and after exiting the second carbon treatment unit. This data is used to determine when the carbon needs to be replaced in the treatment units.

## **5.0 PROGRESS SINCE THE SECOND FIVE-YEAR REVIEW**

The second five-year review of the Vertac site was completed in November 2003, for the period from January 2001 through November 2003. The findings of the second five-year review, the status of recommendations and follow-up actions, the results of implemented actions, and the status of any other issues are described in the following sections.

### **5.1 PROTECTIVENESS STATEMENT FROM THE SECOND FIVE-YEAR REVIEW**

The second five-year review report concluded that the remedies for the Vertac site were considered protective of human health and the environment because the wastes have been removed or contained. Wastes buried in the burial areas and the OU 1 landfill were protected from erosion by caps. Contaminated groundwater was contained and removed by the French drain and groundwater extraction systems and treated at the WWTP prior to discharge. Ongoing implementation of the O&M program monitoring will ensure remedies continue to be protective.

The report also stated because the completed remedial actions and O&M program for the Vertac site are considered protective for the short term, the overall remedy for the site is protective of human health and the environment for the short term, and will continue to be protective if the action items identified in the second five-year review are addressed (EPA 2003b).

### **5.2 SECOND FIVE-YEAR REVIEW RECOMMENDATIONS AND FOLLOW-UP ACTIONS**

The second five-year review of the Vertac site, completed in November 2003, recommended the following follow-up actions (EPA 2003b):

- **Complete reevaluation of the fish consumption advisory for Bayou Meto** – ADH should complete the reevaluation of its fishing advisory for Rocky Branch Creek and Bayou Meto, including the 25 ppt action level for 2,3,7,8-TCDD in fish tissue and the geographical extent of the advisory, and pending completion of its evaluation and determination of an updated action level, should reinstitute the geographical limits of the fish consumption advisory to the pre-existing boundary, as recommended by the first five-year review.
- **Update the draft December 2002 Site Wide Operations and Maintenance Manual in accordance with Agency review comments** – The draft O&M Manual must be updated in accordance with all review comments and resubmitted to the regulatory agencies for review and approval; and following approval, it must be implemented. In particular, it has been noted that the revised manual should specify more direct communication of problems and follow-up actions by the site operator to the regulatory agencies.
- **Document status of disparity in leachate volume between the north and south cells of the OU 1 landfill** – At the time of the five-year review site inspection, the site operators indicated that a disparity in the volume of leachate was being observed between the north cell and the south cell of the OU 1 landfill (with the north cell generating more leachate than the south cell). Actions taken and recommendations for addressing this disparity in leachate volume were to be documented in the next annual progress report for the site and reviewed by EPA and ADEQ.
- **Address detections and exceedances in the wastewater treatment plant effluent** – The detection of low concentrations of chlorophenols and pesticides in the discharge effluent samples from the WWTP should be addressed. Hercules is required to report concentrations of these contaminants in their monthly report to the ADEQ, but no discharge limits have been set. While the concentrations are usually low (less than 10 ppb), the continued detection of these contaminants should be evaluated, including review of the need for discharge limits.

The reported chloride and total dissolved solids (TDS) exceedances should also be reviewed and evaluated by the EPA remedial project manager (RPM) and/or the EPA oversight contractor, along with the 2001-2003 2,3,7,8-TCDD monthly discharge limitation exceedances, including a review of the supporting data, documentation, analysis, and determinations of the site operator with respect to the cause of these discharge exceedances. Although a site waste water treatment facility was originally used as part of the Vertac Remedy, a new plant was constructed just prior to the OU 3 remedial action to treat the leachate produced by the OU 1 landfill, as well as contaminated liquids produced by the new remedial components added in the OU 3 remedial action and the elements of the existing Vertac Remedy that were adopted and incorporated by the OU 3 CERCLA remedy. As part of the actions directed by this review, EPA will investigate and determine if the streamlined treatment methods currently being employed by the WWTP prior to discharge into Rocky Branch Creek meet the OU 3 applicable or relevant and appropriate

requirements (ARARs) Best Available Technology (BAT) standards for certain toxic pollutants under the Clean Water Act.

- **Site Groundwater Monitoring Plan and Operations review** – The site operator has been directed by the EPA RPM to reinstitute semi-annual groundwater monitoring in the first quarter of calendar year 2004 and to restore 2,3,7,8-TCDD to the groundwater monitoring analyte list, as required by the OU 3 ROD. The site operator should also be directed to make corrections to the site groundwater monitoring plan to reflect these requirements, which should continue until otherwise directed. No further modifications to the site remediation O&M program should be undertaken by the site operator without the express prior written approval of both the EPA and the ADEQ.
- **Submission of Level III data packages** – The five-year review recommended that the site operator provide Level III data packages (versus Level II) with at least one of the required annual progress reports per five-year review period to provide for more comprehensive review of data quality in the annual groundwater monitoring progress report by the EPA and ADEQ. The site operator should also be directed to amend the groundwater monitoring plan to provide for this requirement and continue to implement it.
- **Reevaluate the availability of new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer** – The OU 3 ROD requirement for evaluation of the performance of the hydraulic containment system and determination of whether new technologies are available to remediate the contaminated groundwater, should be accomplished at the next five-year review and each subsequent one, in order to confirm the continued applicability of the TI waiver.

### 5.3 STATUS OF RECOMMENDED ACTIONS

This section describes the current status of implementation of the recommendations included in the second five-year review report.

#### Complete reevaluation of the fish consumption advisory for Bayou Meto

In 2001 and 2003, as part of the five year review process, the EPA corresponded with the ADH on the issue of re-imposition of a fishing ban or advisory on the lower Bayou Meto segment below the Highway 13 bridge, and the adoption by the ADH of an EPA recommended screening level for dioxin in fish tissue (EPA 2003a). Oral discussions also took place between the EPA and ADH. Following EPA correspondence at the senior level in October 2003, the Executive Director of the ADH directed a re-examination of whether to reopen the screening levels for dioxin in fish tissue and to re-institute either fishing advisories or the fishing ban on Bayou

Meto below the Highway 13 bridge. The director indicated that in this process ADH would “consider the human health implications as well as possible economic, social, and community ramifications” of such actions. The director also indicated that the ADH would be seeking a grant from the ATSDR for a reassessment of these issues (ADH 2003). In the 2008 review process, the Associate Branch Chief for Epidemiology, ADH, acknowledged the prior requests from EPA asking ADH to consider lowering its dioxin screening level for fish tissues taken from state waters to 0.7 ppt, based upon EPA guidance on fish advisories, from the current level of 25 ppt (an action level derived from prior U.S. FDA guidance), as well as the reinstatement of either the fishing ban, or advisory, on the lower Bayou Meto below the Highway 13 bridge. In response to those requests, the ADH staff spoke with some state legislators, as well as community leaders and representatives, and the Office of the Governor. The ADH also considered the potential for major adverse economic impacts from such changes. Ultimately, ADH decided not to make the recommended changes. In follow-up communications with EPA, the ADH indicated that it also had conducted preliminary discussions about the possibility of obtaining an ATSDR grant, but based on the data already available on Vertac and the competitiveness of the grant process, ultimately did not apply for a grant. ADH currently has no funds, or plans, for further study of this issue (ADH 2008). In addition, the sampling location at Highway 13 bridge was dropped as such in the 2006 study, and the responsible party has recommended reduction of the frequency of the sampling interval from every two years to every five years.

#### Update the draft December 2002 Site Wide Operations and Maintenance Manual

Regarding the recommendation for revision to the draft Site Wide O&M Manual, Terracon has prepared and submitted a revised comprehensive Site Wide O&M Manual to EPA and ADEQ. The manual has been updated in accordance with the review comments and a “Response to Comments” letter from Hercules was submitted to EPA and ADEQ on December 28, 2004, however, formal written approval of the updated manual from EPA and ADEQ was not available. In addition, the revised manual does specify more direct communication of problems and follow-up actions by the site operator to the regulatory agencies. The manual identified specific issues that require immediate reporting to EPA and ADEQ by telephone, e-mail and/or in writing. In addition, any modification to the O&M manual or O&M procedures will be

reported in the annual reports submitted to EPA and ADEQ (Terracon 2008c). The current version of the Site Wide O&M Manual is dated March 2008.

#### Disparity in leachate volume between the north and south cells of the OU1 landfill

Concerning the status of the disparity in leachate volume between the north and south cells of the OU 1 landfill, no additional actions or recommendations for addressing this disparity has been documented in the annual progress report as recommended in the second five-year review. Conversations with the on-site consultant, Terracon, indicate that although there is a difference between the north and south cells, the amount of leachate collected from the system is well below the maximum amount of leachate that can be stored in the sump and still maintain less than 2 ft of head in the primary leachate sump. The O&M manual indicated that if less than 1,130 gallons (gal) of leachate is removed from the sump, the leachate level is less than 2 ft of head on the sump (Terracon 2008c). Based on a review of the recorded leachate data obtained an average of 300 gal from the north cell and 135 gal from the south cell is removed every two weeks. These volumes indicate an average depth in each sump of approximately 0.5 ft for the north cell and 0.25 ft for the south cell. Since this is less than the maximum allowable depth, no additional actions or recommendations are anticipated.

#### Detections and exceedances in the wastewater treatment plant effluent

Although the detection of low concentrations of chlorophenols and pesticides in the discharge effluent samples from the WWTP has continued on an occasional basis, the site operator determined that the cause of the 2,3,7,8-TCDD exceedances was due the use of contaminated backwash water to flush the carbon filters and the presence of leaking valves. Hercules is required to report concentrations of these contaminants in their monthly report to the ADEQ, but there continues to be no set discharge limits. While the concentrations are usually low, the continued detection of these contaminants should be evaluated, including review of the need for discharge limits. In addition, the reported 2,3,7,8-TCDD discharge limitation exceedances, along with chloride, and TDS exceedances should still be reviewed and evaluated by the ADEQ.

### Site Groundwater Monitoring Plan and Operations Review

The site operator has reinstated the semi-annual groundwater monitoring as directed by EPA (Hercules 2006h). In addition, the site operator has restored 2,3,7,8-TCDD to the groundwater monitoring analyte list, as directed by the EPA RPM and as required by the OU 3 ROD. At the time of this review, the Site-Wide O&M Manual (Terracon 2008c) had been updated, but the Site-Wide Groundwater Monitoring Plan (Maud 1998) had not been revised to reflect these requirements. No further modifications other than those identified in the O&M manual have been or will be undertaken by the site operator without the express prior written approval of both the EPA and the ADEQ.

### Level III data packages

The second five-year review recommended that the site operator provide Level III data packages with at least one of the required annual progress reports per five-year review period to provide for more a comprehensive review of data quality in the annual groundwater monitoring progress report by the EPA and ADEQ. This requirement has been implemented and the site operator has included a Level III data package with the report of analytical sampling and analysis from the April 2007 groundwater monitoring event for this five-year review period.

### Availability of new technologies to treat and/or remove NAPL

Regarding the second five-year review recommendation that the next five-year review include another assessment of the availability of technologies to remove NAPL from the fractured bedrock at the site to confirm the status of the TI waiver for the groundwater, this assessment has been performed as part of this third five-year review. The results of this assessment are included in Section 7.4 of this report.

## **6.0 THIRD FIVE-YEAR REVIEW PROCESS**

This section presents the process and findings of the third five-year review. Specifically, this section presents the findings of the document review, data review, ARARs review, site inspection, and interviews.

## **6.1 ADMINISTRATIVE COMPONENTS**

The third five-year review for the Vertac site was led by Mr. Philip Allen, EPA RPM. EA Engineering, Science, and Technology, Inc. (EA), assisted in the review process. EA's team members included Ms. April Ballweg and Mr. Stan Wallace. Mr. Allen notified the PRP group representatives, Mr. Tim Hassett (Hercules) and Mr. David Jaros (Terracon) at the start of the five-year review process. Two ADEQ agency representatives, Ms. Dianna Kilburn, P.G., and Ms. Annette Cushner, P.E., participated during the third five-year review inspection and interview process in June 2008; and Ms. Shirley Louie, M.S., CIH, Associate Branch Chief for Epidemiology, ADH, also participated in the interview process in June 2008. In November 2008, EPA staff had follow-up communications with ADH about related grant questions. Other individuals involved in the interview process included Mr. Phillip Carlisle with the Concerned Citizens Coalition and Mayor Tommy Swaim with the City of Jacksonville.

In March 2008, the review team established the review schedule, which included the following components:

- Document review;
- Data review;
- ARARs review;
- Site inspection; and
- Interviews.

## **6.2 COMMUNITY INVOLVEMENT**

Three public notices announcing the initiation of the five-year review for the site were published in the following local newspapers; *Arkansas Democrat Gazette*, September 1, 2008, *The Leader*, September 3, 2008, and *Jacksonville Patriot*, September 10, 2008. Copies of the initial public notices are provided in Attachment 7.

Upon signature, the Third Five-Year Review Report will be placed in the information repositories for the site, including the City of Jacksonville City Hall, the ADEQ office in Little Rock, Arkansas, and the EPA Region 6 office in Dallas, Texas. A final notice will then be published in the local newspapers summarizing the findings of the review and announcing the availability of the report at the information repositories.

### **6.3 DOCUMENT REVIEW**

The five-year review for the site included a review of relevant documents, including the RODs, ESDs, UAOs, Second Five-Year Review Report, the Site Wide O&M Manual, the Site Wide Groundwater Monitoring Plan, Discharge Monitoring Reports, Progress Reports, and site correspondence with state and federal agencies. Complete references for the documents reviewed are provided in Attachment 2A, and copies of relevant correspondence are provided in Attachment 2B.

### **6.4 DATA REVIEW**

Performance and compliance monitoring data collected as part of O&M activities at the site were reviewed as part of this third five-year review. These data consist of groundwater quality data, groundwater level measurements, WWTP discharge data, and fish tissue monitoring data.

The treatment plant discharge data are collected monthly and compiled in monthly reports submitted to the ADEQ. Groundwater quality data from November 2003 to the present was collected semi-annually and submitted in a progress report (Hercules 2006h and Terracon 2008a). As described in the progress reports and per EPA's request, the site operator resumed semi-annual groundwater sampling. Currently, under this plan, the next groundwater sampling event is scheduled for October 2008. Annual progress reports are submitted, but it was noted during this five-year review they are submitted every two years instead of on a yearly basis. Groundwater level measurements are collected on a monthly basis, and this data is also submitted in the progress report (Hercules 2006h and Terracon 2008a). The fish tissue monitoring data is collected biannually and submitted in a biannual report (GBMc 2004, 2006). Groundwater data available for the site since the second five-year review in 2003 is summarized in Table 4 (through April 2008). Fish tissue monitoring data available for the years 2004 and 2006 is summarized in Table 5.

The majority of reported contaminant concentrations were either below the corresponding MCL/PCL or were non-detect during the third five-year review period. Exceptions to this were noted for 2,3,7,8-TCDD and toluene. The groundwater monitoring data collected through April

2008 indicated three monitor wells (MW-9, MW-77, and LW-5) located outside of the TI zone, and two of the Rocky Branch Creek samples had 2,3,7,8-TCDD exceedances above the MCL of 0.03 nanograms per liter (ng/L), with one exceedance above the PCL of 7 ng/L for MW-77 in November 2005. Table 6 provides the locations, dates, and 2,3,7,8-TCDD concentrations of the exceedances during this five-year review for wells outside of the TI zone.

In addition, three wells located within the TI zone exceeded MCLs but not PCLs. Monitor wells MW-36 and MW-100 exceeded the 2,3,7,8-TCDD MCL of 0.03 ng/L, and MW-101 exceeded the toluene MCL of 1,000 ug/L. Table 7 provides the well identifications, dates, and concentrations of these exceedances.

The water level data available in the progress reports submitted by Hercules in July 2006 and by Terracon in February 2008 indicate that the groundwater extraction system is containing the majority of groundwater flow to the east in the fresh bedrock aquifer. These results indicate that at times slight eastward gradients were observed between some paired wells (i.e., MW-79/MW-99, MW-100/MW-89, MW-102/MW-90, and MW-91/MW-94). This was most common in well pairs MW-100/MW-89 and MW-91/MW-94. These well pairs are located between the TI waiver boundary and Marshall Road. The groundwater extraction system is controlling the hydraulic flow along the eastern edge of the TI zone with the exception of slight eastward lateral gradients during periods of dry weather (Hercules 2006h and Terracon 2008a). The French drain system was installed to the bedrock surface to intercept the flow of contaminated groundwater to the west and south from the site (EPA 2003b).

The WWTP discharge data is collected on a monthly basis, and the data is submitted to the ADEQ in monthly reports. The data from April 2003 through May 2008 were reviewed as part of this third five-year review. The data show that the WWTP exceeded the discharge limit for 2,3,7,8-TCDD in November 2004 (Hercules 2004k), February and May 2006 (Hercules 2006b, e), October and November 2007 (Hercules 2007j, k), and April 2008 (Hercules 2008d). All other discharge requirements were met during the requisite period. One possible explanation by the site operator for the continued exceedances during this review period was laboratory false positives. The site operator indicated that when an exceedance occurs, an

additional discharge sample is obtained during the month in question and analyzed to verify the initial exceedance. The resulting analytical data indicates that the resamples for every month in question, with the exception of October and November of 2007, were below the limits of detection. While the concentrations are usually low, the continued detection of the contaminants should be evaluated in order to identify the action necessary to eliminate or minimize discharge limit exceedances.

The wastewater treatment discharge data also shows that the monthly average limit for TDS was exceeded in June and August through October 2003 and the monthly average limit for chlorides was exceeded in August through October 2003. In addition, the maximum daily average for TDS and/or chlorides were exceeded at least once for the months August through October 2003 (Hercules 2003c, e, f, g). On February 4, 2004, the site operating consultant met with the ADEQ to present calculations in support of a request to revise the discharge limits at Outfall 002 (the WWTP discharge point) for TDS and chlorides. A letter submitted to ADEQ on February 6, 2004, identified that the personnel from the Hazardous Waste Division and Water Division agreed that the limits should be revised to "Report Only" (Terracon 2004). The site operator initiated implementation of the approved revisions in the January 2004 DMR which was submitted in February 2004.

Various chlorophenol, dichlorophenol, trichlorophenol, and pesticide compounds also continue to be sporadically detected in the WWTP discharge samples. There are no set discharge limits for these compounds, but the ADEQ discharge permit does require that results for these compounds be reported in the monthly reports (ADPC&E 1996). The cause for these detections has not been documented.

In May 2007, ADEQ approved (ADEQ 2007) an Outfall 002 Sampling Reduction Request submitted by Terracon. This approval allowed the removal of silver, DDT, and metabolites from the list of sampling parameters for the discharge monitoring reports. A request to remove mercury, cadmium, chromium, lead, heptachlor epoxide, nitrate+nitrite, and cyanide was not granted by ADEQ until further results and/or analytical methods were conducted. In addition, a request to reduce the monitoring frequency for oil and grease, copper, selenium, and toluene was

not granted due to an insufficient amount of data available for review. A copy of the ADEQ letter is provided in Attachment 2B.

On February 21, 2008, Terracon reported to ADEQ an unpermitted release at the Vertac site. Influent water from an equalization (EQ) tank at the WWTP was released at the site on February 17, 2008. The release of approximately 20,000 gal of EQ tank water commingled with storm water runoff occurred which eventually flowed into the Rocky Branch Creek over an 8 to 10 hour period of time. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon estimates approximately 3.5 pounds (lbs) of phenols and 14 lbs of herbicides may have been released (Terracon 2008b).

On February 29, 2008, in a follow-up investigation, Terracon collected soil samples from four locations in the observed area of impact including one sample from an upgradient location (control sample) to be analyzed for phenols and herbicides. One result of 2,4,5-T at 0.110 milligram per kilogram (mg/kg) was detected at the sampling location at the edge of the parking lot of the WWTP. All other samples were below the detection limits. The letter from Terracon to ADEQ noted that the Region 6 Human Health Medium Screening Level 2008 for an industrial outdoor worker for 2,4,5-T is 6,800 mg/kg in soil (Terracon 2008b).

Terracon determined the cause of the equalization tank release was that the control panel dial was not fully engaged in the operating mode which caused the sand filter valve to remain partially open. In addition, a blown fuse caused the EQ tank valve to fail and the associated (backup) sump pump to fail. In order to prevent future incidences, Terracon has marked the sand filter's dial to indicate when the sand filters are in the proper mode of operation, and the operators are now required to check the programmable logic computer along with fuses after any thunderstorms to ensure the system is running properly (Terracon 2008b). Correspondence between ADEQ and Terracon concerning this incident is provided in Attachment 2B.

Fish flesh monitoring pursuant to the CERCLA Off-Site remedy (and at Lake Dupree under a State cleanup) has been performed at seven locations: one in Rocky Branch Creek; one in Lake Dupree; and five along Bayou Meto. The historical sampling locations in the Bayou Meto are

(from upstream near the site to downstream): U.S. Highway 67-167, State Highway 161, Interstate Highway 40, State Highway 15, and State Highway 13. Additionally, as reported in the 2003 Five-Year Review Report, the Arkansas Game and Fish Commission performed fish flesh sampling below the Highway 13 bridge at the request of ADH (EPA 2003b). According to the 2006 Bayou Meto Fish Flesh Monitoring Report (GBMc 2006), the sampling reach at State Highway 13 was eliminated from the study. This decision was made without EPA's approval. Refer to Figures 4 and 5 for the layout of the Rocky Branch Creek, Lake Dupree, and the Bayou Meto relative to the site, and the sampling locations along the Bayou Meto where fish tissue samples are collected. Hercules currently performs biannual fish tissue monitoring at the Rocky Branch Creek location, Lake Dupree, and the four remaining Bayou Meto locations (U.S. Highway 67-167, State Highway 161, Interstate Highway 40, and State Highway 15). The biannual sampling events conducted during this five-year review period occurred in August 2004 (GBMc 2004) and July 2006 (GBMc 2006). The current extent of the fish consumption advisory which now extends only to the State Highway 13 bridge is shown on Figure 4. The analytical results for all sampling events are presented in Table 5.

Geographically, the fish tissue sample results show a general decreasing trend in the 2,3,7,8-TCDD results downstream of the site towards the furthest-downstream sampling location at the State Highway 15 bridge. During the period 2004 to 2006, the highest concentrations of 2,3,7,8-TCDD were detected in fish tissue collected during the 2004 and 2006 events at the Rocky Branch Creek location, and the lowest concentrations of 2,3,7,8-TCDD were detected in the 2004 samples collected near the U.S. Highway 67-167 bridge and Lake Dupree, and in the 2006 samples collected near Arkansas Highway 15 bridge. No sampling results are available at this time for 2008. Although Lake Dupree has been the subject of a separate cleanup response effort involving the ADEQ, it has not been the subject of CERCLA remedial action and is not formally a part of the Vertac site five-year review.

All sample results have been below the FDA advisory level of 25 ppt dioxin in fish tissue samples that is utilized by the ADH. However, fish tissue at all current sampled locations demonstrated the presence of 2,3,7,8-TCDD concentrations above the current EPA recommended screening level of 0.7 ppt (EPA 2003b). Further, in 2001, the special sampling

event conducted by the Arkansas Game and Fish Commission had showed 2,3,7,8-TCDD below the Highway 13 bridge above the recommended EPA screening level in four of five samples (EPA 2003b).

The most recent biannual fish sampling report submitted by Hercules recommended that the fish consumption advisory be rescinded on the Bayou Meto (GBMc 2006). The Hercules report also recommended the cessation of biannual fish tissue monitoring since all of the samples have been less than 25 ppt for three consecutive monitoring periods (GBMc 2006). The Hercules recommendations did not discuss the EPA guidance recommended screening level of 0.7 ppt (EPA 1995a).

During the interview process, the site project manager from Hercules requested that the fish flesh monitoring be modified from biannually to once every five years, with the monitoring event occurring the year prior to the next five-year review (Hercules 2008f). The EPA RPM and the ADEQ representatives present during the meeting tentatively concurred with this recommendation and discussed a postponement of the next fish flesh monitoring event until July and/or August of 2012 with the report to be submitted by December 2012 in time for the next five-year review in 2013. The Hercules representative indicated an intent to submit a formal written request to EPA and ADEQ (Hercules 2008g). However, upon further review of the available data and background information on this subject, the Hercules request will not be approved. Hercules will instead be directed to carry out the regularly scheduled 2008 fish flesh sample by no later than January 31, 2009, and to continue with the fish sampling, and reporting program at all locations on the existing regular two year schedule in 2010, 2012, and so forth under the Off-Site remedy and UAO. In addition, the Highway 13 bridge will be reinstated as a sampling location, and a special sampling of the Bayou Meto below the Highway 13 bridge will be planned to be conducted in July or August 2009. The EPA will then require an analysis of the question of whether a commercial fishing ban or consumption advisory is necessary on Bayou Meto below the Highway 13 bridge, and will review the potential applicability of the 0.7 ppt dioxin screening level for fish flesh as a TBC, while in the interim requiring the responsible party to employ the 0.7 ppt level for its actual sampling and analysis. EPA will also continue to encourage the ADH by appropriate means to reinstate the fish consumption advisory or

commercial fishing ban in the areas below the Highway 13 bridge where it was formerly applicable, while EPA reviews the necessity of this extended sampling from a public health standpoint.

## **6.5 ARAR REVIEW**

ARARs for the four OUs at the Vertac site were identified in several decision documents: Off-Site OU ROD dated September 27, 1990 and amended September 17, 1996; OU1 ROD dated June 30, 1993 and ESD dated May 25, 1995; OU2 ROD dated September 17, 1996; and OU3 ROD dated September 17, 1996. In addition, two five-year reviews have been conducted since the remedial action for the Off-Site Areas OU (November 30, 1993) was commenced. These five-year reviews were conducted in July 2001 and November 2003, respectively.

This five-year review evaluates ARARs and TBCs identified in the RODs and ESDs associated with the overall protectiveness of the remedy at the Vertac site and O&M of the remedy as follows:

- Pumping of affected groundwater from the groundwater extraction system along the eastern portion of the site
- Collection of affected groundwater from the French drain that intercepts groundwater flow along the western and southern boundaries of the burial areas at the site
- Treatment and discharge of extracted groundwater from the WWTP to the Rocky Branch Creek
- Management and off-site disposal of WWTP filtrate media
- Maintenance of the capped burial areas and the OU 1 landfill
- Groundwater and surface water monitoring, and
- Maintenance of the groundwater extraction system, French drain, and WWTP.

ARARs associated with the remedy were evaluated to determine if any newly promulgated or modified requirements of federal and state environmental laws and regulations have significantly changed the protectiveness of the remedy implemented at the Vertac site since the decisions documents were issued and the second five-year review was completed.

Changes to ARARs and TBCs identified in the RODs and ESDs were evaluated. Although changes to the regulations have occurred since the second five-year review, none of these changes impact the protectiveness of the remedy at the Vertac site and no newly-promulgated ARARs were found during this review. However, the EPA will review the question of whether the EPA guidance for fish advisories, specifically the recommended screening level of 2,3,7,8-TCDD of 0.7 ppt, should be adopted as a TBC (EPA 1995a).

### 6.5.1 Chemical-Specific ARARs

The chemical-specific ARARs identified in the RODs and ESDs applicable to the existing remedy at the site include the following:

- **Federal Safe Drinking Water Act, MCLs and Action Levels (40 CFR Part 141), and Secondary MCLs (SMCL) (40 CFR Part 143)**—These requirements are relevant and appropriate to groundwater used for drinking water by residences with private water supply wells at the site. The RODs identified these MCLs and SMCLs as relevant and appropriate to the site except for areas subject to the TI waiver established under the OU 3 ROD (“the TI zone”). The OU 3 ROD required that contaminants of concern (COCs) meet PCLs at the boundary of the TI zone. No changes to the MCLs and SMCLs have been promulgated for the identified COCs. PCLs have not been modified since the ROD was issued as identified in the second five-year review and subsequent review of site data. As indicated in the second five-year review, 2,3,7,8-TCDD was removed from the groundwater monitoring PCL list but was reinstated in the groundwater monitoring program per EPA’s direction (EPA 2003b). The chemical-specific ARARs for groundwater specified in the RODs were the MCLs, SMCLs and PCLs. Specifically MCLs were identified for the Vertac site outside the TI zone. PCLs were defined as the trigger levels for the TI zone.
- **Federal RCRA, Identification and Listing of Hazardous Waste (40 CFR Part 261 and Arkansas Hazardous Waste Management Regulation 23)**—The RODs identified these requirements as applicable to solid wastes generated during the treatment of contaminated groundwater which may be classified as a hazardous waste. Site O&M activities generate hazardous wastes of carbon containing landfill leachate (listed F039 waste) which is sent to Calgon Carbon Corporation for regeneration approximately three times per year (Terracon 2008e) in accordance with these requirements. In addition, during cleanout of the EQ tanks, a sediment/sludge is removed. This removal occurred once in 2000 and has not occurred during the 2003 through 2008 five-year review period. Any future removal of the sediment/sludge would need to meet these ARARs.
- **Federal RCRA, Land Disposal Restrictions (40 CFR Part 268) and Arkansas Hazardous Waste Management Regulation 23**—These requirements were identified in the RODs as applicable to hazardous wastes generated at the site for wastes generated

outside the Area of Contamination (AOC). LDRs do not apply to any wastes consolidated within the AOC. For wastes treated and re-deposited within the AOC, EPA granted a treatability variance for dioxin-contaminated wastes changing the treatability standard from 1 to 5 ppb. For hazardous wastes generated and disposed of off-site the LDRs are applicable. During the 2003-2008 five-year review period, no waste from the site was generated and disposed of in a landfill; therefore, LDRs were not triggered. In the future the LDRs may need to be met for sediment/sludge generated from the cleanout of the EQ tanks. This removal occurred once in 2000 and has not occurred during this review period. Any future removal of the sediment/sludge would need to meet these ARARs.

- **Water Quality Discharge Requirements (40 CFR Parts 122, 125 and 129 and Arkansas Regulations 2 (Regulations Establishing Water Quality Standards for Surface Waters of the State of Arkansas) and 6 (Regulations for State Administration of the National Pollutant Discharge Elimination System (NPDES))**—These requirements were identified in the RODs as applicable to the chemical-specific discharge criteria developed for the discharge of treated groundwater and leachate to Rocky Branch Creek. Regulation 2 was modified in 2007 (effective date November 5, 2007) and Regulation 6 was modified in 2008 (effective date January 17, 2008). Changes made to Regulation 6 do not affect wastewater discharge associated with the Vertac site. Changes made to Regulation 2 do not affect wastewater discharge associated with the Vertac site.

No other chemical-specific federal or State of Arkansas ARARs for the Vertac site were identified during the second five-year review process and no new chemical-specific requirements pertaining to the site have been promulgated since 2003.

### **6.5.2 Location-specific ARARs**

Location-specific ARARs are restrictions on remedial activities solely based on the location of the remedial activity. The location-specific ARARs identified in the RODs and ESDs for the four OUs at the Vertac site are not applicable to the ongoing O&M activities at the site and therefore would not affect the protectiveness of the site remedy.

No other location-specific ARARs for the Vertac site were identified during this five-year review process, and no new location-specific requirements pertaining remedy at the site have been promulgated since 2003.

### 6.5.3 Action-specific ARARs

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions or conditions taken with respect to specific substances. These requirements are triggered by the particular remedial activities that are selected to accomplish the remedy. The action-specific ARARs specified in RODs and ESDs are discussed below:

- **Federal RCRA**

- **Standards Applicable to Generators of Hazardous Waste (40 CFR Part 262 and Arkansas Hazardous Waste Management Regulation 23):** The ROD identified these requirements for management and manifesting hazardous waste for off-site transportation and disposal as being applicable to potential hazardous wastes generated from remedial actions at the site. O&M of the treatment system at the site consider these requirements in accordance with the O&M plan. Site O&M activities generate hazardous wastes of carbon containing landfill leachate (listed F039 waste) which is sent to Calgon Carbon Corporation for regeneration (Terracon 2008e) in accordance with these requirements. In addition, during cleanout of the EQ tanks a sediment/sludge is removed periodically. This removal occurred once in 2000 and has not occurred during the 2003 through 2008 review period. Any future removal of the sediment/sludge would need to meet these ARARs.
- **Standards Applicable the Management of Containers and Tanks (40 CFR Part 264, Subpart I and Arkansas Hazardous Waste Management Regulation 23):** These regulations identify the requirements for the management and storage of containers storing hazardous waste. Waste stored for off-site disposal is managed in accordance with these requirements.
- **Standards Applicable to Landfill Capping and Post-Closure Care Requirements (40 CFR Part 264 Subpart N and Arkansas Hazardous Waste Management Regulation 23):** The RODs identified the ARARs associated with the capping and post-closure care related to the land-related units at the Vertac site. These requirements are being met through implementation of the O&M plan.
- **General TSD Facility Requirements Under RCRA (40 CFR 264, Subparts B, C, and D and Arkansas Hazardous Waste Management Regulation 23):** The RODs identified these ARARs which address the general facility requirements associated with preparedness and prevention, and contingency and emergency planning procedures associated with the operation. These requirements are being met through implementation of the O&M plan.
- **Groundwater Monitoring (40 CFR § 264.91 Arkansas Hazardous Waste Management Regulation 23):** The RODs identified this regulation which requires

that owners/operators of land-based RCRA treatment, storage or disposal (TSD) units conduct groundwater monitoring and response program. The OU 3 ROD determined that although these requirements are not applicable to site-wide monitoring that may be part of a selected remedy for groundwater, the RCRA groundwater monitoring program may be consulted, where relevant and appropriate. Groundwater monitor wells will be used to track the operation and performance of the selected remedy. The number and location of the monitoring locations will be determined by site-specific conditions. Existing monitor wells will be utilized if their location and construction are consistent with the monitoring objectives. This five-year review evaluated the relevance and appropriateness of this requirement and determined that the existing groundwater monitoring program was sufficient to ensure the protectiveness of the remedy.

- **Regulation 3 – Licensing of Wastewater Treatment Plant Operators (effective date March 15, 2008):** This regulation, which specifies the requirements for the licensing of wastewater treatment plant operators, was modified in 2008 and was identified as a potential ARAR in the OU 3 ROD. The site project manager currently holds a Class 1 Industrial Wastewater Operator License (#004190), and the site plant operator holds a Class 2B Industrial Wastewater Operator License (#007555). Both licenses have an effective expiration date of December 31, 2009 (ADEQ 2008). Per Section 3.307 of the regulation, current holders of a Class I or Class II Municipal and Industrial Wastewater Operator Licenses will be grandfathered into the Basic Industrial Wastewater Operator License. Changes made to Regulation 3 do not affect the Vertac site operator’s licenses.
- **Closure Requirements for Injection Wells Regulated Under 40 CFR 144 and 146 and Arkansas Regulation 17 (with modified effective date February 14, 2005):** The second five-year review noted that during the RA, the Reasor-Hill well was buried and several unsuccessful attempts have been made to locate the well and the well has not been closed. This updated ARAR would apply to the remedy in the event that the Reasor-Hill well is eventually located, or for the closure of other injection, extraction, and monitor wells on-site.

No other action-specific federal or state of Arkansas ARARs for the Vertac site were identified during the five-year review process, and no new action-specific requirements pertaining to the site have been promulgated since 2003.

#### 6.5.4 To Be Considered

The Off-Site OU ROD identified TBCs as follows:

- April 24, 1986, memo from ATSDR to EPA Region 6. This memo recommends cleanup levels specific to the Vertac off-site area.

- January 26, 1989, memo from EPA to ATSDR stating that the highest concentration of 2,3,7,8-TCDD found in the Rocky Branch Creek and Bayou Meto sediments does not pose an unacceptable health threat.
- The EPA 1-ppb action level previously employed at other 2,3,7,8-TCDD contaminated sites.
- Proposed advisories on protection of human health and aquatic life developed under the Clean Water Act (CWA). The advisories for aquatic life are specific to individual fish species, and may have to be adjusted for conditions in Rocky Branch Creek.

These guidelines were reviewed in the second five-year review. During the second five-year review it was identified that the ATSDR had modified its screening levels, evaluation levels, and actions level TEQs in 1997. Since the second five-year review, the ATSDR policy related to dioxins was modified in 2005 (February 17, 2005). In that policy document, the ATSDR removed the 1 ppb action level (ATSDR 2005). Based upon the second five-year review it was determined that the site-specific risk assessments for the Vertac site for residential soil cleanup level of 1 ppb action level and covered with at least 1 ft of clean soil to prevent exposures was protective. Therefore, the ATSDR guidelines in 1997 and 2005 do not affect the protectiveness remedy at the Vertac site.

In 2002, the reaches of two bodies of water (Bayou Meto and Lake Dupree) associated with the Rocky Branch Creek were identified as a potential CWA 303(d) listed water which may have required the development of a total maximum daily load. In 2004 and 2006, the state of Arkansas removed these two tributaries of the Rocky Branch Creek from the CWA 303(d) listed waters as the State demonstrated that there were other pollution control mechanisms required by state, local, or federal authority that will result in attainment of water quality standards for the listed pollutants within a reasonable time.

In addition, the site is required to test the previously mentioned streams for fish tissue dioxin levels above Food and Drug Administration (FDA) advisory levels. The FDA health advisory level recommends that fish containing 2,3,7,8-TCDD concentrations greater than 50 ppt should not be consumed and that fish with levels less than 25 ppt pose no serious health concern (FDA 1981, 1983). Fish tissue has been monitored as part of the Vertac site remedy. Recent analysis in 2006 indicate that the fish flesh concentrations of 2,3,7,8-TCDD TEQ from the collected samples continue to be below the FDA advisory level of 25 ppt. However, as noted above, the

EPA has raised questions with the ADH about the appropriateness of the FDA recommended screening level versus the more recent EPA recommended screening level of 0.7 ppt, which has not been adequately addressed by the ADH. Therefore, the EPA will review and consider the issue of whether this screening level should be adopted as a TBC.

## **6.6 SITE INSPECTION**

An initial site inspection was conducted on April 16, 2008, with the official site inspection conducted on June 24, 2008. The site inspections were conducted to assess the condition of the site and the effectiveness of measures employed to protect human health and the environment from the contaminants still present at the site. Attendees during the official June 24, 2008 site inspection included: Philip Allen (EPA), Dianna Kilburn (ADEQ), Annette Cusher (ADEQ), Stanley Wallace (EA), April Ballweg (EA), Tim Hassett (Hercules), David Jaros (Terracon), Thomas Pilgrim (Terracon), Ken Brown (Terracon), and Roland McDaniel (GBMc). The completed site inspection checklist including the inspection team roster is provided in Attachment 3. The site inspection photographs are provided in Attachment 4.

The Vertac site appears to be well maintained with no signs of vandalism noted. Security fencing and gates were secured and in good condition (Photograph 1) with only two areas of cut fencing noted during the April 2008 site visit. During the subsequent site inspection in June 2008, these areas of fencing had been repaired (Photograph 34). Trees and vegetation were noted along fence lines which may help obscure the site thereby possibly impeding trespasser access to the fence (Photograph 31). Identification signs were posted on the perimeter fences and gates. Site access roads (Photographs 14, 17, 19, and 20) were in good condition throughout the site.

Many of the existing on-site groundwater monitor wells and extraction wells (Photographs 39 – 42) were located during the Vertac site inspection. All observed surface completions were secure and in good condition. Due to the size of the site and the various components of the remedy, every well was not visually inspected during the third five-year review site inspection, but the condition of all inspected wells was good. One of the extraction wells was opened

during the site inspection (Photographs 39 and 40). The equipment inside the well vault was in good condition. The 2006 Progress Report stated that three of the five flow meters in the extraction wells were replaced over the last two-year period due to mechanical failures (Hercules 2006).

The French drain was reviewed during the site inspection. All manholes were in good condition (Photographs 11, 13, and 14). Some of the French drain manholes were inspected and appeared to be functioning as intended (Photographs 11 and 12). The controllers and flow meters for the French drain pumps are mounted on power poles located near the manholes (Photograph 13). Each controller and flow meter appeared to be in good condition and functioning properly. There were no visible signs of surface seepage along the French drain.

The Reasor-Hill Burial Area and the North Burial Area appear to be mowed and maintained (Photographs 16 and 17). The vegetative cover was well established, and no obvious signs of erosion were noted.

The sedimentation vault (Mount Vertac) was also inspected while the team was on-site for the third five-year review site inspection (Photograph 5). The armored (rip-rap) west slope of the vault noted during the previous five-year review appeared to be in good condition with some minor vegetative growth noted but no trees (Photographs 9 and 10).

Slope failure was noted on the north side of the sedimentation vault during the April 2008 and June 2008 site visits (Photographs 6, 7, and 8). The site operator indicated that the area of slope failure was in the same general vicinity of an earlier slope failure event in January 2005, which was subsequently repaired in August 2005 (Terracon 2008d). The area was surveyed on June 25, 2008 and the following observations were reported in a letter from Terracon to the EPA RPM on July 25, 2008 (letter available in Attachment 2B):

- The area of erosion measures approximately 100 ft in width by 100 ft in length.
- The erosion appears to be confined to the vegetative layer and upper clay layer.

- The erosion occurred on the upper surface and apparently occurred due to the excessive saturation resulting from rain events in March and April 2008.
- The side slope on the north face of the landfill is considered steep with an approximate 3 (horizontal) to 1 (vertical) slope.
- The top of the landfill is relatively flat with a 3 to 4 percent slope to the northwest.
- A low area was noted on the top of the landfill near the north edge where stormwater is assumed to accumulate and pond.

Repairs to the sedimentation vault slope were initiated in mid-October, with remedial activities completed by the end of October 2008 (Photographs 61 – 66). On October 28, 2008, the EPA RPM conducted an inspection of the sedimentation vault slope and deemed it adequate at the time.

The third five-year review site inspection also included an inspection of the OU 1 landfill. The cap had a well established and maintained vegetative cover with no signs of erosion, slumping, bulging, cracking, settlement, or animal burrows (Photograph 21). The letdown channels are covered with large rocks and drain stormwater runoff from the top of the cap (Photograph 23). The leachate collection and leachate detection sumps were secured and in good condition (Photographs 25, 26, 27, and 28). During the April 2008 site investigation, the passive landfill gas vents were missing screens to keep birds out. During the subsequent site inspection in June 2008, the screens had been replaced on the vents (Photograph 33). Sedimentation ponds to address runoff from the landfill cap are present along the north, east, and south sides of the landfill. The containment structures surrounding these ponds appeared to be in good condition with the exception of some areas of thin vegetation outer portion of the north basin (Photograph 30). The overflow structures were also in good condition, and no signs of excessive siltation were noted in the sedimentation ponds.

The Vertac site contains two buildings. One building contains equipment associated with the groundwater extraction system (the groundwater recovery building; Photograph 35) while the second building contains the water treatment equipment (the WWTP). The groundwater recovery building contains a holding tank, pumps, piping, and sampling ports (Photographs 37 and 38) for the collection of extracted groundwater from the extraction wells and some of the monitor wells. This building also contains some spare parts and equipment. Several monitor

wells and the extraction wells are connected to the tank (Photograph 36) in the groundwater recovery building via underground piping. The tank is used to store recovered groundwater for transfer via underground pipes to the WWTP. The tank and associated appurtenances appeared in good condition.

The WWTP was also inspected (Photograph 2). Two large equalization tanks are located outside the building (Photograph 45). These tanks store the water extracted from the French drain and the groundwater extraction system which is then transferred to the WWTP through a piping system (Photographs 47 and 48). In addition, leachate recovered from the leachate collection sumps at the OU 1 landfill is also manually pumped into these tanks. The tanks appeared to be in good condition. No leaking was noted around the tanks, and the secondary containment berm was present and in good condition. The WWTP building houses the remaining components of the treatment system including two pumps (Photograph 49), two sand filters (Photograph 50), a backwash holding tank for the sand filters (Photograph 51), three carbon treatment units (Photograph 52), a pH neutralization tank (Photograph 53), and the treated water tank (Photograph 54). Sampling ports are located inside the building before each carbon treatment unit, after the final carbon treatment unit, and after the treated water tank. All components inside the building appeared in good condition, including the newly acquired air compressor (Photograph 55). The WWTP only operates when enough water has been recovered for treatment. The plant was not in operation at the time of the site inspection. The facility can be operated manually, but the system is typically operated by a programmable logic computer located within an on-site control room (Photograph 56). The outfall for the wastewater treatment facility was also inspected (Photograph 57). No effluent discharges were observed, and the discharge pipe appeared to be in good condition.

Other areas of the Vertac site observed during the site inspection included the leachate sump in the former cooling pond (Photograph 15), a surface seep sump near the Reasor-Hill Burial Area, the weir at Rocky Branch Creek where surface water samples can be collected (Photograph 18), and a water meter shed located on the east side of the site. The site operator stated that the shed, which houses a city water meter and supplies water to the nearby hydrant and the rest of the facility, had been blown off of its foundation (Photograph 43). The EPA

RPM identified the need for this building to be replaced onto its concrete footing to ensure safe and adequate access for city inspectors.

## **6.7 SITE INTERVIEWS**

In accordance with the community involvement requirements of the five-year review process, EPA identified eight key individuals to be interviewed. All individuals were interviewed in person during the week of the site investigation on either June 24, 2008 or June 25, 2008. Table 8 lists the individuals that participated in the interviews records for the third five-year review.

In general, the interviews reflected an overall positive perception of the site operations with no comments or issues identified by the local citizens per the Vice President of the Concerned Citizens Coalition and the Mayor of the City of Jacksonville. ADEQ personnel indicated that they will continue to monitor identified issues at the site such as the sedimentation vault slope failure (repaired in October 2008) and the low level exceedances identified in the discharge monitoring reports. In addition, ADEQ mentioned approval of the Hercules-suggested modification in the fish flesh monitor reporting from a biannual event (once every two years) to once every five years prior to the next five-year review. (However, as noted above, the EPA has decided not to approve a change in the biannual sampling requirement and will require restoration of the Highway 13 bridge sample location.) ADH personnel indicated adequate communication during this five-year review period with the ability to sufficiently track progress at the site and no issues identified during the last five years.

## **7.0 TECHNICAL ASSESSMENT**

The conclusions presented in this section support the determination that the selected remedy for the Vertac site is currently protective of human health and the environment. The EPA guidance identifies three questions (Questions A, B, and C) to be used to provide a framework for organizing and evaluating data and information, and to ensure all relevant issues are considered when determining the protectiveness of a remedy. These questions are assessed for the site in the following sections.

## 7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

- **RA Performance**—The documents that detail the remedial decisions for the site are the September 1990 ROD for the Off-Site Areas and its amendment of September 1996; the June 1993 ROD for OU 1 and its May 1995 ESD; the September 1996 ROD for OU 2 and its January 1998 ESD; and the September 1996 ROD for OU 3. EPA and ADEQ have concurred that the remedial actions for the site are complete. The O&M is ongoing, and based on the data review, the site inspection, and interviews, it appears that the Vertac site remedy is functioning as intended by the decision documents.
- **Cost of System and O&M**—According to information provided by the PRP representative, the average cost for O&M has been about \$500,000 per year. The O&M costs estimated in the ROD were approximately \$126,000 (EPA 1996c). The current O&M costs are more than the estimate presented in the ROD, but are reasonable considering the level of effort required on a daily, weekly, and monthly basis, the number of OUs to maintain (i.e., landfills and groundwater systems), the number of wells being sampled, parameters being analyzed, and frequency of sampling.
- **Opportunities for Optimization**—Fish flesh monitor reporting has been occurring on a biannual basis for the two previous five-year reporting periods. Hercules informally requested a modification to the monitor reporting period from once every two years to once every five years prior to the next five-year review process. Although EPA and ADEQ staff tentatively concurred with this request, based on further review of the issue, the EPA will not approve such a change. Hercules indicated that it plans to submit a formal written request to EPA and ADEQ for this modification (Hercules 2008g). In addition, requests to eliminate or reduce the monitoring frequency of parameters for the discharge monitoring reports and/or the progress reports are expected to be submitted to the appropriate agencies for consideration. The EPA and ADEQ will review the submitted requests and determine if the modification is acceptable. Such review should take into account the relevance, if any, of documented exceedances and uncontrolled, unpermitted releases involving COCs occurring during the past several years at the site. If the request is approved, then upon receipt of written approval the modifications may be implemented at the Vertac site.
- **Early Indicators of Potential Issues**—At the time of the five-year review site inspection, the site operator discussed with the inspection team the unpermitted release of untreated water from an EQ tank at the WWTP in February 2008 after a thunderstorm event. It was estimated that approximately 20,000 gallons of EQ tank water commingled with storm water runoff flowed off site and into the Rocky Branch Creek. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon estimates approximately 3.5 lbs of phenols and 14 lbs of herbicides may have been released with this water (Terracon 2008b). The site operator had promptly notified the EPA Region 6 RPM of the release. The apparent cause of the release was that the control panel dial did not engage in the operating mode, causing the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the

EQ tank valve and the sump pump failing to operate. In order to prevent future unpermitted releases, the site operator will conduct a system inspection after any significant thunderstorms.

Upon review of the progress reports and the analytical groundwater data, MCL exceedances for 2,3,7,8-TCDD were noted in three wells (MW-9, MW-77, and LW-5) located outside of the TI zone and in two of the Rocky Branch Creek samples. The exceedance noted in MW-77 was also above the PCL for 2,3,7,8-TCDD. In addition, the data indicated two wells (MW-36 and MW-100) were above the MCL for 2,3,7,8-TCDD, and one well (MW-101) was above the MCL for toluene. These three wells are located within the TI zone. The site operator identified the potential reason for the exceedances laboratory false positives. This potential issue should be evaluated further to determine the reason for the observed exceedances, especially for the wells located outside of the TI zone and the Rocky Branch Creek.

Low level exceedances in the discharge limitations of 2,3,7,8-TCDD have been identified in six of the discharge monitoring reports examined during this five-year review. The site operator relayed the fact that when this occurs, an additional discharge sample is obtained during the month in question and analyzed to verify the initial exceedance. The data indicates that the resamples, with the exception of October and November of 2007, were below the limits of detection. ADEQ is monitoring these conditions and will notify the site operator of any required modification to address this issue.

The O&M Manual and Site-Wide Groundwater Monitoring Plan were to be updated to reflect continued monitoring on a semiannual basis and restoration of 2,3,7,8-TCDD to the groundwater monitoring analyte list as required by the OU 3 ROD. The Site-Wide O&M Manual was modified in accordance with comments received from EPA and ADEQ, but the Groundwater Monitoring Plan has not been updated yet. In addition, the annual progress reports are being submitted approximately every two years. These issues can be remedied by updating the Site-Wide Groundwater Monitoring Plan and submitting the progress reports yearly.

- **Implementation of Institutional Controls and Other Measures**—Some institutional controls have been implemented in accordance with the RODs. The court appointed Receiver for Vertac Chemical Corporation filed and recorded three Notices of Lis Pendens (CERCLA Docket Nos. CERCLA 6-01-97, 6-02-97, and 6-04-97) with the Pulaski County Clerk's Office which assert an EPA intention to place a lien upon the Vertac site (EPA 1996e). These documents, filed in 1996-97, contain attached copies of three UAOs issued by the EPA for CERCLA response action at the Vertac site requiring that the said orders be so filed for the purpose of providing notice to third parties (EPA 1996e). The 1987 appointment of the Receiver for all assets of Vertac Chemical Corporation, including the site, by the United States District Court for the Eastern District of Arkansas (which appointment is still in force) is itself an effective form of institutional control. The CERCLA documents provided by the Pulaski County Clerk's Office and reviewed during this five-year review are included in Attachment 6.

Additional institutional controls limit redevelopment of the southern portion of the site (zoned industrial), and access controls physically limit access to the site. Access at the site is controlled by a fence and locked gates. Access through the main gate can only be obtained from inside the WWTP or through the use of an access code. No wells other than those associated with the groundwater extraction and monitoring system have been installed at the site. No development has occurred on the 93-acre southern portion of the site, nor is any development of this part of the Vertac site contemplated due to the remedial action components in place in the area, as well as the presence of contamination below the caps, in the groundwater, and disposal units.

- **Status of the TI Waiver for NAPLs in the Tilted, Fractured Bedrock System**—The OU 3 ROD included a requirement that five-year reviews at the site determine if any new technologies are available to remediate the contaminated groundwater, in light of the NAPLs contained in the fractured bedrock (EPA 1996c). As part of the third five-year review, the potential development of new technologies that might be capable of remediating NAPL in fractured bedrock aquifers was researched. This search was conducted by reviewing available technologies at the Federal Remediation Technologies Roundtable (FRTR) website data-base at <http://www.frtr.gov/> (FRTR 2008). No new technologies that might benefit the groundwater remediation at the Vertac site were identified.

## 7.2 QUESTION B: ARE THE ASSUMPTIONS USED AT THE TIME OF REMEDY SELECTION STILL VALID?

There have been no changes in the physical condition of the site that would affect the protectiveness of the remedies at the Vertac site.

- **Changes in Standards, Newly Promulgated Standards, and To-Be-Considered**—The changes to ARARs and TBCs identified in the RODs and ESDs were evaluated previously in Section 6.5. Although changes to the regulations have occurred since the second five-year review in 2003, none of these changes impact the protectiveness of the remedy at the Vertac site and no newly promulgated standards were found during this five-year review.
- **Changes in Exposure Pathways**—There have been no changes in exposure pathways for the Vertac site.
- **Changes in Toxicity and Other Contaminant Characteristics**—The previous five-year reviews identified a change in the recommended EPA screening level for dioxin in fish tissues. Although the Off-Site ROD requirement was based on an FDA recommended figure of 25 ppt (EPA 1990a), the EPA currently recommends that 0.7 ppt be used to conduct more intensive site-specific monitoring (EPA 2003b). This change in guidance was reflected in the five-year review recommendation that the State of Arkansas reevaluate the fish consumption advisory for Bayou Meto. EPA has recommended

additional measures in this report for addressing this issue and associated questions concerning fishing bans or consumption advisories. No other changes in toxicity or other contaminant characteristics were identified during this five-year review.

- **Changes in Land Use**—There were no changes in land use identified at the Vertac site (Parcel 1) during this review. The interview with the Mayor of Jacksonville identified a change in the land use for portion of the site located north of the Vertac site (Parcel 2). The city plans on developing fire and police training facilities in that area. These plans are not anticipated to affect the ongoing O&M activities at the Vertac site.

### **7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?**

No other information has come to light as part of this third five-year review for the site that would call into question the protectiveness of the site remedy.

### **7.4 TECHNICAL ASSESSMENT SUMMARY**

The technical assessment, based on the data review, site inspection, technical evaluation, and interviews, indicates the remedial actions selected for this site generally appear to have been implemented as intended by the decision documents.

As required by EPA during the second five-year review, semi-annual sampling of groundwater was reinstated and conducted throughout this five-year review period. The majority of reported contaminant concentrations were either below the corresponding MCL/PCL or were non-detect during the third five-year review period. Exceptions to this were noted for 2,3,7,8-TCDD and toluene, and are summarized in Tables 6 for wells located outside of the TI zone and Table 7 for wells located inside of the TI zone.

The water level data available in the progress reports submitted by Hercules in July 2006 and by Terracon in February 2008 indicate that the groundwater extraction system is containing the majority of groundwater flow to the east in the fresh bedrock aquifer. These results indicate that at times slight eastward gradients were observed during periods of dry weather.

The WWTP discharge data indicated that discharge limitations were exceeded for 2,3,7,8-TCDD in November 2004, February and May 2006, October and November 2007, and April 2008. The other discharge requirements appear to have been met during the requisite period. When an exceedance occurs, the site operator collects an additional discharge sample to verify the initial exceedance. The resulting analytical data indicates that the resamples for every month in question, with the exception of October and November of 2007, were below the limits of detection.

The discharge limits for TDS and chlorides was modified by the ADEQ on February 4, 2004, to reflect "Report Only" criteria. The site operator initiated implementation of the approved revisions immediately. In addition, ADEQ approved the removal of silver, DDT, and metabolites from the list of sampling parameters for the discharge monitoring reports in May 2007.

On February 17, 2008, an unpermitted release at the Vertac site occurred. Influent water from an EQ tank at the WWTP was released at the site resulting in approximately 20,000 gal of EQ tank water commingled with storm water runoff carrying an estimated 3.5 lbs of phenols and 14 lbs of herbicides.

Fish flesh monitoring shows a general decreasing trend in the 2,3,7,8-TCDD results downstream of the site towards the furthest-downstream sampling location at the State Highway 15 bridge. All of the indicated sample results were below the FDA alert level of 25 ppt, but above the EPA recommended screening level of 0.7 ppt.

No new technologies for the remediation of NAPL in fractured bedrock were identified as part of this five-year review. Also, no changes in ARARs or changes in exposure pathways, toxicity data, or other contaminant characteristics were noted for the second five-year review period.

## 8.0 ISSUES

Operations and maintenance are ongoing at the site, and based on the data review, site inspection, interviews, and technology assessment, it appears the remedy is functioning as intended by the decision documents. To ensure continued protectiveness, six issues are identified in the third five-year review for this site, as described in the following paragraphs. These issues do not currently affect the protectiveness of the remedy, although they need to be addressed to ensure continued protectiveness.

- **Landfill cap issues**—At the time of the five-year review site inspection a slope failure was noted on the north slope of the sedimentation vault. No exposed waste was observed. The site operator indicated that this had occurred previously in January 2005 and was repaired in August 2005. Due to the recurrence of the slope failure, it was determined that an alternate method to repair the area was required. The area was surveyed on June 25, 2008 and a letter providing the planned repairs for the slope was submitted to EPA and the ADEQ. The EPA RPM approved the plan for repairing the slope and the remediation activities were scheduled to commence during the period of August to October 2008. On October 28, 2008, after repairs to the slope were completed, EPA conducted an inspection of the slope modifications and deemed the repairs to be adequate.
- **Unpermitted release of wastewater treatment plant (WWTP) influent water**—An unpermitted release of untreated water from an EQ tank at the WWTP occurred in February 2008 during a thunderstorm event and was reported to the RPM. It was estimated that approximately 20,000 gallons of EQ tank water commingled with storm water runoff flowed off site and into the Rocky Branch Creek. Based on analytical data obtained on February 12, 2008 for the influent concentration of the equalization water, Terracon estimates approximately 3.5 lbs of phenols and 14 lbs of herbicides may have been released. The cause of the release was determined to be a control panel dial that did not fully engage in the operating mode, causing the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate.
- **Groundwater sample exceedances of MCLs and PCLs**—The Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-TCDD in three wells (MW-9, MW-77, and LW-5) located outside of the TI zone and in two of the Rocky Branch Creek samples. The one exceedance noted in MW-77 was also above the PCL for 2,3,7,8-TCDD. In addition, the data indicated two wells (MW-36 and MW-100) were above the MCL for 2,3,7,8-TCDD, and one well (MW-101) was above the MCL for toluene. These three wells are located within the TI zone.

- **WWTP discharge limitation exceedances**—Low level exceedances in the discharge limitation of 2,3,7,8-TCDD have been identified in six of the discharge monitoring reports examined during this five-year review. The site operator stated that when this occurs, an additional discharge sample is obtained during the month in question. The data indicates that the resamples, with the exception of October and November of 2007, were below the limits of detection.
- **Plan and progress report discrepancies**—The second five-year review identified the need for the Site-Wide Groundwater Monitoring Plan to be updated to reflect continued monitoring on a semiannual basis and restoration of 2,3,7,8-TCDD to the groundwater monitoring analyte list as required by the OU 3 ROD. The Site-Wide Groundwater Monitoring Plan has yet to be updated to reflect these changes. In addition, the annual progress reports are being submitted approximately every two years.
- **Reevaluation of new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer**—The ROD for OU 3 (groundwater) called for five-year reviews to evaluate the performance of the hydraulic containment system and to determine if any new technologies are available to remediate the contaminated groundwater to confirm the continued applicability of the TI waiver. This has been done for this third five-year review, but remains an issue to be addressed in future five-year reviews.
- **Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto**—In 2001 and 2003, the EPA recommended that the ADH review and assess re-imposition of a fishing ban or advisory on the lower Bayou Meto segment below the Highway 13 bridge, and that ADH consider adoption of an EPA recommended lower screening level for dioxin in fish tissue. ADH acknowledges communications with the EPA on this subject, but has indicated that after review of the matter, including discussions with legislators, community leaders and representatives, and the governor’s office, and consideration of the potential for adverse economic impacts, it decided not to make the changes. The ADH has no funds, or plans, for further study of this issue. In addition, the Highway 13 bridge was dropped as a location for fish flesh sampling, and the responsible party site operator has recommended that the frequency of fish flesh sampling under the Off-Site remedy and UAO be reduced from every two years to every five years in view of declining concentrations of dioxin in fish tissue sampling events.

Table 9 provides a summary table of issues identified, and if they currently affect the remedy protectiveness.

## 9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The following actions are recommended in response to these issues:

- The sedimentation vault slope was repaired in October 2008. The area was surveyed on June 25, 2008 and a letter providing the proposed slope repairs was submitted to the EPA RPM on July 25, 2008. The EPA RPM reviewed the repair plan and requested the site operator proceed with the plan (EPA 2008b). In mid-October 2008, repairs to the sedimentation vault slope were initiated. The top of the sedimentation vault and the north slope were repaired and on October 28, 2008, EPA inspected the modifications and deemed the repairs to be adequate at the time.
- The reason for the unpermitted release of WWTP influent water was a control panel dial that did not fully engage in the operating mode which caused the sand filter valve to remain partially open, coupled with a blown fuse which resulted in the EQ tank valve and the sump pump failing to operate. In order to prevent future unpermitted releases, the site operator will conduct a system inspection after any significant thunderstorms. This O&M task must be adhered to and documented, in order to prevent future unpermitted releases.
- The recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek should be evaluated to determine the reason for the observed exceedances. This is expected to be accomplished within the next 12 months by EPA and the PRP.
- The reason for the discharge limitation exceedances of 2,3,7,8-TCDD should be investigated and modifications should be implemented to eliminate this issue. Possible modifications may include additional treatment methods in the WWTP system and increasing quality control of sample collection techniques and/or analytical laboratory services. In addition, the ADEQ is currently monitoring this situation.
- The Site-Wide Groundwater Monitoring Plan should be updated in accordance with the current groundwater monitoring activities. In addition, progress reports should be submitted on an annual basis in order to keep the regulatory agencies up to date on the status of the site. This is expected to be accomplished within 12 months by the PRP.
- The OU 3 ROD requirement for evaluation of the new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer was conducted during this third five-year review. No new technologies for remediation of the NAPL impacted bedrock were identified. This standing requirement should be conducted during the next five-year review.
- Instead of continuing to press the ADH to institute a change in its own fish tissue dioxin screening level to 0.7 ppt, as recommended by EPA guidance, the EPA will require that fish tissue sampling taken for the site remedy be analyzed toward the recommended level, and it will continue to encourage by appropriate means, the ADH to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto, where it was suspended. The EPA will continue to require that the fish tissue dioxin sampling be performed every two years, including the sampling location on the Bayou Meto at the Highway 13 bridge, and will require a special sampling event below the bridge. EPA

will also review the question of further restrictions on the consumption or taking of fish from the Bayou Meto below the Highway 13 bridge, as well as the appropriateness of the recommended fish flesh screening level as a TBC at this site.

Table 10 summarizes the recommendations and follow-up actions for the Vertac site.

## **10.0 PROTECTIVENESS STATEMENT**

The conclusions presented in this section support the determination that the selected remedy for the Vertac Superfund Site is protective of human health and the environment in the short-term.

### **Short-Term Protectiveness**

Based on the information available during the third five-year review, the remedy for the Vertac Superfund Site currently protects human health and the environment.

After documents and data were reviewed, and the site inspection and interviews were completed, it appears that the remedy is functioning as intended by the RODs and the ESDs. The remedies for the Vertac site are considered protective of human health and the environment because the waste have been removed or contained.

- Wastes buried in the North Burial Area, the Reasor-Hill Burial Area, the sedimentation vault, and the OU 1 landfill, are protected from erosion by caps. The functionality of the caps to prevent exposure of buried wastes was restored with the repairs made to the sedimentation vault.
- Contaminated groundwater is contained and removed by the French drain and the groundwater extraction system and treated at the wastewater treatment plant prior to discharge.
- Groundwater concentrations have generally been below MCLs and PCLs except for the occasional detections in six monitor wells (MW-9, MW-36, MW-77, MW-100, MW-101, and LW-5) and in two of the Rocky Branch Creek samples. These six wells have exhibited groundwater concentrations above current MCLs (and above the PCL in MW-77) since the last five-year review. Because there are groundwater exceedances, institutional controls should continue to be enforced to ensure that the remedy remains protective (i.e., no human contact with the contaminated groundwater occurs).

- Institutional controls have been implemented in accordance with the ROD, but should be expanded. The EPA plans to handle this through the United States District Court, which still has jurisdiction over the Vertac site, as well as the Receiver appointed by the Court.
- EPA continues to require that regular fish tissue sampling and analysis on specimens taken from Rocky Branch Creek and Bayou Meto be performed every two years, and the ADH continues to impose a commercial fishing ban and fish consumption advisory on these waters to the Highway 13 bridge on the Bayou Meto. Data show a continual, declining level of 2,3,7,8-TCDD in these samples.

Because the completed remedial actions and O&M program for the Vertac site are considered protective for the short term, the overall remedy for the site is protective of human health and the environment for the short term, and will continue to be protective if the action items identified in this five-year review are addressed.

### **Long-Term Protectiveness**

Although the third five-year review found that the selected remedy is currently performing as intended and is protective of human health and the environment, the following recommendations and follow-up actions should be addressed to ensure that the remedy will remain protective of human health and the environment in the long-term:

- Evaluate groundwater data for exceedances of MCLs to ensure that institutional controls remain protective of the remedy (i.e., no human contact with the contaminated groundwater occurs).
- Evaluate and remedy the WWTP effluent exceedances associated with the discharge limits.
- EPA will continue to encourage by appropriate means, the ADH to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto below the Highway 13 bridge, where it is suspended, while EPA reviews the necessity of such an extension from a public health standpoint. The EPA will require that regular fish tissue dioxin sampling and analysis be targeted to the 0.7 ppt EPA recommended screening level, while it reviews the question of whether this level taken from EPA guidance should be adopted as a TBC for the Vertac site. The EPA intends to restore the Highway 13 bridge as a fish tissue sampling location and to require a special sampling of fish tissue taken below the Highway 13 bridge in the summer of 2009.

## **11.0 NEXT REVIEW**

The Vertac site requires ongoing statutory five-year reviews. The next review will be conducted within five years from the date of this review but no later than on or before November 20, 2013.

**ATTACHMENT 1**  
**FIGURES AND TABLES**

## Figures

[Figure 1 - Site Location](#)

[Figure 2 - Site Layout Map](#)

[Figure 3 - TI Zone](#)

[Figure 4 - Fish Advisory Map](#)

[Figure 5 - Fish Sampling Locations](#)

## Tables

[Table 1](#)

[Table 2](#)

[Table 3](#)

[Table 4](#)

[Table 5](#)

[Tables 6 and 7](#)

[Tables 8 and 9](#)

[Table 10](#)

**Attachment 2A**  
**Documents Reviewed**

[Documents Reviewed](#)

**Attachment 2B**  
**Relevant Correspondence**

[CI-TDS limits calculations October 2003](#)

[CI and TDS limits request ADEQ February 2004](#)

[O&M Manual Response Letter to ADEQ - December 2004](#)

[ADEQ Discharge Response Letter - May 2007](#)

[Discharge Letter - December 2007](#)

[Discharge Letter - January 2008](#)

[ADEQ Unpermitted Release Letter - March 2008](#)

[Terracon Response to ADEQ - April 2008](#)

[Mt Vertac Slope Letter to EPA - July 2008](#)

**Attachment 3**  
**Site Inspection Checklist**

[Site Inspection Checklist - June 2008](#)

[Inspection Team Roster](#)

## **Attachment 4**

[Site Inspection Photographs](#)

**Attachment 5**  
**Interview Records**

[Vertac Interview Questions ADEQ](#)

[Vertac Interview Questions ADH](#)

[Vertac Interview Questions CCC](#)

[Vertac Interview Questions CoJ](#)

[Vertac Interview Questions Terracon Hercules](#)

**Attachment 6**  
**County Clerk's Office Documents**

[OU 2 Lis Pendens](#)

[OU 3 Lis Pendens](#)

[Offsite Lis Pendens](#)

**Attachment 7**  
**Public Notices**

[Vertac Public Notice](#)