FOURTH FIVE-YEAR REVIEW REPORT

FOR THE

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

MAY 2014

PREPARED BY:

United States Environmental Protection Agency
Region 6
Dallas, Texas

9647016

EXECUTIVE SUMMARY

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

The U.S. Environmental Protection Agency (EPA) Region 6, in cooperation with the Arkansas Department of Environmental Quality (ADEQ), has completed the fourth five-year review of the remedial actions implemented at the Vertac Superfund Site. Vertac is located in Jacksonville, Pulaski County, Arkansas. Between 1990 and 1996 EPA signed four Records of Decision to define remedies at Vertac using a 1 part per billion soil concentration reference for dioxin. These remedies were all completed by 1997. Where waste is left on site, the Superfund statute requires EPA to conduct a review of the protectiveness of implemented remedies every 5 years. Previous 5 year reviews were completed in 2001, 2003, and 2008. Each of these reviews concluded that the remedies remained protective of human health and the environment. In 2012, EPA revised guidance on safety levels for dioxin to reflect the latest science regarding non-cancer impacts from dioxins. Instead of 1 part per billion, soil concentrations as low as 50 parts per trillion of dioxin, depending on a variety of exposure factors, are recommended for review as of human health and the environment. Technical information for the fourth five year review was collected between April and November 2013 and are documented in this report. In broadest terms, EPA finds that the remedies selected continue to be protective in areas where remediation was conducted but more testing is needed to determine if additional action is needed in areas outside of active remediation areas. The EPA will immediately commence negotiations with the Responsible Party, in collaboration with ADEQ, to collect and evaluate additional sampling data.

This memorandum documents the EPA's performance and determinations of the Vertac fourth five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC § 9621(c), as provided in the attached Fourth Five-Year Review Report.

Summary of Fourth Five-Year Review Findings

This fourth five-year review is based on data obtained during groundwater monitoring activities performed from 2008 through 2013. In general, the selected remedy appears to be performing as intended, but currently the determination of site-wide protectiveness of human health and the environment cannot be evaluated due to changes in the non-cancer limit for 2,3,7,8-TCDD. Issues identified during development of the five-year review are provided below.

- Dioxin Reassessment OU Off-Site Areas—The EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or RfD, for 2,3,7,8-TCDD in the Integrated Risk Information System (IRIS) in February of 2012. The soil remedial action goals were re-evaluated during this fourth five-year review to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD. At the time of the remedial action, the cleanup level was 1.0 part per billion for Off-Site

Areas including residential and agricultural areas (EPA 1990). Available data was not sufficient to determine residual soil exposure levels for comparison to protective levels using the RfD. Additional data collection and evaluation is needed as part of the re-evaluation of the dioxin Off-Site Areas soil cleanup. However, Off-Site areas that were part of previous cleanup efforts are protective and will not be part of the reassessment.

- Dioxin Reassessment OU2 On-Site Soils—The on-site soil remedial action goals were reviewed to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD for 2,3,7,8-TCDD (EPA 2012a). At the time of the remedial action, the cleanup level for OU2 On-Site Soils (EPA 1996b) was 5.0 parts per billion. A full evaluation of the existing site data has not been conducted and, therefore, a full determination of the protectiveness of the on-site soil cleanup level cannot be provided at this time. However, OU2 On-Site soils areas previously cleaned up are protective and will not require re-assessment.

- Groundwater Sample Exceedances of Maximum Contaminant Levels (MCLs)—The Annual Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-TCDD in monitoring well LW-5, at the Rocky Branch Creek sampling point, and Outfall 001. These sample locations are outside of the Technical Impracticability (TI) zone. The data indicated that ground water from monitoring well MW-36, located inside the TI zone, also had concentrations above the MCL for 2,3,7,8-TCDD. In addition, ground water concentrations measured in three other monitoring wells (MW-100, MW-101, and MW-102) were above the MCL and/or the Plume Concentration Levels (PCL) for toluene, 2,4-dichlorophenoxyacetic, and/or 2,4,5-trichlorophenoxy-propionic acid (Silvex). These three wells are located within the TI zone.

- Wastewater Treatment Plant (WWTP) Discharge Limitation Exceedances—Low-level exceedances of the discharge limitation for 2,3,7,8-TCDD have been identified in 10 of the monthly discharge monitoring reports (DMRs) 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 concentrations measured in the re-samples were below the limits of detection. The reason for the exceedances was not determined.

  The Arkansas Department of Environmental Quality (ADEQ) identified issues with the DMRs for January-April 2013 (ADEQ 2013c). ADEQ stated that analytical data reporting limits submitted for several parameters do not meet current required Minimum Quantification Levels (MQLs) and the reported analytical results do not indicate whether or not the water quality standards of the receiving stream are being maintained. In addition, the letter identified that it would be helpful in determining the potential for aquatic toxicity in the discharge if analytical results for "dissolved" values for metals were reported in addition to "total" values.

- Site-Wide Groundwater Monitoring Plan—The third 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 operable unit (OU) 3 Record of Decision (ROD). The Site-Wide Groundwater Monitoring Plan was revised in April 2009, but it does not include modifications to the sampling schedule and list of parameters that were implemented in 2010 through 2012 based on discussions with the EPA. At the time of this report, the 2013 sampling schedule and list of parameters were under development. The plan has not been updated to reflect these ongoing modifications.

- Fish Flesh Monitoring in the Rocky Branch Creek and Bayou Meto—According to the 1990 Off-Site Areas ROD (EPA 1990), the fish in Rocky Branch Creek and Bayou Meto are 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. Additionally, EPA has required that fish tissue sampling taken for the site be analyzed and compared with the recommended fish tissue dioxin screening level of 0.7 parts per trillion (ppt). All of the fish tissue samples collected during this review period, except for three of four samples collected at the lower reaches of the Bayou Meto (below the State Highway 13 bridge), exceeded the EPA recommended screening level of 0.7 ppt. In 2009, two of the samples collected from the Rocky Branch Creek (reach nearest the Vertac site) had sample results greater than 50 ppt, which historically is the level at which FDA issues a health advisory stating that fish should not be consumed.

  The site operator, Hercules Incorporated, was directed per the third five-year review to carry out the regularly scheduled 2008 fish flesh sampling by no later than January 31, 2009. This task was not accomplished during the identified timeframe but was conducted in July/August 2009.

- Engineering Controls, Perimeter Fence—Engineering controls include the maintenance of the site fence. A section of the perimeter fencing located on the west side of the Resource Conservation and Recovery Act, Subtitle C landfill (OU1 landfill) is damaged and opened. Multiple patch repairs were observed during the site visit, but appear to be ineffective in preventing animal activity that has caused the opening in the fence.

The following actions are recommended in response to the identified issues:

- Additional sampling is recommended for off-site soils. The sampling should focus on areas near residential homes and target the areas of potential human contact. Data from this sampling will be evaluated to determine if residual soil dioxin levels are protective of human health based upon the new 2,3,7,8-TCDD RfD. Areas previously cleaned up are protective and will not require additional sampling.

- Available site data should be fully evaluated for OU2 on-site soils. Considerations include the IRIS RfD for dioxin (EPA 2012a) and the use of appropriate soil dioxin detection limits and sampling protocols. Evaluation of the existing site data will determine whether additional sampling is needed in order to determine whether exposure concentrations of on-site soils are considered protective. OU2 soils previously cleaned up are protective and will not require additional sampling.

- 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 continued 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. The ADEQ continues to monitor this situation.

  The analytical data reporting limits for the DMRs need to meet the current MQLs as identified in the July 24, 2013 letter from ADEQ. In addition, the dissolved values for metals should be monitored and reported in addition to the total values per ADEQ's request (ADEQ 2013c).

- The Site-Wide Groundwater Monitoring Plan needs to be updated to include the revised sampling schedule and list of parameters. If a change to the Operation and Maintenance Plan is necessary, then an official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement.

- EPA will continue to require that fish tissue samples be analyzed and compared with the fish tissue dioxin screening level of 0.7 ppt, as recommended by EPA guidance, and continue to require that fish tissue dioxin sampling be performed every two years. For the next five-year review, the sampling schedule is identified as occurring in 2013, 2015, and 2017. The Fish Flesh Monitoring Reports associated with these three fish tissue sampling events should be made readily available for review during the fifth five-year review, which is to occur in 2018. In addition, EPA continues to encourage the Arkansas Department of Health to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto where it was suspended.

- The open section of the perimeter fence near the OU1 landfill needs to be repaired and reinforced due to the repetitive nature of the animal activity causing damage.

Determinations

Based on the information available during the Fourth Five-Year Review, the selected remedy for the Vertac site is currently performing as intended for OU1 and OU3. 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 operation and maintenance program for the Vertac site are considered protective for the short-term, the remedy for OU1 and OU3 are 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.

OU Off-Site areas and OU2 soils previously cleaned up are protective. A protectiveness determination of the remedies for OU Off-Site and OU2, not previously cleaned up, cannot be made at this time until further information is obtained. Additional data collection and evaluation are needed for areas that were not previously cleaned up for the OU Off-Site Areas and OU2 remedies. Based on the recently issued IRIS RfD for dioxin (EPA 2012a) the residual dioxin soil exposure risk level could not be determined using available data.

By: _____ May 13, 2014
Carl Edlund Date
Director
Superfund Division, Region 6
U.S. Environmental Protection Agency

Routing and Concurrence Slip

Begin Routing Date: 11/18/2013

Routing Status: Normal

To: (Name, office symbol, route number, building, Agency/Post	Initials	Date
1. **Philip Allen**	**PA**	**11/18/2013**
2. **Carlos Sanchez**	**CS**	**01/03/2014**
3. **John Meyer**	**JM**	**01/10/2014**
4. **Charles Faultry** Stephanie Delgado	**CF**	**01/31/2014**
5. **Elizabeth Pletan**	**EP**	**02/20/2014**
6. **Mark Peycke**	**MP**	**03/05/2014**
7. **Stephanie Delgado**		
8.		

Office: ☐ Remedial Branch - Arkansas/Texas Section

Tracking Category: ☐ Five-Year Review

Enforcement Confidential: ○ **Yes** ● **No**

Email Subject: Vertac 4th Five Year Review

Due Date: 11/29/2013

DD/DDD Assigned:

DD/DDD Status: Pending

DD/DDD Remarks:

Front Office Assigned:

☐ Action	☐ Coordination	☐ Justify	☐ Signature
☐ Approval	☐ File	☐ Note and Return	☐ AD Signature
☐ As Requested	☐ For Clearance	☐ Per Conversation	☒ DD/DDD Signature
☐ Circulate	☐ For Correction	☐ Prepare Reply	☐ RA Signature
☐ Comment	☐ For Your Information	☐ Review	
☒ Concurrence	☐ Investigation	☐ See Me	

Remarks:

From: (Name, org, symbol, Agency/Post)
Philip Allen

Room No./Bldg: 6SF-RA

Phone Number: 214.665.8516

Choose EDIT document and turn on Track changes in WORD.
Remember to SAVE the Word Document before exiting Word.

Then Click on Save & Exit or Save and Route Next.
Otherwise your changes will not be saved.

For Signature : Choose EDIT document	- Vertac Final Fourth FYR_8Nov13.docx
Inquiry/Supporting Documents:	- Vertac 4th FYR Site Inspection Photographs_04Jun13
Final Document(s):	

DO NOT ATTACH DOCUMENTS BELOW HERE!
USE THE ATTACH DOCUMENT BUTTON!

CONCURRENCES:

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

CONTENTS

ATTACHMENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
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
APC&EC	Arkansas Pollution Control & Ecology Commission
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
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-*bis*-(p-chlorophenyl)ethane
DMR	Discharge Monitoring Report
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	Food and Drug Administration
FS	feasibility study
Hercules	Hercules Incorporated
HQ	Hazard Quotient
IRIS	Integrated Risk Information System
LDR	land disposal restrictions
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MQL	minimum quantification levels
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
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

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

ppm	parts per million
ppt	parts per trillion
PRG	preliminary remediation goals
PRP	potentially responsible party
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RD	remedial Design
RfD	Reference Dose
RG	remediation goal
RI	remedial investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	regional screening level
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
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
UCL	upper confidence limit
µg/L	microgram(s) per liter
Vertac	Vertac, Inc. Superfund Site
WWTP	wastewater treatment plant
yd^3	cubic yards

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Vertac, Inc. Superfund Site		
EPA ID: ARD000023440		
Region: 6	**State:** AR	**City/County:** Jacksonville/Pulaski County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): Philip Allen
Author affiliation: U.S. EPA
Review period: November 2008 – November 2013
Date of site inspection: June 4, 2013
Type of review: Statutory
Review number: 4
Triggering action date: November 20, 2008
Due date *(five years after triggering action date)*: November 20, 2013

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Off-Site Areas	Issue Category: Remedy Performance			
	Issue: EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) in the Integrated Risk Information System (IRIS) in February 2012. The soil remedial action goals were reviewed to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD. At the time of the remedial action, the cleanup level was 1.0 part per billion for Off-Site Areas including residential and agricultural areas (EPA 1990). Available data was not sufficient to determine residual soil exposure levels for comparison to protective levels using the RfD for those areas that were not part of the previous cleanup conducted for the site.			
	Recommendation: Additional data collection and evaluation are needed to complete the re-evaluation of the dioxin Off-Site Areas soil cleanup for off-site areas that were not part of the previous cleanup activities. Areas that were previously cleaned up are protective. However, it is currently unknown whether unacceptable exposure off-site exists for areas not part of past cleanup activities. Sampling should focus on areas near residential homes and target areas of potential human contact that were not previously cleaned up. Data from sampling should be used to determine if residual soil dioxin levels are protective of human health based on the new 2,3,7,8-TCDD RfD.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Deferred	Deferred	PRP	EPA/State	Nov. 20, 2018

OU(s): OU2 On-Site Soils	Issue Category: Remedy Performance
	Issue: The on-site soil remedial action goals were reviewed to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD for 2,3,7,8-TCDD. At the time of the remedial action, the cleanup level for OU2 On-Site Soils (EPA 1996b) was 5.0 parts per billion. A full evaluation of the existing site data has not been conducted and, therefore, a full determination of the protectiveness of the on-site soil cleanup level cannot be provided at this time for those areas that were not part of the previous cleanup conducted at the site.
	Recommendation: Available site data should be fully evaluated. Considerations include the IRIS RfD for dioxin (EPA 2012a) and the use of appropriate soil dioxin detection limits and sampling protocols. Evaluation of the existing site data will determine whether additional sampling is needed in order to determine whether exposure concentrations of on-site soils are considered protective. Areas previously cleaned up are protective and will not need additional sampling.

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
Deferred	Deferred	PRP	EPA/State	Nov. 20, 2018

OU(s): OU3	Issue Category: Monitoring
	Issue: The Progress Reports and the analytical groundwater data indicated Maximum Contaminant Level (MCL) exceedances for 2,3,7,8-TCDD in water collected from monitoring well LW-5, at the Rocky Branch Creek sampling point, and Outfall 001. These sample locations are outside of the Technical Impracticability (TI) zone. The data indicated that groundwater monitoring well MW-36, located inside the TI zone, was also above the MCL for 2,3,7,8-TCDD. In addition, three other monitoring wells (MW-100, MW-101, and MW-102) were above the MCL and/or the Plume Concentration Levels (PCLs) for toluene, 2,4-dichlorophenoxyacetic, and/or 2,4,5-trichlorophenoxypropionic acid (Silvex). These three wells are located within the TI zone.
	Recommendation: The recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek should be investigated to determine the reason for the observed exceedances.

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date

No	Yes	PRP	EPA/State	Nov. 20, 2014

OU(s): OU3	Issue Category: Remedy Performance			
	Issue: Low-level exceedances of the discharge limitation for 2,3,7,8-TCDD have been identified in 10 of the discharge monitoring reports (DMRs) 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 were below the limits of detection. The reason for the exceedances was not determined. The Arkansas Department of Environmental Quality (ADEQ) identified issues with the DMRs for January-April 2013. ADEQ stated that analytical data reporting limits submitted for several parameters do not meet current required Minimum Quantification Levels (MQLs) and the reported analytical results do not indicate whether or not the water quality standards of the receiving stream are being maintained. In addition, the letter identified that it would be helpful in determining the potential for aquatic toxicity in the discharge if analytical results for "dissolved" values for metals were reported in addition to "total" values.			
	Recommendation: The reason for the continued 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, increasing quality control of sample collection techniques, and/or analytical laboratory services. The ADEQ continues to monitor this situation. The analytical data reporting limits for the DMRs need to meet the current MQLs as identified in the July 24, 2013 letter from ADEQ. In addition, the dissolved values for metals should be monitored and reported in addition to the total values per ADEQ's request.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	PRP	EPA/State	Nov. 20, 2014

OU(s): OU3	Issue Category: Operations and Maintenance
	Issue: The third 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 OU3 Record of Decision (ROD). The Site-Wide Groundwater Monitoring Plan was revised in April 2009, but modifications to the sampling schedule and list of parameters were implemented in 2010 through 2012 based only on

	discussions with the EPA, not the revised plan. At the time of this report, the 2013 sampling schedule and list of parameters were under development. The plan has not been finalized to reflect these ongoing modifications.
	Recommendation: The Site-Wide Groundwater Monitoring Plan needs to be updated to include the revised sampling schedule and list of parameters. If a change to the Operation and Maintenance Plan is necessary, then an official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement. A copy of the Settlement Agreement is included as Attachment 6 of the Fourth Five-Year Review Report.

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	PRP	EPA/State	Nov. 20, 2014

OU(s): Off-Site Areas	Issue Category: Monitoring
	Issue: According to the 1990 Off-Site Areas ROD, the fish in Rocky Branch Creek and Bayou Meto are 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. Additionally, EPA has required that fish tissue sampling taken for the site remedy be analyzed and compared with the EPA recommended fish tissue dioxin screening level of 0.7 part per trillion (ppt). All of the fish tissue samples except for three of four samples collected at the lower reaches of the Bayou Meto (below the State Highway 13 bridge) during 2009 and 2011 exceed the EPA recommended screening level of 0.7 ppt. In 2009, two of the samples collected from the Rocky Branch Creek (reach nearest the Vertac site) had sample results greater than 50 ppt, which historically is the level at which FDA issues a health advisory stating that fish should not be consumed. The site operator, Hercules Incorporated, was directed per the third five-year review to carry out the regularly scheduled 2008 fish flesh sampling by no later than January 31, 2009. This task was not accomplished during the identified timeframe, but was conducted in July/August 2009.
	Recommendation: EPA continues to require that fish tissue sampling taken for the site remedy be analyzed and compared with the fish tissue dioxin screening level of 0.7 ppt as recommended by EPA guidance. EPA

	continues to require that fish tissue dioxin sampling be performed every two years. For the next five-year review, the sampling schedule is identified as occurring in 2013, 2015, and 2017. The Fish Flesh Monitoring Reports associated with these three fish tissue sampling events should be made readily available for review during the fifth five-year review which is to occur in 2018. In addition, EPA continues to encourage by appropriate means, the Arkansas Department of Health to reinstitute the stream fishing ban or advisory in the impacted areas of the Bayou Meto, where it was suspended.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	Nov. 20, 2014

OU(s): OU1	**Issue Category: Site Access/Security**			
	Issue: A section of the perimeter fencing located to the west of the Resource Conservation and Recovery Act, Subtitle C landfill (OU1 Landfill) is damaged and open. Multiple patch repairs were observed during the site visit, but appear to be ineffective to the animal activity that caused the opening in the fence.			
	Recommendation: The open section of fence needs to be repaired and reinforced due to the repetitive nature of the animal activity causing damage to the fencing.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	Nov. 20, 2014

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date:*
OU Off-Site Areas	Protectiveness Deferred	November 20, 2018

Protectiveness Statement:

OU Off-Site Areas that were previously cleaned up are protective. A protectiveness determination for the remedy at OU Off-Site Areas, for areas that were not part of previous cleanup activities, cannot be made until further information is obtained. Remediation was conducted until the recommended soil cleanup level of 1 ppb was reached. It is unknown whether there are potential unacceptable risks based on the recently issued IRIS RfD for dioxin (EPA 2012a). Additional data collection for areas that were not previously cleaned up and evaluation are needed as part of the re-evaluation of the dioxin OU Off-Site Areas remedy to determine whether off-site soils are now considered protective.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU1 – On-Site Above Ground Media	Protective	Not applicable

Protectiveness Statement:

The remedy at OU1 is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. The remedial action is complete, and operation and maintenance of the Resource Conservation and Recovery Act, Subtitle C landfill (OU1 landfill) is ongoing. However, during the site inspection, the perimeter fencing was observed to be compromised west of the OU1 landfill, but no evidence of site trespassing was or has been observed. Heavy vegetation physically and visually obscures the opening suggesting the damage was caused by animal activity. Repairs to and reinforcement of the fence in the section identified need to be conducted in order to ensure long-term protectiveness.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date:*
OU2 – On-Site Soils	Protectiveness Deferred	November 20, 2018

Protectiveness Statement:

OU2 On-Site Soils that were part of previous cleanup activities are protective. A protectiveness determination for the remedy at OU2 On-Site Soils, for soils not previously cleaned up, cannot be made until existing site data are evaluated for factors including the IRIS RfD for dioxin (EPA 2012a) and the use of appropriate soil dioxin detection limits and soil dioxin sampling protocols. Evaluation of existing site data will determine whether additional sampling is needed in order to determine whether exposure concentrations for on-site soils, that were not previously cleaned up, are considered protective of human health.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date:*
OU3 – Groundwater	Short-term Protective	Not applicable

Protectiveness Statement:

The remedy at OU3 currently protects human health and the environment in the short term because on-site contaminated groundwater is extracted and treated for site contaminants of concern. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: determine the reason for MCL exceedances of 2,3,7,8-TCDD at sampling locations outside of the TI zone, and determine the reason for discharge limitation exceedances of 2,3,7,8-TCDD and implement treatment modifications to eliminate this issue to ensure protectiveness.

Sitewide Protectiveness Statement (if applicable)

Protectiveness Determination:	*Addendum Due Date:*
Protectiveness Deferred	November 20, 2018

Protectiveness Statement:

The remedial actions at OU1 (on-site above ground media) and the ongoing remedial action at OU3 (groundwater) are protective in the short-term and will be protective in the long-term provided the recommendations identified in the five-year review are implemented. However, because the remedial action at OU Off-Site Areas and OU2 On-Site Soils cannot be assessed with the information available at the time of this five-year review, the protectiveness determination of the remedy at OU Off-Site Areas and OU2 cannot be made. Therefore, the determination of protectiveness of OU Off-Site Areas and OU2 is deferred. Further information will need to be obtained, including additional data collection, as part of a re-evaluation of the dioxin soil cleanup. The sampling should focus on areas near residential homes and target the areas of highest potential human contact. Data from this sampling will be used to determine if residual soil dioxin levels are protective of human health based upon the recently issued 2,3,7,8-TCDD RfD. An assessment will be performed before the next five-year review.

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Region 6 has conducted a fourth 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 Fourth Five-Year Review Report documents the results of the review for the Vertac site, conducted in accordance with EPA guidance (EPA 2001 and 2011b) 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 Third Five-Year Review Report was signed on November 20, 2008, the period addressed by this five-year review for the Vertac site extended from 2008 to 2013. The triggering action for this review was the Third Five-Year Review Report completed in November 2008. This fourth five-year review was conducted from May through August 2013; 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 third five-year review (Section 5.0), discussion of the 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 3 provides the site inspection checklist. Attachment 4 provides the site inspection photographs. Attachment 5 provides the interview records. Attachment 6 provides Case No. 4:80-CV-00109-DPM which includes a Declaration of Restrictive Covenants applicable to the Vertac property and two Quitclaim Deeds as recorded with the Pulaski County Clerk. 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/region6/6sf/pdffiles/vertac-ar.pdf (EPA 2013a).

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. 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 a former herbicides manufacturing facility 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 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, its predecessor companies or other site owners and operators (EPA 1990).

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 above mean sea level in the north to approximately 260 feet 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.

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 28,500 people (estimate 2012) 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 third 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. Additional portions of Parcel 2 have been developed with a Police and Fire Department training facility and shooting range since the previous five-year review. 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.

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 that 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. Dioxins are the major contaminants of concern (COC) 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 1990).

In 1961, the City of Jacksonville's sewage treatment plant (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 1990).

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's West Wastewater Treatment Facility (EPA 1990).

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 at these OUs are described under Section 4. A summary 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. 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 1990).

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 landfill area was capped and a French drain, slurry wall, and leachate collection system were installed around the burial area (Figure 2). Improvements were 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 were 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 1990). 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 OU3 (discussed below), they are considered as a part of OU3 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.

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 of in the on-site landfill that is compliant with the requirements of RCRA, Subtitle C (hazardous waste), constructed as part of the remedy for OU1 (hereinafter referred to as the OU1 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. 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 third five-year review. The four OUs are: (a) the Off-Site Areas, (b) OU1 (on-site above-ground media), (c) OU2 (on-site soil, curbs, foundations, and underground utilities), and (d) OU3 (groundwater).

4.1 REMEDY OBJECTIVES

The specific remedial objectives of the Off-Site Areas OU RA 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 1990).

The specific remedial objectives of the OU1 (on-site above ground media) RA were:

- Treat principal 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 OU2 (on-site soils, foundations, curbs, and underground utilities) RA were:

- Remediate dioxins and furans to 5 ppb, expressed as toxicity equivalents (TEQ) 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 OU3 (groundwater) RA 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 $1x10^{-4}$ to $1x10^{-6}$ through treatment of extracted groundwater at the on-site WWTP.
- Use institutional controls to prevent the installation of drinking or utility water 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 (ROD) were issued by EPA for the Vertac site, for each of the four OUs. The Off-Site Areas OU ROD addressed the cleanup of releases to areas off the Vertac plant site. The ROD for OU1 addressed the site buildings and other above-ground contaminated media. The ROD for OU2 dealt with the remedy for subsurface contamination at the site, and the ROD for OU3 addressed the cleanup 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 and addressed 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 1990).

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 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 incinerated on-site. The sludge drying beds were to be capped with 1 foot 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 foot 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 foot 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 (EPA 1990).

Amendments to the Off-Site Areas OU ROD and the ROD for OU2 were signed on September 17, 1996, which allowed the excavated media from the Vertac Off-Site Areas OU to be disposed of 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 of in a consistent manner (EPA 1996b).

The ROD for OU1, 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.

The remedy described in the ROD for OU1 included the following elements:

- On-site construction of the OU1 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 OU1 landfill.
- Deferment of a remedy for containerized mud and sediments collected from manholes, drains, leaf filters, drilling, and bagged soil until the ROD for OU2 is approved.
- 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 OU1 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 OU1 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 OU1 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 OU1 media to be consistent with the ash and salt generated from the incineration of the drummed D-waste and T-waste (EPA 1993).

An UAO was issued to Hercules in March 1994 requiring it to perform remedial design (RD) and RA under the ROD for OU1. Hercules's RD 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 OU1. Hercules completed all aspects of the OU1 remedy in May 1998.

A ROD for OU2, the surface and subsurface soil, foundations and curbs, pads, and underground utilities was signed on September 17, 1996 (EPA 1996a). As part of the remedy for OU2, a treatability variance from the Land Disposal Restrictions (LDR) 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 OU2 ROD allowed certain Off-Site Areas OU waste to be

consolidated on-site in the OU1 landfill. This standard would apply should placement of wastes be determined to have occurred in the on-site OU1 landfill.

The remedy for OU2 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 of in the on-site OU1 landfill. All excavated areas were to be backfilled with clean soil and re-vegetated. 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 OU1 landfill of approximately 2,770 cubic yards (yd^3) of dioxin contaminated soil excavated from residential yards by Hercules in 1989.

- Consolidation in the OU1 landfill of contaminated soil to be excavated from the Rocky Branch Creek and Bayou Meto floodplains.

- Consolidation in the OU1 landfill of approximately 890 yd^3 of digester sludge from the Old STP and about 2 yd^3 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 OU1 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.

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 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 OU2 ROD on January 12, 1998. This ESD determined that the Jacksonville Residential Areas Superfund Site was part of an "area of contamination" under OU2 of the Vertac Superfund Site, and it stipulated that soils excavated from the residential yards were to be disposed of in the on-site OU1 landfill (EPA 1998). On January 15, 1998, the EPA issued an Administrative Order on Consent to Hercules requiring it to perform the necessary sampling, analytical, removal, and disposal work called for under the action memo. Response activities performed by Hercules's 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 RA for the Jacksonville Residential Areas Superfund Site and the ESD for the OU2 RA were completed in May 1998 (EPA 1998).

The ROD for OU3, 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 (NAPL) 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 (MCL) 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 had become 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 OU3 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 (PCL) 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 were 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 OU3. 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 RA 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 risks ranging from $1x10^{-4}$ to $1x10^{-6}$ and non-carcinogenic hazards of 1.

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 (PRP) 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.

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.
- Soil containing 2,3,7,8-TCDD concentrations greater than 10.0 ppb be excavated to 4 feet 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 inches of clean soil.
- Excavated areas where 2,3,7,8-TCDD concentrations exceeded 10.0 ppb should be backfilled with 4 feet 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 OU2 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. A UAO was issued on March 24, 1994, requiring the implementation of the RD/RA for OU1 (EPA 1994). Another UAO for the implementation of the RD/RA for OU2 was issued on December 10, 1996 (EPA 1996d). With EPA concurrence, Hercules modified the OU1 RD documents to incorporate the work required for OU2. This allowed for the administration of a comprehensive RA for both OUs.

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 OU1 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 OU1 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 OU1 landfill. Construction work began in August of 1996. The OU1 landfill was completed in June 1997.

Mobilization for the comprehensive RA for OU1 and OU2 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 OU1 and OU2 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 the site to final grade, consolidation of materials into the on-site OU1 landfill, and capping and closure of the on-site OU1 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 OU1 landfill. The final elevation was lower than originally designed. Materials disposed of in the on-site OU1 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.

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. The cleanup level for OU2 On-Site Soils was 5 ppb as identified in the 1996 ROD (EPA 1996b).

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 OU1 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.

On December 10, 1996, EPA signed a UAO requiring Hercules to perform the RA for OU3 (EPA 1996d). The objective of the RA for OU3 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 OU3, a new wastewater treatment facility was constructed by Hercules at the site. This construction occurred between January and June 1997. Activities conducted as part of the RA for OU3 included the construction of the groundwater recovery building, installation of additional monitor wells, installation of extraction wells, and the development of a Site-Wide Groundwater Monitoring Plan. Construction of the remedy for OU3 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 OU3 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 OU2, the well was buried. Attempts to locate the well were unsuccessful, and the well has not been plugged and abandoned.

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 third five-year review, the Site-Wide Groundwater Monitoring Plan (Terracon 2009b) for the Vertac site was updated based on EPA's and ADEQ's comments. Upon EPA's consent during a meeting on February 24, 2011, site-wide groundwater monitoring was reduced from a frequency of semi-annual to annual sampling during 2011-2012. In addition, the sampling of some parameters from specific wells was reduced for the 2011-2012 period. EPA is evaluating the sampling schedule for 2013 and the Site-Wide Groundwater Monitoring Plan should be revised once final decisions have been made.

Hercules's contractor, Terracon, currently staffs the project with four personnel, two of which are operator personnel conducting on-site activities. O&M activities are conducted in accordance with the Site Wide O&M Manual, which was revised in March 2008.

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 OU1 landfill, inspections and maintenance of the fences at the site, maintenance of the groundwater monitor wells, 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. O&M activities are described in detail in the Site Wide O&M Manual (Terracon 2008a) and summarized in the following paragraphs.

The OU1 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 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 third 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 was conducted on a semi-annual basis in 2008-2009, and then reduced to an annual basis from 2010 through 2012. The results summary for the groundwater sampling events conducted since 1994 are presented in Table 4.

Monitoring of fish tissue in Rocky Branch Creek and Bayou Meto has occurred since 1994 on a biannual basis (every two years) with the exception of 2008, which was delayed until 2009, and the most recent event occurring in 2011. The sampling stations for the Bayou Meto fish flesh monitoring program are illustrated in Figures 5 and 6. Samples have also been collected from Lake Dupree during monitoring events conducted in 1996, 2000, 2002, 2004, 2006, 2009, and 2011. The collection of fish flesh samples from Lake Dupree are outside the scope of the site CERCLA remedy. The 2,3,7,8-TCDD and TEQ 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. During the site visit on June 4, 2013, a section of fencing with multiple previous patches, was damaged and in need of replacement.

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.

5.0 PROGRESS SINCE THE THIRD FIVE-YEAR REVIEW

The third five-year review of the Vertac site was completed in November 2008, for the period from December 2003 through November 2008. The findings of the third 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 THIRD FIVE-YEAR REVIEW

The third five-year review report concluded that the remedies for the Vertac site were protective of human health and the environment because the wastes had been removed or contained. Wastes buried in the burial areas and the OU1 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 ensured the remedies continued to be protective.

The report also stated because the completed remedial actions and O&M program for the Vertac site were protective for the short term, the overall remedy for the site was protective of human health and the environment for the short term, and would continue to be protective if the action items identified in the third five-year review were addressed (EPA 2008).

5.2 THIRD FIVE-YEAR REVIEW RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The following is an excerpt from the third five-year review, completed in November 2008, in which EPA recommends follow-up actions (EPA 2008):

- **Landfill cap issues-Sedimentation vault (Mount Vertac)**—At the time of the third five-year review site inspection, a slope failure was observed on the north slope of the sedimentation vault (Mount Vertac). No exposed waste was observed. The area was surveyed on June 25, 2008 and a letter providing the proposed slope repairs was submitted to the EPA Remedial Project Manager (RPM) on July 25, 2008. The EPA RPM reviewed the repair plan and directed the site operator to proceed with the plan.

- **Unpermitted release of WWTP influent water**—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 equalization (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.

- **Groundwater sample exceedances of MCLs and PCLs**—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.

- **WWTP discharge limitation 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.

- **Plan and progress report discrepancies**—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.

- **Re-evaluation of new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer** —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.

- **Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto**—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.

5.3 STATUS OF RECOMMENDED ACTIONS

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

Landfill cap issues-Sedimentation vault (Mount Vertac)

The sedimentation vault slope was repaired in October 2008. 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.

Unpermitted release of WWTP influent water

In order to prevent future unpermitted releases and as recommended during the third five-year review, the site operator conducts a system inspection after any significant thunderstorms.

Groundwater sample exceedances of MCLs and PCLs

Recurring low level exceedances of the MCLs and PCLs in groundwater monitoring wells and the Rocky Branch Creek continues to occur periodically. An evaluation to determine the reason for the observed exceedances has yet to be completed.

WWTP discharge limitation exceedances

Periodic discharge limitation exceedances of 2,3,7,8-TCDD continue to occur at the site. An investigation has yet to identify the reason for the exceedances and modifications have not been identified to eliminate this issue. ADEQ is continues to monitoring this situation.

Plan and progress report discrepancies

The Site-Wide Groundwater Monitoring Plan was revised in April 2009. Since that time, additional changes to groundwater monitoring activities have occurred with a reduction of sampling from a semi-annual basis to an annual basis occurring from 2010 through 2012. EPA consented to the reduction in frequency of semi-annual to annual sampling during a meeting on February 24, 2011. In addition, the sampling of some parameters from specific wells was reduced for the 2011-2012 period. EPA is evaluating the sampling schedule for 2013 and the Site-Wide Groundwater Monitoring Plan will need to be revised once the final decisions have been made.

Annual Progress Reports have been submitted on an annual basis. A review of the progress reports identified that the 2011 report covered January 2011 – July 2011. The next year's report captured the remaining year of 2011 and covered the period of August 2011 through December 2012.

Re-evaluation of new technologies to treat and/or remove NAPL from the contaminated bedrock aquifer

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 fourth five-year review. Based upon the concentrations of detected COCs at the site and the subsequent evaluation of those concentrations in conjunction with documented solubilities for each constituent, it does not appear that dissolved phase concentrations exist in sufficient magnitude to indicate the presence of NAPL adjacent to the points where those samples were collected. This indicates continued protectiveness of the existing remedy in preventing potential migration of NAPL. However, the presence of NAPL in the past, the distribution of the monitoring well network, and the complexities of fractured bedrock hydrology do not preclude the possibility of a continuing sorbed or non-aqueous source of contamination in the subsurface within the TI zone. Based upon an evaluation of existing technologies and technological developments since the last five-year review, no new technologies for remediation of the NAPL impacted bedrock were identified.

Fish flesh monitoring and screening levels and fishing bans or consumption advisories for Rocky Branch Creek and Bayou Meto

As directed by the EPA, fish tissue dioxin sampling is being performed every two years, with the exception of 2008. Based on the original two-year sampling schedule which started in 1994, a fish tissue monitoring event should have occurred in 2008, but the last two events were conducted in 2009 and 2011. As recommended during the previous five-year review, the sampling location on the Bayou Meto at the Arkansas Highway 13 bridge was reinstated during these two events and the sampling results are provided in Table 5. Sampling below the Arkansas Highway 13 bridge was conducted in 2009 and 2011 based on the study reach identified in the Bayou Meto Fish Flesh Monitoring Reports (GBMc 2010, 2012).

6.0 FOURTH FIVE-YEAR REVIEW PROCESS

This section presents the process and findings of the fourth 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 fourth five-year review for the Vertac site was led by Mr. Philip Allen, EPA RPM. Ms. April Ballweg with EA Engineering, Science, and Technology, Inc. (EA), assisted in the review process. 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. The fourth five-year review site inspection was conducted on June 4, 2013 and was attended by the following representatives:

- Mr. Philip Allen, EPA RPM
- Ms. Annette Cusher, P.E., ADEQ
- Ms. Dianna Kilburn, P.G., ADEQ
- Mr. Mostafa Mehran, P.E. ADEQ
- Ms. Candice Brock, ADEQ Geologist
- Mr. Douglas Ritchie, ADEQ Epidemiologist
- Mr. Tim Hassett, P.E., Hercules/Ashland, Remedial Project Manager
- Mr. David Jaros, Terracon, Site Manager
- Mr. David Hopkins, P.G., Terracon, Project Manager
- Ms. Jody Adams, Terracon, Project Geologist
- Mr. Thomas Pilgram, Terracon, Senior Technician
- Mr. Roland McDaniel, GBMc and Associates, Project Scientist
- Ms. April Ballweg, EA, Project Engineer.

On June 5, 2013, a meeting was conducted at the ADH and was attended by the following representatives:

- Mr. Philip Allen, EPA RPM
- Ms. Shirley Louie, M.S., CIH, Associate Branch Chief for Epidemiology, ADH
- Ms. Carrie Poston, ADH
- Ms. Lori Simmons, ADH
- Ms. Ashley Whitlow, ADH
- Ms. Annette Cusher, P.E., ADEQ
- Ms. Dianna Kilburn, P.G., ADEQ
- Mr. Mostafa Mehran, P.E. ADEQ
- Ms. Candice Brock, ADEQ Geologist
- Mr. Douglas Ritchie, ADEQ Epidemiologist
- Ms. April Ballweg, EA, Project Engineer.

Other individuals involved in the interview process included Mr. Phillip Carlisle with the Concerned Citizens Coalition, and Mayor Gary W. Fletcher and Mr. James S. Whisker, P.E. with the City of Jacksonville.

In April 2013, the review team established the review schedule, which included the following components:

- Document review;
- Data review;
- Applicable or relevant and appropriate requirements (ARAR) review;
- Site inspection; and
- Interviews.

6.2 COMMUNITY INVOLVEMENT

Two public notices announcing the initiation of the five-year review for the site were published in the following local newspapers; *The LEADER*, May 22, 2013, and the *Jacksonville Patriot*, May 23, 2013. Copies of the initial public notices are provided in Attachment 7.

Upon signature, the Fourth 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, Third Five-Year Review Report, the Site Wide O&M Manual Revised March 2008, the Site-Wide Groundwater Monitoring Plan Revised April 2009, Discharge Monitoring Reports (DMR), Annual Progress Reports, Construction Quality Assurance Certification Report-Slope Repair and Final Cover Improvements-Vertac Sediment Vault Landfill, and site correspondence with state and federal agencies. Complete references for the documents reviewed are provided in Attachment 2.

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 fourth five-year review. These data consist of slope repairs to the Vertac sedimentation vault, groundwater quality data, groundwater level measurements, WWTP discharge data, and fish tissue monitoring data.

During a routine site inspection in May 2009, site personnel observed a slope failure on the north side of the sedimentation vault landfill. A "Request for Proposal – Slope Repair" was developed in September 2009 and construction activities commenced in December 2009. Per the Construction Quality Assurance Certification Report (Terracon 2010a), the failure occurred in the final cover of the sedimentation vault landfill and did not cause the exposure of contaminated soils. The construction sequence associated with the slope repairs and armoring (with rip-rap) of the remaining vegetative slopes was as follows:

- Site preparation, removal of vegetation layer, and grading of side slopes
- Preparation of existing clay liner surface
- Installation and quality assurance testing of an additional lift of compacted clay liner, paced at 95% of the Standard Proctor density with a maximum hydraulic conductivity of 1.0×10^{-7} centimeters/second
- Installation of a woven geotextile
- Installation of 90 pound rip-rap on slopes
- Installation of Class 7 stone on select slopes and the top of the landfill
- Hydroseeding disturbed areas
- Road repairs around the sedimentation vault landfill.

Repairs to the sedimentation vault slopes were completed by mid-January 2010 and a Construction Quality Assurance Certification Report was prepared and stamped by a Professional Engineer on February 1, 2010.

The treatment plant discharge data are collected monthly and compiled in monthly reports submitted to the ADEQ. Groundwater quality data from November 2008 to the present were collected and reported in Annual Progress Reports (Terracon 2009a, 2010c, 2011a, 2012a, and 2013a). As described in the progress reports, the site operator conducted semi-annual groundwater sampling in 2008 and 2009. In 2010-2012, annual groundwater sampling events were conducted. The 2010 sampling was based on discussions with EPA, and a written document (e-mail from Terracon to EPA) identified the annual sampling schedule for 2011 and 2012 (Terracon 2011b). A groundwater sampling event was conducted in October 2013. The EPA and ADEQ are reviewing the groundwater sampling report.

Progress reports are submitted annually. Annual reports were submitted during this five-year review period, however, it was observed that the 2011 progress report covered the timeframe of January 2011 through July 2011 and the 2012 report covered the period of August 2011 through December 2012. The three previous reports covered the standard January through December timeframes.

Groundwater level measurements are collected on a monthly basis, and this data is included in the progress reports. The fish tissue monitoring data is collected biannually and submitted in a biannual report (GBMc 2010 and 2012). Groundwater data available for the site since the third five-year review in 2008 is summarized in Table 4. Fish tissue monitoring results summarizing 2,3,7,8-TCDD and TEQ data from 1994 through 2011 is provided in Table 5.

The majority of reported contaminant concentrations in the progress reports were either below the corresponding MCL/PCL or were non-detect during the fourth five-year review period. Exceptions to this were noted for 2,3,7,8-TCDD, 2,4-D, Silvex, and toluene.

The groundwater monitoring data collected through February 2013 indicated one monitoring well (LW-5) located outside of the TI zone, and two Rocky Branch Creek samples (RBC and 001) had 2,3,7,8-TCDD exceedances above the MCL of 0.03 nanograms per liter (ng/L). Table 6 provides the locations, dates, and 2,3,7,8-TCDD concentrations of the exceedances which occurred outside of the TI zone during this five-year review period.

In addition, four wells located within the TI zone exceeded MCLs with one exceedance observed above the PCL for a toluene sample. Monitor well MW-36 exceeded the 2,3,7,8-TCDD MCL of 0.03 ng/L. Monitoring wells MW-100, MW-101, and MW-102 exceeded the toluene MCL of 1,000 micrograms per liter (µg/L), with MW-101 also exceeding the PCL of 9,000 µg/L. These three monitoring wells also exceeded the 2,4-D MCL of 70 milligrams per liter (mg/L). In addition, wells MW-100 and MW-102 exceeding the Silvex MCL of 50 µg/L. Table 7 provides a summary of the well identifications, dates, and concentrations of these exceedances for the wells located within the TI zone.

The water level data available in the progress reports developed by Terracon from 2008 through 2012 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., EX-3/MW-102, MW-79/MW-99, MW-100/MW-89, MW-102/MW-90, and MW-91/MW-94). This eastward gradient was most common in well pairs MW-100/MW-90 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 (Terracon 2009a, 2010c, 2011a, 2012a, and 2013a). The 2010 Progress Report identified that the groundwater extraction pumps were lowered an additional five feet in October 2010 in an attempt to increase the inward gradient at the site (Terracon 2011a). 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.

The WWTP discharge data are collected on a weekly basis and the data are submitted to ADEQ in monthly reports. The permit discharge limit for 2,3,7,8-TCDD is 0.0053 ng/L as identified on the Vertac Site Permit Conditions Monitoring Reports (monthly reports submitted to ADEQ), and as approved by the Arkansas Pollution Control & Ecology Commission (APC&EC) letter dated September 25, 1997 (APC&EC 1997). The data from June 2008 through May 2013 were reviewed as part of this fourth five-year review. The data show that treated water from the WWTP exceeded the discharge limit for 2,3,7,8-TCDD during the following months:

- September 2008 (Hercules 2008c)
- May 2009 (Hercules 2009e)
- August 2009 (Hercules 2009h)
- October 2009 (Hercules 2009j)
- December 2009 (Hercules 2009l)
- December 2010 (Ashland 2010k)
- February 2011 (Hercules 2011b)
- December 2011 (Hercules 2011l)
- February 2012 (Hercules 2012b)
- July 2012 (Hercules 2012g).

The site operator indicated that when an exceedance occurs, the standard action is to collect an additional discharge sample during the month in question and analyze it to verify the initial exceedance. A review of the analytical data indicated that resampling within the month or samples collected the month following a discharge exceedance were typically below the 0.0053 ng/L discharge limit. The continued detection of the contaminants in the treated water should be evaluated to identify the action necessary to eliminate or minimize discharge limit exceedances.

One detected concentration of 2,6-dichlorophenol and two detections of total zinc were identified 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 (APC&EC 1996). The cause for these detections was not documented.

In a letter dated July 24, 2013, ADEQ identified issues with the DMRs for January-April 2013. Per the letter, the analytical data reporting limits submitted for several parameters do not meet current required Minimum Quantification Levels (MQL). The parameters identified are not compared to any permit standards, only a "Report" requirement. ADEQ stated that because of the discrepancy between the MQLs achieved in the analyses reported to date and the water quality based limits, the reported analytical results do not indicate whether or not the water quality standards of the receiving stream are being maintained. In addition, the letter stated that it would be helpful in determining the potential for aquatic toxicity in the discharge if analytical results for "dissolved" values for metals were reported in addition to "total" values. Therefore, the ADEQ directed that all future analytical results should meet the current MQLs as provided in the June 2013 letter and that dissolved values for the metals should be monitored and reported in addition to the total values (ADEQ 2013c).

The DMRs include chronic whole effluent toxicity testing which is conducted once per quarter (1 test per 90 days) and is reported on a pass/fail basis. The data shows that a total of nine toxicity test failures during the following quarters:

Second Quarter 2008 Acute Toxicity Testing

- June 2008 Original Test: Reproduction portion of the test, as well as, Pimephales promelas test for larval survival and growth – Failed (Terracon 2008b)
- July 2008 First Re-test: Reproduction portion of the test, as well as, Pimephales promelas test for larval survival and growth – Failed (Terracon 2008c)
- August 2008 Second Re-test: Passed (Hercules 2008c).

Third Quarter 2008 Acute Toxicity Testing

- September 2008 Original Test: Ceriodaphnia dubia reproduction – Failed (Terracon 2008d)
- October 2008 First Re-test: Passed (Terracon 2008e)
- November 2008 Second Re-test: Ceriodaphnia dubia portion – Failed (Terracon 2008f)
- December 2008 Test: Passed (Hercules 2008g).

Second Quarter 2009 Acute Toxicity Testing

- June 2009 Original Test: Ceriodaphnia dubia reproduction – Failed (Terracon 2009c)
- July 2009 First Re-test: Passed (Terracon 2009d)
- August 2008 Second Re-test: Passed (Terracon 2009e).

First Quarter 2010 Acute Toxicity Testing

- March 2010 Original Test: Failed (Ashland 2010b)
- April 2010 First Re-test: Passed (Terracon 2010d).

Second Quarter 2010 Acute Toxicity Testing

- June 2010 Original Test: Ceriodaphnia dubia reproduction – Failed (Terracon 2010g)
- July 2010 First Re-test: Ceriodaphnia dubia reproduction – Failed (Terracon 2010h)
- August 2010 Second Re-test: Passed (Terracon 2010i).

Third Quarter 2012 Acute Toxicity Testing

- September 2012 Original Test: Pimephales promelas and Ceriodaphnia dubia survival and reproduction – Failed (Terracon 2012c)
- October 2012 First Re-test: Passed (Terracon 2012d)
- November 2012 Second Re-test: Passed (Terracon 2012e).

The monthly monitoring reports include weekly discharge data. Some weeks were not included in the monthly reports due to the lack of sufficient amounts of water collected and treated as a result of drought conditions at the site. The following weeks were identified during this five-year review period as not having a discharge event based upon a review of the reports submitted:

- Last week – May 2010
- Last week – September 2010
- First week – October 2010
- First week – September 2011

- First week – August 2012
- Second week – August 2012
- Last week – August 2012
- Last week – September 2012.

Fish flesh monitoring pursuant to the CERCLA Off-Site Areas remedy (and at Lake Dupree) has been performed at seven locations as follows: one at Rocky Branch Creek; one at Lake Dupree; and five along the Bayou Meto. The sampling locations from upstream near the Vertac site to downstream along the Bayou Meto are: U.S. Highway 67-167, State Highway 161, Interstate Highway 40, State Highway 15, and State Highway 13. According to the 2009 Bayou Meto Fish Flesh Monitoring Report (GBMc 2010), the reach at State Highway 13 was reinstated as recommended by EPA during the third five-year review, and was included during the sampling events conducted in 2009 and 2011. Refer to Figures 5 and 6 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. The current fish consumption advisory as identified in the Bayou Meto Fish Flesh Monitoring Report, extends to the State Highway 13 bridge is shown on Figure 4 (GBMc 2012). The analytical results for 2,3,7,8-TCDD and TEQ from the fish flesh monitoring events conducted since 1994 are presented in Table 5.

Fish tissue monitoring at the Rocky Branch Creek, Lake Dupree, and the five Bayou Meto locations (U.S. Highway 67-167, State Highway 161, Interstate Highway 40, State Highway 15, and State Highway 13) is to be conducted on a biannual basis (once every two years). The sampling events conducted during this five-year review period occurred in July/August of 2009 (GBMc 2010) and July of 2011 (GBMc 2012). Based on the previous five-year review period, the actual sampling events should have occurred during the years of 2008, 2010, and 2012.

The 2009 and 2011 Bayou Meto Fish Flesh Monitoring Reports concluded that the fish tissue data continue to show a general decreasing or stable trend at all of the locations with the exceptions of Rocky Branch Creek for predator species and Interstate Highway 40 (identified as sampling location BM-5.5) for bottom feeder species in 2009 (GBMc 2010). Results in

2011 were similar showing decreasing or stable tends at all locations except BM-5.5 for bottom feeders (GBMc 2012).

Review of the fish flesh monitoring data indicate that the 2,3,7,8-TCDD results downstream of the site towards the furthest-downstream sampling location at the State Highway 13 bridge were the lowest overall when compared to the remaining locations, at less than 1.0 ppt for the four fish tissue data collected. Of the four samples at State Highway 13 collected in 2009 and 2011, only one sample collected was above 0.7 ppt (smallmouth buffalo at 0.924 ppt in 2009). The highest concentrations of 2,3,7,8-TCDD were detected in two fish tissue samples collected during the 2009 event at the Rocky Branch Creek location with predator species (largemouth bass) having concentrations of 80.4 and 81.7 ppt . When levels are found to be at 50 ppt or greater, the reports identified that the ADH issued warnings recommending no consumption of fish by individuals and a ban relating to commercial fishing for the affected waters (GBMc 2010, 2012). In addition, as cited in the water quality criteria document for 2,3,7,8-TCDD (EPA 1984), the FDA issued a health advisory stating that fish with concentrations greater than 50 ppt should not be consumed and that levels less than 25 ppt pose no serious health concern (FDA 1981, 1983).

Although Lake Dupree has been the subject of a separate cleanup response effort involving the ADEQ, it has not been the subject of CERCLA RA and is not formally a part of the Vertac site five-year review. The four fish tissue results for the Lake Dupree samples collected in 2009 and 2011 were below the 25 ppt level but above the EPA recommended screening level of 0.7 ppt.

All fish monitoring results generated during the fourth five-year review period, except for the two 2009 Rocky Branch Creek samples identified previously, were below 25 ppt for dioxin in fish tissue samples. However, only three fish tissue samples collected at State Highway 13 bridge, demonstrated 2,3,7,8-TCDD concentrations below the EPA recommended screening level of 0.7 ppt.

The most recent biannual fish sampling report developed by GBMc & Associates (GBMc) recommends that the fish consumption advisory be rescinded for the Bayou Meto excluding the Rocky Branch Creek reach (GBMc 2012). The report states that the "TEQ concentration exceeding the 50 ppt no consumption advisory level witnessed in the largemouth bass predator composite at Rocky Branch Creek in 2009 requires the further monitoring of the predator species at Rocky Branch Creek until concentrations are below the 25 ppt TEQ level for two consecutive monitoring periods." (GBMc 2012). The recommendations did not discuss the EPA guidance recommended screening level of 0.7 ppt.

Hercules was directed per the third five-year review to carry out the regularly scheduled 2008 fish flesh sampling by no later than January 31, 2009. This task was not accomplished during the identified timeframe but was conducted in July/August 2009.

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. Three five-year reviews have been conducted since the RA for the Off-Site Areas OU (November 30, 1993) was commenced. These five-year reviews were conducted in July 2001, November 2003, and November 2008 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 OU1 landfill
- Groundwater and surface water monitoring,
- Maintenance of the groundwater extraction system, French drain, and WWTP
- Review of soil remedies for on-site and off-site areas, and
- Fish tissue monitoring.

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 third 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 third five-year review, none of these regulatory changes impact the protectiveness of the remedy at the Vertac site and no newly-promulgated ARARs were found during this review. However, the EPA developed a new non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-TCDD in 2012. Site-specific dioxin preliminary remedial goals (PRG) and cleanup levels should be reviewed to ensure that the original values are protective for the non-cancer RfD and acceptable estimates of cancer toxicity. This TBC is discussed further in Section 6.5.4.

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 Code of Federal Regulations [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 OU3 ROD "the TI zone". The OU3 ROD required that COCs meet PCLs at the boundary of the TI zone. PCLs, MCLs, and SMCLs for OU3 are outlined in the Site-Wide Groundwater Monitoring Plan (Terracon 2009b). 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. 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 fourth five-year review and subsequent review of site data.

- **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 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 2008 through 2013 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 2008-2013 five-year review timeframe, 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 Regulation 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 2012 (effective date September 26, 2011) and Regulation 6 was modified in 2008 (effective date February 9, 2013). Changes made to Regulation 6 do not affect wastewater discharge associated with the Vertac site. ADEQ representatives have identified that reporting limits for the monthly discharge sampling should be evaluated to ensure APC&EC Regulation 2 is being complied with, therefore, changes made to Regulation 2

may 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 fourth five-year review process and no new chemical-specific requirements pertaining to the site have been promulgated since 2008.

No other chemical-specific federal or State of Arkansas ARARs for the Vertac site were identified during the fourth five-year review process and no new chemical-specific requirements pertaining to the site have been promulgated since 2008.

6.5.2 Location-specific ARARs

Location-specific ARARs are restrictions on remedial activities solely based on the location of the remedial activity.

- **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. RCRA states that any facility within a 100-year flood plain must be designed, constructed, operated, and maintained to prevent washout. Washout is described as "the movement of hazardous waste from the active portion of the facility as a result of flooding. These requirements are being met through implementation of the O&M plan.

- **Floodplain Management Order; Executive Order No. 11988**—This Executive Order (40 CFR 6 Appendix A) dictates that federally funded or authorized actions within the 100-year flood plain avoid, to the maximum extent possible, adverse impacts associated with development of a flood plain. A facility located in a 100-year flood plain must be designed, constructed, operated, and maintained to prevent wash out of any hazardous waste by a 100-year flood, unless the owner or operator can demonstrate to the Regional Administrator's satisfaction that waste can be removed before flood waters arrive and that no adverse health hazards are at risk if flooding occurs.

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 2008.

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. The O&M plan requires that O&M of the treatment system at the site is conducted in accordance with these requirements. Site O&M activities generate hazardous wastes of carbon containing landfill leachate (listed F039 waste) which is sent to Calgon Carbon Corporation for regeneration 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 2008 through 2013 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 identify 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 Treatment, Storage or Disposal (TSD) Facility Requirements Under RCRA (40 CFR 264, Subparts B, C, and D and Arkansas Hazardous Waste Management Regulation 23):** The RODs identify 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 identify this regulation which requires that

owners/operators of land-based RCRA treatment, storage or disposal (TSD) units conduct a groundwater monitoring and response program. The OU3 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 OU3 ROD. The site project manager currently holds a Class I Basic Industrial Wastewater Treatment Operator License (#007555), and the site plant operator holds a Class II Basic Industrial Wastewater Treatment Operator License (#004190). In addition, the assistant to the site project manager, who periodically works at the site, has a Basic Industrial Wastewater Treatment Operator License (#010799). All three licenses have an effective expiration date of June 30, 2015 (ADEQ 2013d). 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 previous five-year reviews noted that during the RA, the Reasor-Hill well was buried and several unsuccessful attempts have been made to locate the well. 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 2008.

6.5.4 To Be Considered

The Off-Site OU ROD (EPA 1990) 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.

As identified in the previous five-year reviews, 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 would result in attainment of water quality standards for the listed pollutants within a reasonable time.

Fish tissue has been monitored as part of the Vertac site remedy. The site tests the Rocky Branch Creek and the Bayou Meto streams for fish tissue dioxin levels and the FDA advisory levels are used as a TBC for the site. The FDA TBC outlined 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).

Recent analysis in 2009 and 2011 indicate that the majority of fish flesh concentrations of 2,3,7,8-TCDD from the collected samples continue to be below 25 ppt, however, fish tissue data at the sampling location near the site (Rocky Branch Creek) had analytical data above the 50 ppt health advisory level. In addition, EPA continues to recommend the screening level of 0.7 ppt.

As previously stated, the EPA has developed an Integrated Risk Information System (IRIS) non-cancer RfD for 2,3,7,8-TCDD in 2012. Consistent with the NCP's preamble (see e.g., 55 Fed.

Reg. 8666 at p. 8745 (March 8, 1990) and subsequent guidance, the IRIS RfD should be considered in establishing exposure screening levels that are protective of human health. Thus, the 2,3,7,8-TCDD RfD should be used in re-evaluating site-specific RGs and cleanup levels under CERCLA and the NCP that have been established for the site.

6.6 SITE INSPECTION

The site inspection was conducted on June 4, 2013. The site inspection was 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 site inspection were as identified in Section 6.1 above. 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 observed. Security fencing and gates were secured and in good condition (Photograph 1) with one area of damaged and open fencing observed during the June 2013 site visit (Photograph 20). Trees and vegetation were noted along fence lines which may help obscure the site thereby possibly impeding trespasser access to the fence. Identification signs were posted on the perimeter fences and gates (Photographs 1, 37, and 47). Site access roads (Photographs 1, 4, 9, 26, 32, and 46) were in good condition throughout the site.

Many of the existing on-site groundwater monitoring wells and extraction wells (Photographs 13, 14, 23, 24, 39, 40, and 45) were located during the Vertac site inspection. All observed surface completions were secure and in good condition with some need for repainting and relabeling required (Photograph 13 and 45). Due to the size of the site and the various components of the remedy, every well was not visually inspected during the fourth five-year review site inspection, but the condition of all inspected wells appeared to be sufficient at the time of the visit. One of the extraction wells was opened during the site inspection (Photographs 39 and 40). The equipment inside the extraction well vault appeared to be in good condition.

The French drain was reviewed during the site inspection. All manholes were in good condition (Photographs 11, 12, and 34). Some of the French drain manholes were inspected and appeared to be functioning as intended. The controllers and flow meters for the French drain pumps are mounted on power poles located near the manholes. 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. The vegetative cover was well established, and no obvious signs of erosion were noted.

The sedimentation vault landfill (Mount Vertac) was also inspected while the team was on-site for the fourth five-year review site inspection (Photographs 5-10). The armored (rip-rap) sides of the vault appeared to be in good condition with some minor vegetative growth observed.

The fourth five-year review site inspection also included an inspection of the RCRA, Subtitle C landfill (OU1 landfill). The cap had an established vegetative cover with no signs of erosion, slumping, bulging, cracking, or settlements. A small hole believed to be an animal burrow was observed near the leachate collection pipes (Photograph 31). The letdown channels are covered with large rocks and drain stormwater runoff from the top of the cap (Photographs 18, 27, and 28). The leachate collection and leachate detection sumps were secured and in good condition (Photographs 17, 29, and 30).

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 tree debris observed in the basin located on the south side of the OU1 landfill (Photograph 27). The overflow structures were 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; Photographs 35, 36, and 41) while the second building contains the wastewater treatment equipment (Photographs 2, 36, and 48). The groundwater recovery building contains a holding tank, pumps, piping, and sampling ports (Photographs 42, 43, and 44) 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 a collection tank (Photograph 42) 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 EQ tanks are located outside the building (Photograph 48). 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. In addition, leachate recovered from the leachate collection sumps at the OU1 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, two sand filters, a backwash holding tank for the sand filters, three carbon treatment units (Photograph 49), a pH neutralization tank (Photograph 51), and the treated water tank (Photograph 50). 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. 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.

6.7 SITE INTERVIEWS

In accordance with the community involvement requirements of the five-year review process, EPA identified key individuals to be interviewed. All individuals were interviewed in person or provided interview survey forms during the week of the site investigation on either June 4 or June 5, 2013. Table 8 lists the individuals that participated or completed the interview survey forms for the fourth 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 identified that the RA work has been satisfactory but identified the following issues in the completed survey forms which are provided in Attachment 5:

- DMR–Out fall 002 May-June 2009 exceedances for dioxin. Investigation of cause not complete. Updating the reporting limits for several constituents should be part of this five-year review.
- Discharge limits have not been revised since 2007. The limits have been lowered in Regulation No. 2; lower method detection limits for the COCs should be obtained. The reporting limits for the monthly discharge sampling should be evaluated to ensure current APC&EC Regulation No. 2 is being complied with. Correspondence between ADEQ and EPA to bring the water treatment plant discharge limits up to current requirements are ongoing and expected to be resolved concurrently or soon after this five-year review.
- Groundwater monitoring did not occur according to the O&M Plan during the entire five years. Consistency of monitoring and reporting needs to be improved.
- Based on the current institutional controls and the recent site visit, new or updated signage may be appropriate.

ADH personnel indicated information provided was more than adequate and confirmed that discharge monitoring reports were being received since the last five-year review. No issues or concerns were identified by the ADH.

7.0 TECHNICAL ASSESSMENT

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 OU1 and its May 1995 ESD; the September 1990 and 1996 RODs for OU2 and its January 1998 ESD; and the September 1996 ROD for OU3. 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 site surveys/interviews, it appears that the Vertac site remedy is functioning as intended by the decision documents.

- **O&M**—Section 4.4 above includes site-specific information of operation and maintenance activities conducted during this five-year review period.

- **Opportunities for Optimization**—On February 24, 2011, Hercules and Terracon held a meeting with EPA to discuss revisions to the sampling schedule, the list of parameters collected, and the number of wells sampled from during groundwater events. In an e-mail from Terracon to EPA on June 23, 2011, the sampling schedule was documented as being modified from semi-annual to annual sampling and it provided an agreed upon reduced list of parameters and a reduced number of wells for 2011 and 2012. In 2010, sampling was conducted once during the year based on a verbal discussion with EPA. EPA considerations of continuing the reduced schedule and parameters for the 2013 sampling year are ongoing at the time of this five-year review process.

Per the August 2013 interview survey form, the PRP representative identified "Hercules would like to optimize the groundwater and discharge monitoring programs and have proposed several reductions in the monitoring that do not compromise protection of human health and the environment. These have been agreed to by EPA and ADEQ on a year by year basis and we would like to have these become more permanent and modify the O&M Manual accordingly." An official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement prior to any modifications.

The EPA and ADEQ will review submitted requests and determine if suggested modifications are acceptable. Such reviews will 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**—Review of the annual progress reports and the groundwater monitoring data collected from June 2008 through February 2013 indicated one monitoring well (LW-5) located outside of the TI zone, and two Rocky Branch Creek samples (RBC and 001) had 2,3,7,8-TCDD exceedances above the MCL of 0.03 ng/L.

  Four monitoring wells, located inside of the TI zone, were observed to have exceeded MCLs with one exceedance above the PCL for a toluene sample. Monitor well MW-36 exceeded the 2,3,7,8-TCDD MCL of 0.03 ng/L. Monitoring wells MW-100, MW-101, and MW-102 exceeded the toluene MCL of 1,000 µg/L, with MW-101 also exceeding the PCL of 9,000 µg/L. These three monitoring wells also exceeded the 2,4-D MCL of 70 mg/L. In addition, wells MW-100 and MW-102 exceeding the Silvex MCL of 50 µg/L. This potential issue was observed during the previous five-year review and continues to need to be evaluated further to determine the reason for the MCL/PCL

exceedances, especially for the well located outside of the TI zone and the Rocky Branch Creek sampling points.

Low level exceedances in the discharge limitations of 2,3,7,8-TCDD were identified in 10 of the discharge monitoring reports examined during this five-year review. In addition, the discharge monitoring reports showed a total of nine toxicity test failures in six quarters. 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 revised in 2009. Since that time, changes to the groundwater monitoring sampling schedule, list of sampling parameters, and list of sampling wells has been modified based upon meetings between the PRP, the PRP's subcontractor, and EPA. The Site-Wide Groundwater Monitoring Plan may be updated. If a change to the Operation and Maintenance Plan is necessary, then an official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement. The Settlement Agreement is provided as Attachment 6.

- **Implementation of Institutional Controls and Other Measures**—Institutional controls have been implemented in accordance with the RODs. A Notice of Filing Executed Documents in the United States District Court, Easter District of Arkansas, Western Division, Case 4:80-CV-00109-DPM, Document 2661 was filed on May 24, 2013. The document included Exhibit A, "Declaration of Restrictive Covenants" which identifies the imposition of certain restrictions and limitations described as the "Institutional Controls" applicable to Zone 1 and Zone 2 of the Property depicted in a plat map included as Exhibit 1 (Figure 7). Additionally, two quitclaim deeds were included in the court documents. The first quitclaim deed transferred three real property tracts from the City of Jacksonville (Grantor) to Lee S. Thalheimer, Receiver for Vertac Chemical Company (Grantee) as witnessed and notarized on March 1, 2013. The second quitclaim deed transferred six real property tracts from Lee S. Thalheimer, Receiver for Vertac

Chemical Company (Grantor) to East Bay Realty Services, Inc. (Grantee) as witnessed and notarized on May 19, 2013. The six real property tracts of the second quitclaim deed included the first three tracts identified in the first quitclaim deed signed in March 2013, as well as three additional tracts. The East Bay Realty Services, Inc. company is a subsidiary of Hercules Inc. which is a wholly owned subsidiary of Ashland Inc.

The Declaration of Restrictive Covenants and the two Quitclaim Deeds were filed and recorded in the Official Records of Larry Crane, Pulaski County Circuit/County Clerk on May 23, 2013. A copy of the documents discussed in this section is included as 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 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 OU3 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 fourth five-year review, the potential development of new technologies that might be capable of remediating NAPL in fractured bedrock aquifers was researched. An evaluation was completed to compare the existing remedy against available geologic, hydrologic, contaminant distribution, and fate and transport data to evaluate the potential for new technologies developed since the last five-year review. The results of the technology

evaluation indicate that no additional technologies have been developed which would allow for practicable remediation of NAPLs at the site. Therefore, 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?

No. Toxicity values used to establish remedial action goals (RG) for dioxins, toluene, and 2,4,6-trichlorophenol are not consistent with current toxicity values and are discussed below. 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—EPA has been conducting a reassessment of dioxin toxicity for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment. On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or RfD of $7x10^{-10}$ mg/kg-day for 2,3,7,8-TCDD in EPA's IRIS. A dioxin cancer reassessment will follow; however, it has not occurred at the time of this review. The dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health and is applicable as a TBC for this site.

Changes in Exposure Pathways—There have been no changes in exposure pathways for the Vertac site.

Changes in Toxicity and Other Contaminant Characteristics—EPA developed human health risk-based RGs for on-site soil, off-site soil, and groundwater. The on-site soil RG for dioxins and furans (as 2,3,7,8-TCDD TEQ) of 5 µg/kg was determined to be protective for a worker exposure scenario. The on-site soil RG of 500 mg/kg for tetrachlorobenzene was established for crystalline material in the spill area. EPA developed a human health risk-based RG for off-site

soil for dioxins and furans (as 2,3,7,8-TCDD TEQ) of 1 μg/kg that was protective of the residential exposure scenario.

EPA developed human health risk-based RGs (PCLs) for groundwater, which are presented below:

- 2-Chlorophenol - 6 mg/L based on a noncancer endpoint
- 2,4-Dichlorophenol - 2 mg/L based on a noncancer endpoint
- 2,4-D - 210 mg/L based on a noncancer endpoint
- Silvex (2,4,5-TP) - 84 mg/L based on a noncancer endpoint
- Toluene - 9 mg/L based on a noncancer endpoint
- 2,4,5-Trichlorophenol - 52 mg/L based on a noncancer endpoint
- 2,4,6-Trichlorophenol - 0.1 mg/L based on a cancer endpoint
- 2,4,5-T - 210 mg/L based on a noncancer endpoint
- 2,3,7,8-TCDD - 7 ng/L based on a cancer endpoint.

The EPA identified that 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 are above the FDA alert level (EPA 1990). When levels are found to be at 50 ppt or greater, the ADH issues warnings recommending no consumption of fish by individuals and a ban relating to commercial fishing for the affected waters (GBMc 2010, 2012). However, the EPA requires that fish tissue sampling taken for the site remedy be analyzed toward the recommended level of 0.7 ppt.

The toxicity values used to establish RGs for 2,3,7,8-TCDD, 2,4,6-trichlorophenol and toluene are not consistent with current toxicity values (see Table 9).

The only current and potential future complete exposure pathways are for on-site soil, off-site soil, and fish ingestion. Groundwater was subjected to a TI waiver, and 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 groundwater remedy in order to prevent the off-site migration of contaminated groundwater above the MCLs. Institutional controls have been instituted at the site to prevent the installation of wells on-site and prevent exposure of site workers through use of the contaminated

groundwater (EPA 1996c). As a result, the primary concern in changes in toxicity values are the new oral RfD for 2,3,7,8-TCDD set forth in IRIS in 2012 as they pertain to the soil RGs. However, the toxicity changes for 2,4,6-trichlorophenol and toluene will be discussed as they pertain to the groundwater PCLs.

Soil

A site-specific re-evaluation of the recommended soil cleanup levels and residual soil levels for dioxin will be performed, for those areas that were not part of previous cleanup activities, to determine the protectiveness of the remedies. The following is a two-step process for the dioxin re-evaluation:

i) A desktop review should be conducted to determine the adequacy of data already collected with regard to recalculation of risk. If sufficient data exist, the exposure area(s) should be identified, and the 95% upper confidence limit (UCL) concentration for the exposure area(s) should be calculated. The Hazard Quotient (HQ) associated with the appropriate exposure scenario and this 95% UCL concentration should be calculated.

ii) If existing data are not sufficient to perform this calculation, an additional field investigation should be planned and carried out.

The remedy selected for OU2, On-Site Soils, consisted of the excavation and consolidation within an on-site hazardous waste landfill of site soils and debris that contain dioxin contamination levels at or above a 5 ppb cleanup level. The excavated areas were backfilled with clean fill, graded, and vegetative cover established. Soil areas previously cleaned up are protective. A full determination of the protectiveness of the on-site soil cleanup level cannot be determined at this time for those areas that were not part of previous cleanup activities. It is recommended that available site data be evaluated; considerations include the IRIS RfD for dioxin (EPA 2012a) and the use of appropriate soil dioxin detection limits and sampling protocols. Evaluation of existing site data will determine whether additional sampling is

needed for soils that were not previously cleaned up in order to determine whether exposure concentrations for on-site soils are now considered protective.

As part of the RA, off-site soils were removed from the floodplain-zoned residential areas and the residential areas directly east of the Vertac site adjacent to a plot currently owned by Vertac. Excavation occurred in 6- to 12-inch intervals. After each interval, confirmation samples were collected to determine if further excavation was required. Sampling and excavation continued until a soil concentration of 1 ppb was reached. Eight grids on the west side and ten grids on the east side of Rocky Branch Creek were excavated. Off-site soils previously cleaned up are protective. A full determination of the protectiveness of the off-site soil cleanup level cannot be determined at this time for those soils that were not part of previous cleanup activities. It is unknown whether there are potential unacceptable risks based on the recently issued IRIS RfD for dioxin (EPA 2012a). It is recommended that additional sampling be conducted, for areas that were not previously cleaned up, to confirm that exposure concentrations along the Rocky Creek Branch floodplain and the residential areas directly east of the Vertac site are considered protective of human health.

Groundwater

Of the groundwater PCLs, toxicity values have changed for 2,3,7,8-TCDD, 2,4,6-trichlorophenol and toluene. For each of these chemicals, only the non-cancer toxicity values have been revised since the calculation of the PCLs. The PCLs were calculated as monitoring levels at or near the plume boundary to ensure that plume retraction and containment within the site's boundaries is in fact occurring (EPA 1996d). The PCLs evaluate dermal exposure to, incidental ingestion, and inhalation of volatiles from groundwater, except for 2,3,7,8-TCDD. The PCL for 2,3,7,8-TCDD assumes incidental ingestion only. The scenario reflected in the PCLs assumed groundwater enters Rocky Branch Creek or other areas at the site and child/teenager exposure is through entering or playing in the groundwater discharge (EPA 1996d). The use of groundwater at the Vertac site is not considered likely, due to restricted future access to the site, deed restrictions limiting the installation of wells, and

limited groundwater yield from on-site aquifers. Therefore, the PCLs do not assume groundwater is used as a tap water source.

The PCL for 2,3,7,8-TCDD assumes a cancer risk level of 10^{-5}. Based upon a review of the EPA tap water RSLs, the tap water RSL for a cancer endpoint is two orders of magnitude (i.e., 100 times) more conservative than the non-cancer endpoint tap water RSL. The tap water RSL assumes a cancer risk level of 10^{-6}, so the PCL cancer risk level of 10^{-5} is still lower than the non-cancer endpoint. Therefore, the cancer risk level is protective of the non-cancer endpoint (EPA 1996e), and there are no concerns for the 2,3,7,8-TCDD PCL due to the new non-cancer toxicity values. The change in non-cancer toxicity values for toluene result in an RfD that is approximately 2 times lower than previously evaluated. The relationship between the PCL and the non-cancer toxicity value is inversely proportional. The reduction in the non-cancer toxicity value of a factor of 2 would result in an approximate increase in the PCL (i.e., the non-cancer hazard associated with toluene) of 2. The increase in the PCL would be minimal but potentially higher than a target level of 1, since the target threshold for the PCL is 1. For 2,4,6-trichlorophenol, the revised non-cancer RfD is two orders of magnitude lower than previously evaluated. The PCL for 2,4,6-trichlorophenol is based upon a cancer endpoint (EPA 1996e). However, the change in non-cancer toxicity value may result in a lower PCL. It is noted that the PCLs are only used for screening values and not risk calculations for direct contact with groundwater. As a result, the change in toxicity values for groundwater COCs is not expected to affect the protectiveness of the OU3 remedy.

Fish Tissue

For fish ingestion, a RG was not determined. When levels are found to be at 50 ppt dioxin or greater, the ADH issued warnings recommending no consumption of fish by individuals and a ban relating to commercial fishing for the affected waters (GBMc 2010, 2012). However, the EPA continues to recommend a screening level of 0.7 ppt. This value is protective of both a cancer and non-cancer endpoint based upon the EPA fish tissue RSLs (EPA 2013b). Therefore, there are no changes anticipated for the ingestion of fish.

Changes in Land Use—There were no changes in land use identified at the Vertac site (Parcel 1) during this review. The inspection team observed changes to the northern section of the Vertac site (Parcel 2). The city developed fire and police training facilities in that area. These changes to Parcel 2 are located north of the Parcel 1 fence line and are not anticipated to affect the ongoing O&M activities at the Vertac site. The RGs developed for the land located north of the Vertac site did take into account potential re-development of the area for commercial/industrial use. The exposure parameters used to derive the RGs for both on-site and off-site soil in the RODs are consistent with current guidance (EPA 2013c).

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 fourth five-year review for the site that would call into question the protectiveness of the site remedy. In addition, there are no new or previously unidentified risks and no impacts from natural disasters that could affect performance or protectiveness of the 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 have been implemented as intended by the decision documents. However, EPA released the final non-cancer dioxin reassessment, publishing a non-cancer toxicity value, or RfD for 2,3,7,8-TCDD in IRIS. The IRIS RfD for dioxin is to be used to ensure protection of human health at Superfund sites and for re-evaluating previously cleaned up sites. Existing data are not adequate to recalculate risk and determine whether residual dioxin concentrations are equal to or more stringent than soil cleanup levels now considered protective in the Off-Site Area. Additional data collection and evaluation is needed for off-site soil as part of the re-evaluation of the dioxin soil cleanup. The protectiveness determination is deferred until additional data are collected and evaluated.

Groundwater sampling events were conducted throughout this five-year review period with semi-annual events occurring in 2008-2009 and annual sampling events conducted in 2010-

2012. The majority of contaminants were either below the corresponding MCL/PCL or were non-detect during the fourth five-year review period. However, exceptions to this were noted for 2,3,7,8-TCDD, 2,4-D, toluene, and Silvex. MCL exceedances for wells located outside of the TI zone and MCL/PCL exceedances for wells located inside of the TI zone were identified during this review.

The water level data available in the progress reports indicate that the groundwater extraction system is containing groundwater flow to the east in the fresh bedrock aquifer with the exception that during periods of dry weather, slight eastward gradients were observed.

The WWTP discharge data indicated that the discharge limit for 2,3,7,8-TCDD was exceeded during the months of September 2008, May 2009, August 2009, October 2009, December 2009, December 2010, February 2011, December 2011, February 2012, and July 2012. When an exceedance occurs, the site operator collects an additional discharge sample to verify the initial exceedance. The reason for the exceedances has not been identified.

The analytical data reporting limits submitted for several parameters in the monthly DMRs do not meet current required MQLs and only "total" values for metals is reported. ADEQ directed that all future analytical results should meet the current MQLs as provided in the June 2013 letter and that dissolved values for the metals should be monitored and reported in addition to the total values.

Fish flesh monitoring of the Rocky Branch Creek, Lake Dupree, and the five Bayou Meto locations is to be conducted once every two years. The 2008 sampling event was not conducted as scheduled and as specified in the third five-year review. The sampling of State Highway 13 was reinstated during this five-year review period as specified in the third five-year review.

The 2009 and 2011 Bayou Meto Fish Flesh Monitoring Reports identified that the fish tissue data continued to show a general decreasing or stable trend at all of the locations with the exception of Rocky Branch Creek and Interstate Highway 40 in 2009, and again at all locations except Interstate Highway 40 in 2011. The highest concentrations of 2,3,7,8-TCDD were

detected in fish tissue collected during the 2009 event at the Rocky Branch Creek location and a general upward trend in concentrations was noted for Interstate Highway 40 fish tissue samples in 2009 and 2011. All fish tissue samples, with the exception of one at Interstate Highway 13 were above the EPA recommended screening level of 0.7 ppt.

Changes in land use were observed for the land located north of the Vertac site (Parcel 2). The property has been developed by the City of Jacksonville with the construction of a Police and Fire Department training facility and shooting range.

Institutional controls have been updated with the filing of a Declaration of Restrictive Covenants and the two Quitclaim Deeds in the Official Records of Larry Crane, Pulaski County Circuit/County Clerk on May 23, 2013. Six real property tracts have been transferred from Lee S. Thalheimer, Receiver for Vertac Chemical Company (Grantor) to East Bay Realty Services, Inc. (Grantee). East Bay Realty is a subsidiary of Hercules Inc. which is a wholly owned subsidiary of Ashland Inc.

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, were noted for this five-year review period.

8.0 ISSUES

O&M is 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. However, at this time, EPA cannot determine that the remedy continues to be protective of human health and the environment because of changes in the non-cancer toxicity value for 2,3,7,8-TCDD. Issues identified during development of the five-year review are provided below.

- Dioxin Reassessment OU Off-Site Areas—EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or RfD, for 2,3,7,8-TCDD in the IRIS in February 2012. At the time of the remedial action, the cleanup level was 1.0 part per billion for Off-Site Areas including residential and agricultural areas (EPA 1990). Off-Site soils previously cleaned up are protective. Available data was not sufficient to determine residual soil exposure levels for comparison to protective levels using the RfD for off-site soils that were not previously cleaned up. The soil remedial action goals will be re-evaluated to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD.

- Dioxin Reassessment OU2 On-Site Soils— EPA released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or RfD, for 2,3,7,8-TCDD in the IRIS in February 2012.At the time of the remedial action, the cleanup level for OU2 On-Site Soils (EPA 1996b) was 5.0 parts per billion. On-Site soils that were part of previous cleanup activities are protective. A full evaluation of the existing site data has not been conducted and, therefore, a full determination of the protectiveness of the on-site soil cleanup level cannot be provided at this time for those soil areas that were not part of previous cleanup activities. The soil remedial action goals will be re-evaluated to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD.

- Groundwater Sample Exceedances of MCLs—The Progress Reports and the analytical groundwater data indicated MCL exceedances for 2,3,7,8-TCDD in water collected from monitoring well LW-5, at the Rocky Branch Creek sampling point, and Outfall 001. These sample locations are outside of the TI zone. The data indicated that groundwater from monitoring well MW-36, located inside the TI zone, was above the MCL for 2,3,7,8-TCDD. In addition, three other monitoring wells (MW-100, MW-101, and MW-102) were above the MCL and/or the PCL for toluene, 2,4-D, and/or Silvex. These three wells are located within the TI zone.

- WWTP Discharge Limitation Exceedances—Low-level exceedances of the discharge limitation for 2,3,7,8-TCDD have been identified in 10 of the DMRs 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 were below the limits of detection. The reason for the exceedances was not determined.

  The ADEQ identified issues with the DMRs for January-April 2013. ADEQ stated that analytical data reporting limits submitted for several parameters do not meet current required MQLs and the reported analytical results do not indicate whether or not the water quality standards of the receiving stream are being maintained. In addition, the letter identified that it would be helpful in determining the potential for aquatic toxicity in the discharge if analytical results for "dissolved" values for metals were reported in addition to "total" values.

- Site-Wide Groundwater Monitoring Plan—The third 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 OU3 ROD. The Site-Wide Groundwater Monitoring Plan was revised in April 2009, but modifications to the sampling schedule and list of parameters were implemented in 2010 through 2012 based on discussions with the EPA. At the time of this report, the 2013 sampling schedule and list of parameters were under development. The 2009 plan has not been revised to reflect these ongoing modifications.

- Fish Flesh Monitoring in the Rocky Branch Creek and Bayou Meto—According to the 1990 Off-Site Areas ROD, the fish in Rocky Branch Creek and Bayou Meto are 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 FDA alert level. Additionally, EPA has required that fish tissue sampling taken for the site remedy be analyzed toward the recommended fish tissue dioxin screening level of 0.7 ppt. All of the fish tissue samples except for three of four samples collected at the lower reaches of the Bayou Meto (below the State Highway 13 bridge) during 2009 and 2011 exceed the EPA recommended screening level of 0.7 ppt and in 2009 two of the samples collected from the Rocky Branch Creek (reach nearest the Vertac site) had sample results greater than 50 ppt which historically is the level at which FDA issues a health advisory stating that fish should not be consumed.

  Hercules was directed per the third five-year review to carry out the regularly scheduled 2008 fish flesh sampling by no later than January 31, 2009. This task was not accomplished during the identified timeframe but was conducted in July/August 2009.

- Engineering Controls, Perimeter Fence—Engineering controls include the maintenance of the site fence. A section of the perimeter fencing located on the west side of the RCRA Subtitle C landfill (OU1 landfill) is damaged and opened. Multiple patch repairs were observed during the site visit but appear to be ineffective in preventing animal activity which has been identified as the reason for the opening in the fence.

Table 10 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 the issues identified in Section 8.0:

- Additional data collection and evaluation are needed to complete the re-evaluation of the dioxin Off-Site Areas soil cleanup for off-site soils that were not previously cleaned up. Off-Site soil areas that were previously cleaned up are protective. It is currently

unknown whether unacceptable exposure off-site exists that were not previously cleaned up. Sampling should focus on areas near residential homes and target areas of potential human contact for those areas that were not previously cleaned up. Data from sampling should be used to determine if residual soil dioxin levels are protective of human health based on the new 2,3,7,8-TCDD RfD.

- OU2 on-site soils previously cleaned up are protective. Available site data should be fully evaluated for OU2 on-site soils. Considerations include the IRIS RfD for dioxin (EPA 2012a) and the use of appropriate soil dioxin detection limits and sampling protocols. Evaluation of the existing site data will determine whether additional sampling is needed for those areas that were not previously cleaned up in order to determine whether exposure concentrations of on-site soils are considered protective.

- 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 continued 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. The ADEQ continues to monitor this situation.

  The analytical data reporting limits for the DMRs need to meet the current MQLs as identified in the July 24, 2013 letter from ADEQ. In addition, the dissolved values for metals should be monitored and reported in addition to the total metals values per ADEQ's request.

- The Site-Wide Groundwater Monitoring Plan need to be updated to include the revised sampling schedule and list of parameters. If a change to the Operation and Maintenance Plan is necessary, then an official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement. A copy of the Settlement Agreement is included as Attachment 6 in this report.

- EPA will continue to require that fish tissue sampling taken for the site remedy be analyzed toward the fish tissue dioxin screening level of 0.7 ppt, as recommended by EPA guidance. EPA continues to require that fish tissue dioxin sampling be performed every two years. For the next five-year review, the sampling schedule is identified as occurring in 2013, 2015, and 2017. The Fish Flesh Monitoring Reports associated with these three fish tissue sampling events should be made readily available for review during the fifth five-year review which is to occur in 2018. In addition, EPA continues 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 open section of the perimeter fence near the OU1 landfill needs to be repaired and reinforced due to the repetitive nature of the animal activity causing damage to the fencing in that specific area.

Table 11 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 OU1 (on-site above ground media); that the ongoing remedy for OU3 (groundwater) is protective in the short-term and will be protective in the long-term provided the recommendations identified are implemented; and that the OU Off-Site Areas and OU2 On-Site Soils that were previously cleaned up are protective. For those Off-Site Areas and OU2 On-Site Soils that were not part of previous cleanup activities, the protectiveness determination cannot be made at this time until further information is obtained.

Short-Term Protectiveness

Based on the information available during the fourth five-year review, the remedy for the Vertac Superfund Site currently protects human health and the environment for OU1 and OU3.

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 OU1 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 been below MCLs and PCLs except for the occasional detections at five monitor wells (MW-36, MW-100, MW-101, MW-102, 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-101) 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, and have been expanded as documented in a "Notice of Filing Executed Documents in the United States District Court, Easter District of Arkansas, Western Division, Case 4:80-CV-00109-DPM, Document 2661" which was filed on May 24, 2013. The document includes Exhibit A, "Declaration of Restrictive Covenants" which identifies the imposition of certain restrictions and limitations described as the "Institutional Controls" applicable to Zone 1 and Zone 2 of the Property depicted in a plat map included as Exhibit 1. Additionally, two quitclaim deeds were included in the court documents.

- 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 requires the analysis be targeted to the 0.7 ppt EPA recommended screening level.

Because the completed remedial actions and O&M program for the Vertac site are considered protective for the short-term, the remedy for OU1 and OU3 are 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 fourth five-year review found that the OU1 and OU3 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 continues to require that fish tissue sampling taken for the site remedy be analyzed toward the fish tissue dioxin screening level of 0.7 ppt, as recommended by EPA guidance. EPA continues to require that fish tissue dioxin sampling be performed every two years. For the next five-year review, the sampling schedule is identified as occurring in 2013, 2015, and 2017. The Fish Flesh Monitoring Reports associated with these three fish tissue sampling events should be made readily available for review during the fifth five-year review which is to occur in 2018. In addition, EPA continues 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.

Protectiveness Deferred

OU Off-Site Areas and OU2 On-Site Soils that were previously cleaned up are protective. A determination of the protectiveness for the OU Off-Site Areas and OU2 On-Site Soils, that were not part of previous cleanup activities, cannot be completed with the information available at the time of this five-year review. Thus, a protectiveness determination for the OU Off-Site Areas and OU2 On-Site Soils, that were not previously cleanup up, cannot be made at this time until further information is obtained. EPA will conduct a re-evaluation of the soil dioxin cleanup levels to determine whether residual soil dioxin levels are protective of human health and the environment under the new 2,3,7,8-TCDD RfD. The re-evaluation will include a full evaluation of the existing site data as well as field sampling for those areas that were not part of previous cleanup activities. The sampling should focus on areas near residential homes and target the areas of highest potential human contact. This re-evaluation will be performed before the next five-year review.

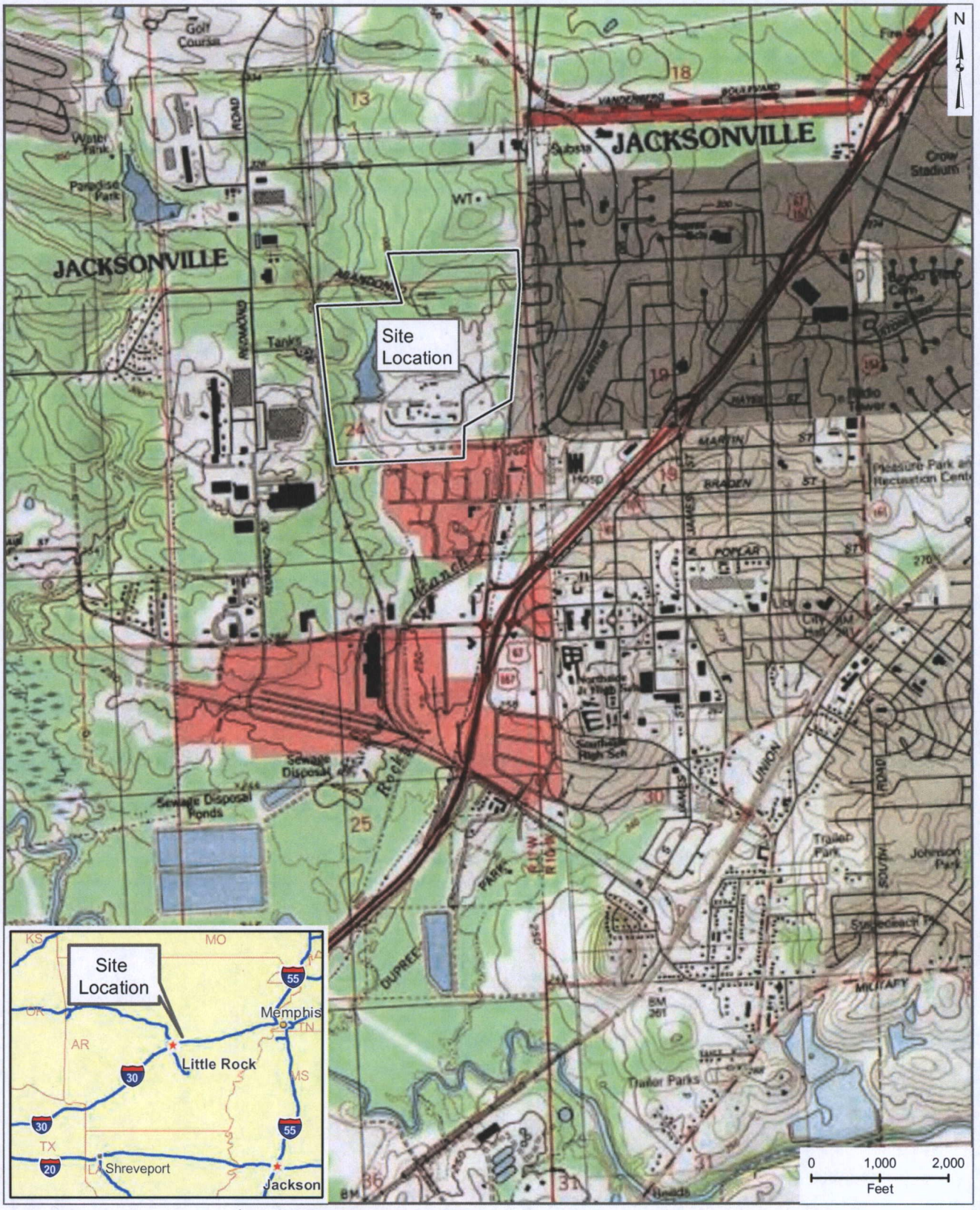
11.0 NEXT REVIEW

The Vertac site requires ongoing statutory five-year reviews. The next review will be conducted within five years from the date of this review.

ATTACHMENT 1

FIGURES AND TABLES

FIGURES

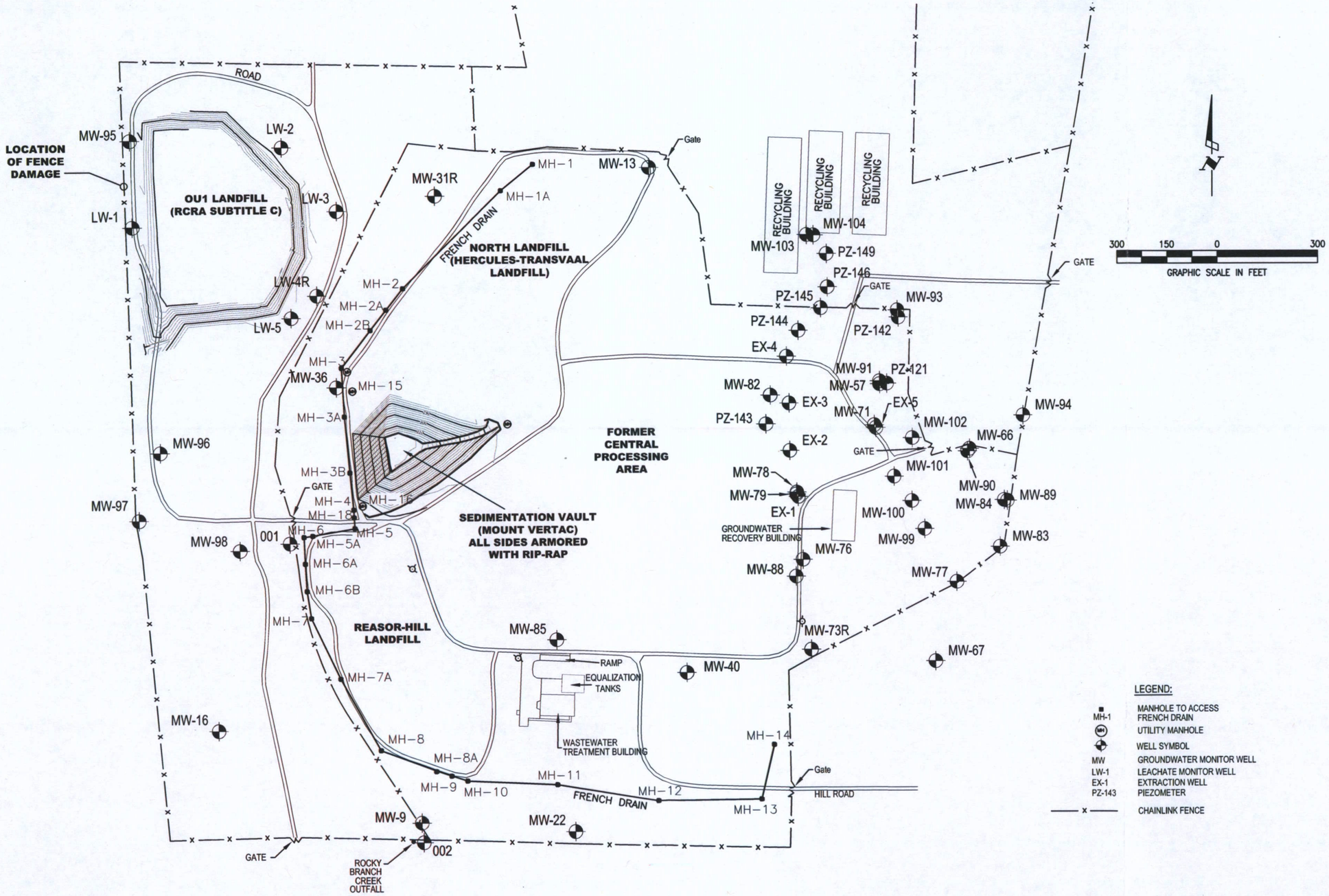


Source: ESRI ArcGIS Online and data partners including USGS and © 2007 National Geographic Society, 2009 Redlands, CA: Environmental Systems Research Institute

Vertac Site
1907 Hill Road
Jacksonville, Arkansas

Figure 1
Site Location Map

2013-08-13 R:\Federal\EPA\RAC II\0095-Vertac 4th FYR\MXDs\Figxx_SiteLoc.mxd EA-Dallas jschwertz



SITE LAYOUT MAP

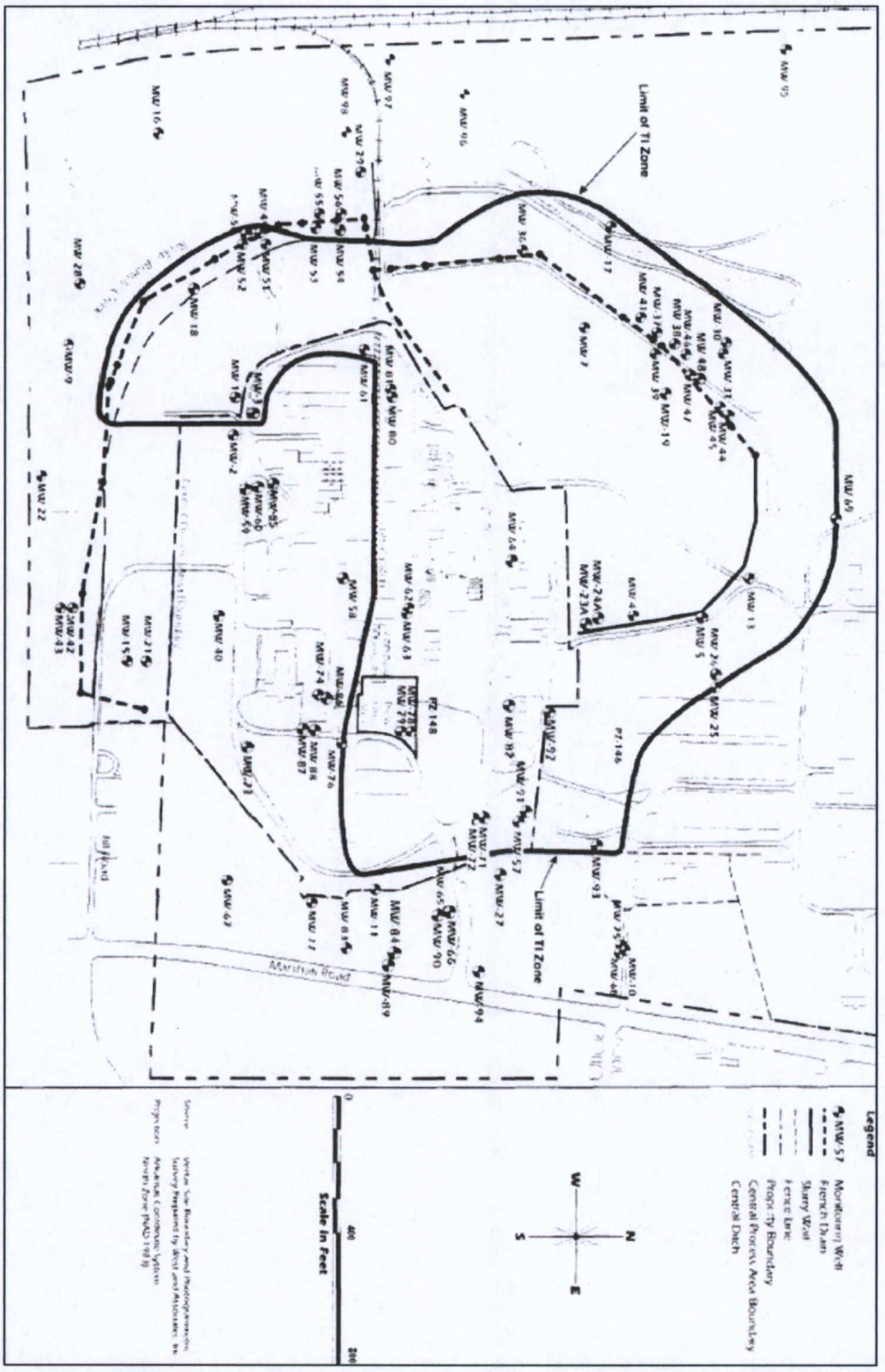
VERTAC SITE
1907 HILL ROAD
JACKSONVILLE, AR

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

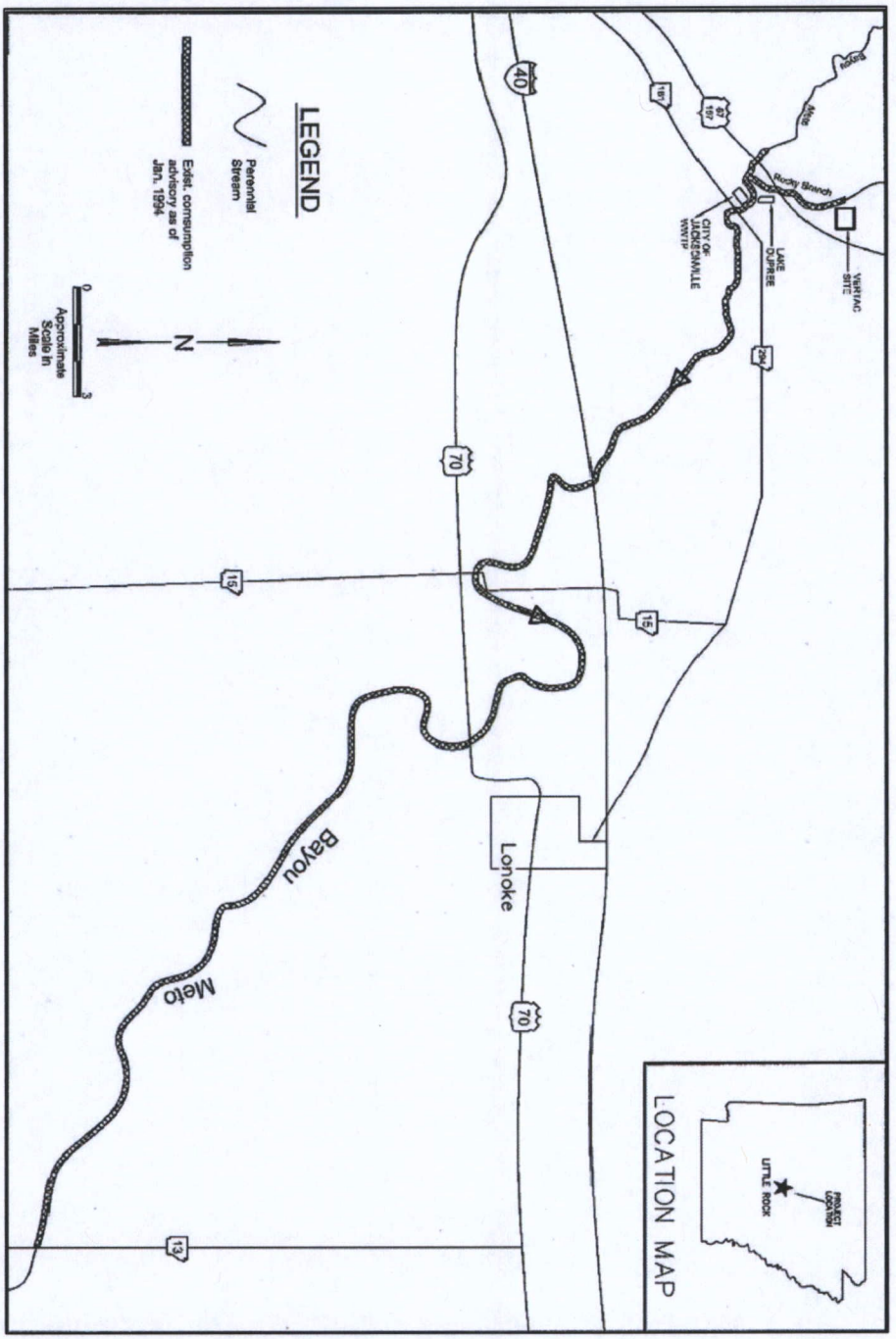
DATE	JUNE 2013
PROJECT NO.	1434295
REVISION	-
DRAWING NO.	-
FIGURE	2
PROJECT MGR.	JS
DESIGNED BY	-
DRAWN BY	JFS
CHECKED BY	AB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

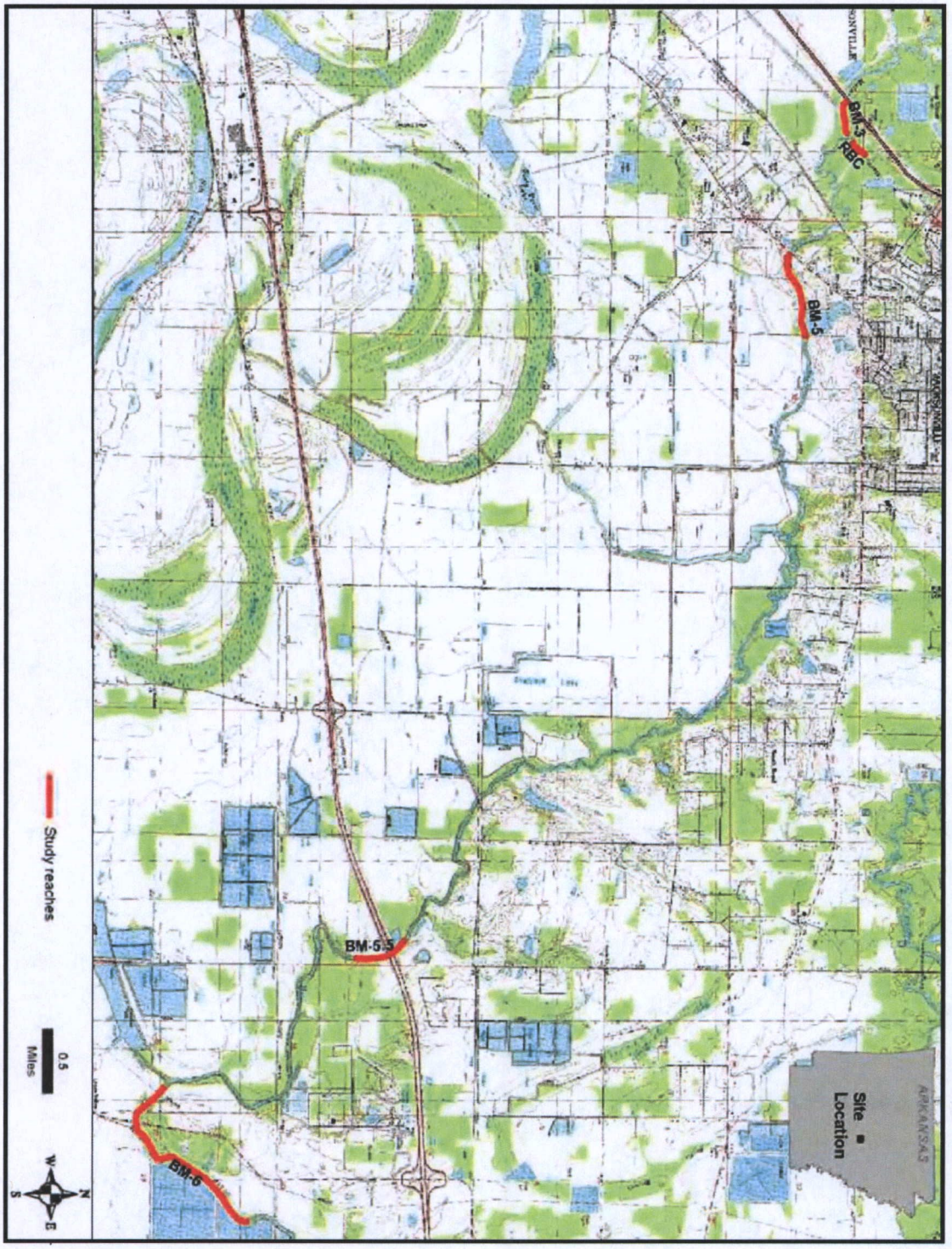
DRAWING NAME: R:\Federal\EPA\RAC II\0095-Vertac 4th FYR\Figures\vertac-layout.dwg
DATE: 8/12/2013 2:47 PM DRAWN BY: Schwertz, John



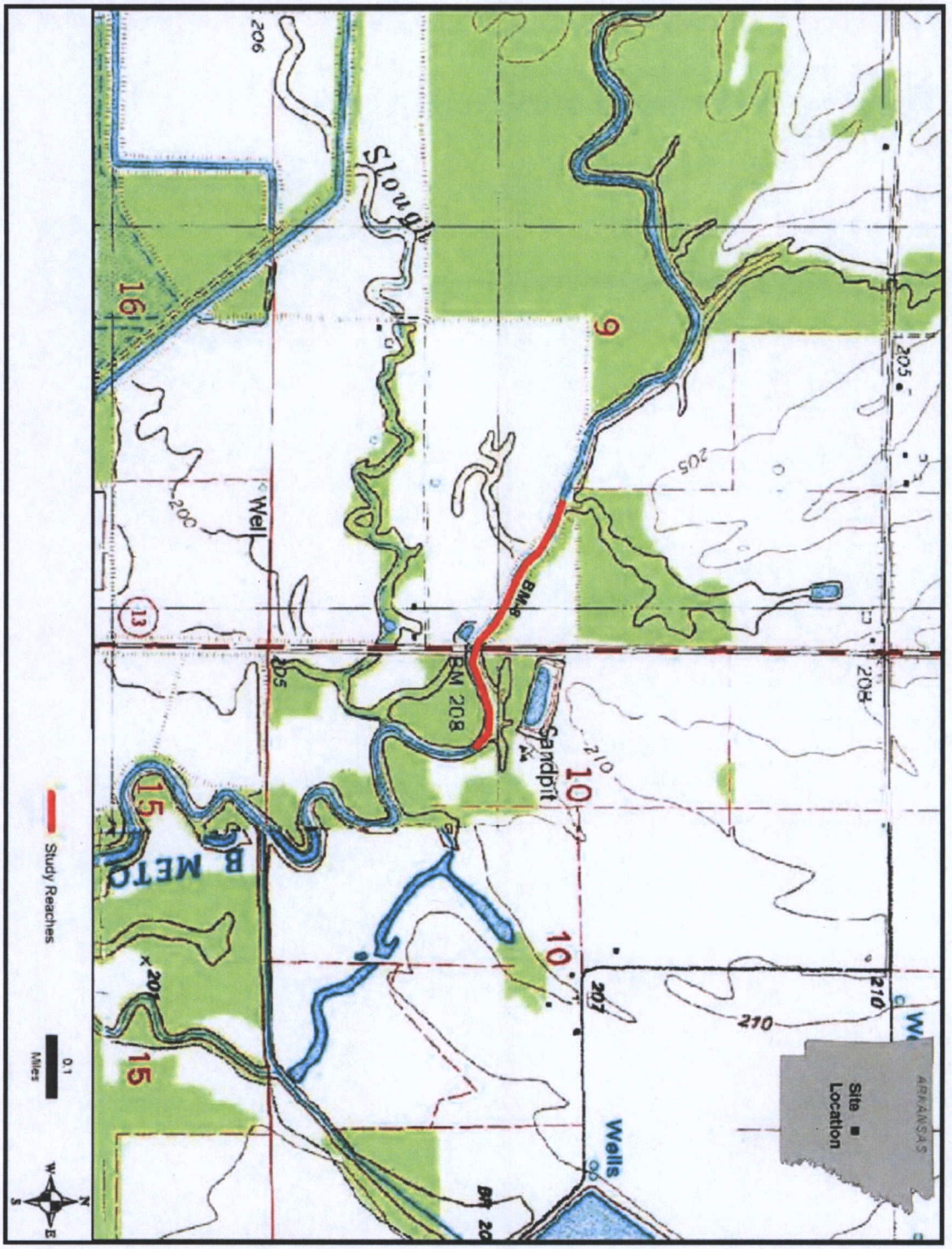
PREPARED FOR: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DESIGNED BY –	VERTAC SITE, 1907 HILL ROAD JACKSONVILLE, ARKANSAS				SPATIAL EXTENT OF THE TECHNICAL IMPRACTICABILITY ZONE	
	PROJECT MGR J STROUP						
	BY EA ENGINEERING, SCIENCE, AND TECHNOLOGY	DRAWN BY JFS	CHECKED BY AB	SCALE AS SHOWN	DATE JULY 2013	PROJECT NO 1434295	FIGURE 3



PREPARED FOR: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DESIGNED BY –	VERTAC SITE, 1907 HILL ROAD JACKSONVILLE, ARKANSAS			EXISTING BAYOU METO FISH CONSUMPTION ADVISORY		
	PROJECT MGR J. STROUP						
BY EA ENGINEERING, SCIENCE, AND TECHNOLOGY	DRAWN BY JFS	CHECKED BY AB	SCALE AS SHOWN	DATE JULY 2013	PROJECT NO 1434295	FIGURE 4	

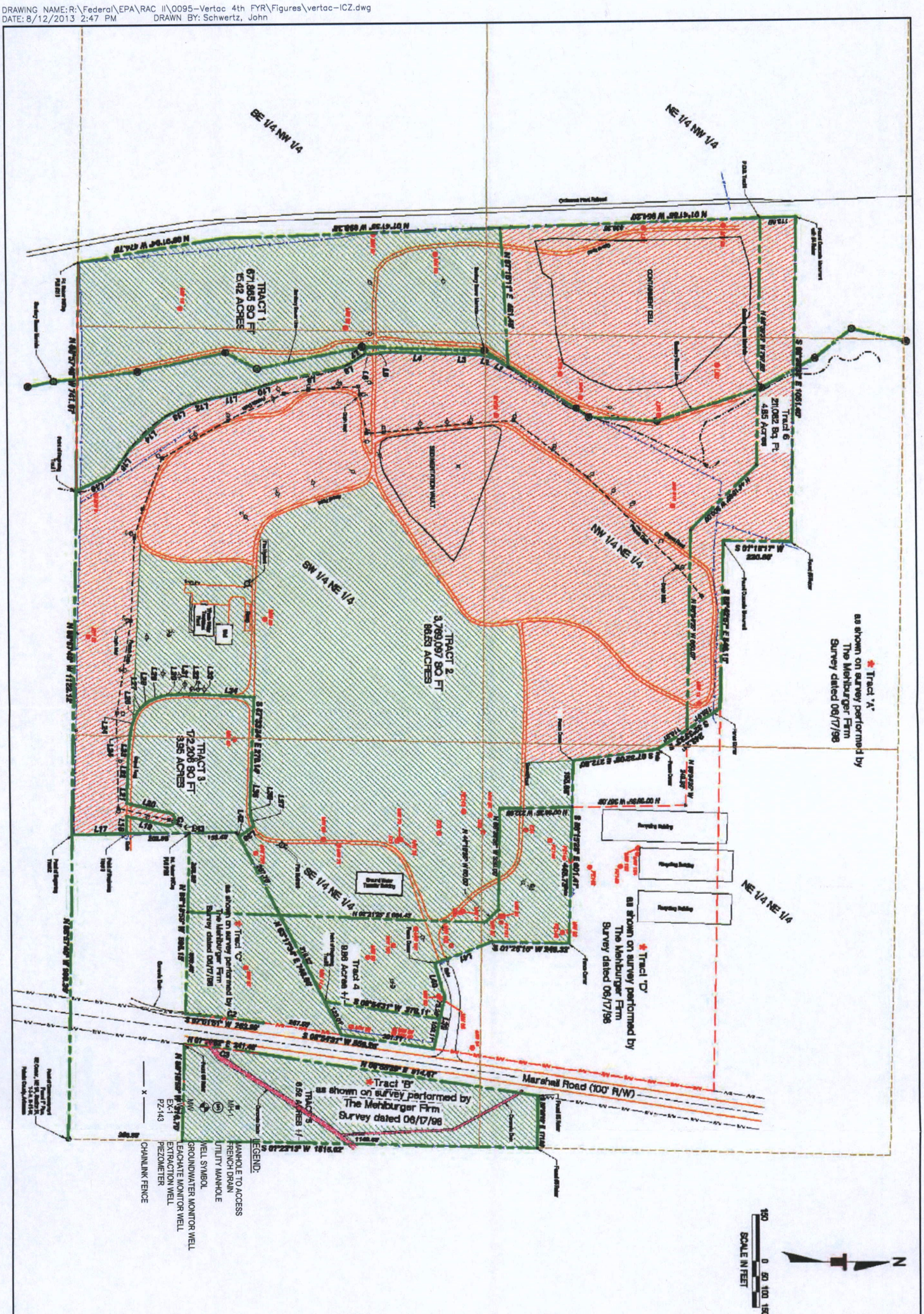


PREPARED FOR: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DESIGNED BY –	VERTAC SITE, 1907 HILL ROAD JACKSONVILLE, ARKANSAS			STUDY REACH OF THE 2011 BAYOU METO FISH FLESH MONITORING PROGRAM		
	PROJECT MGR J. STROUP						
	BY EA ENGINEERING, SCIENCE, AND TECHNOLOGY	DRAWN BY JFS	CHECKED BY AB	SCALE AS SHOWN	DATE JULY 2013	PROJECT NO 1434295	FIGURE 5



PREPARED FOR: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DESIGNED BY –	VERTAC SITE, 1907 HILL ROAD JACKSONVILLE, ARKANSAS			STUDY REACH AT HIGHWAY 13 OF THE 2011 BAYOU METO FISH FLESH MONITORING PROGRAM		
	PROJECT MGR J. STROUP						
	BY EA ENGINEERING, SCIENCE, AND TECHNOLOGY	DRAWN BY JFS	CHECKED BY AB	SCALE AS SHOWN	DATE JULY 2013	PROJECT NO 1434295	FIGURE 6

DRAWING NAME: R:\Federal\EPA\RAC II\0095-Vertac 4th FYR\Figures\vertac-ICZ.dwg
DATE: 8/12/2013 2:47 PM DRAWN BY: Schwertz, John



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	EA ENGINEERING, SCIENCE, AND TECHNOLOGY		VERTAC SITE 1907 HILL ROAD JACKSONVILLE, AR				INSTITUTIONAL CONTROL ZONES		
PROJECT MGR.	DESIGNED BY	DRAWN BY	CHECKED BY	DATE	PROJECT NO.	REVISION	DRAWING NO.	FIGURE	
JS	-	JFS	AB	JUNE 2013	1434295	-	-	7	

TABLES

TABLE 1

CHRONOLOGY OF SITE EVENTS

Date	Event
1930s	Use of site initiated at Arkansas Ordinance Plant
1948	Reasor Hill purchased the site and began production of insecticides
1950s	Reasor Hill began the production of pesticides
1961	Reasor Hill began discharging process wastewater to the City of Jacksonville's Old Sewage Treatment Plant; Hercules Powder Company (Hercules) purchased the plant
1964-1969	Hercules produced the herbicide "Agent Orange"
1969	The city's West Wastewater Treatment Facility is upgraded, and Hercules began discharging all of its process wastewater to the city's wastewater treatment facility
1971	Hercules leased the plant to Transvaal Corporation (Transvaal)
1976	Transvaal Corporation purchased the property from Hercules and reorganized as Vertac Incorporated (Vertac)
1979	Arkansas Department of Pollution Control and Ecology (ADPC&E) issued orders to Vertac to improve its hazardous waste practices
March 4, 1980	U.S. Environmental Protection Agency (EPA) and ADPC&E file joint lawsuit against Vertac Incorporated and Hercules Incorporated; C.A. No. LR-C-80-110
January 18, 1982	Consent Decree entered by all parties to allow an independent consultant to assess the site and propose a remedy
September 8, 1983	Site is finalized on the National Priorities List (NPL)
Fall 1983 – Spring 1985	Remedial investigation/feasibility study (RI/FS) for the off-site areas is conducted
July 18, 1984	Court orders the implementation of the "Vertac Remedy," which was opposed by the EPA
Mid 1984 – July 1986	"Vertac Remedy" is implemented
July 15, 1986	Trust fund is established by Vertac to remediate portions of the site
August 1986	EPA issues a Unilateral Administrative Order (UAO) to the potentially responsible parties requiring the posting of warning signs and fencing at the West Wastewater Treatment Facility and along portions of Rocky Branch Creek
January 31, 1987	Vertac declares insolvency and abandons the site; EPA commences a CERCLA removal action to secure and stabilize the site, including the hazardous waste management of thousands of dioxin-contaminated waste drums
1987-1989	Additional sampling is conducted to determine the extent of off-site contamination in Rocky Branch Creek, Bayou Meto, and Lake Dupree
September 1988	Administrative Order on Consent issued to Hercules requiring the excavation of soils in residential yards south of the site and improvements to on-site drainage control
1989	Hercules completes the removal of soils from residential yards
July 1989	Administrative Order on Consent issued to Hercules requiring Hercules to perform the on-site RI/FS
June 1990	FS for off-site areas revised based on additional data and to meet the requirements of Superfund Act and Reauthorization Act (SARA)
September 27, 1990	Record of Decision (ROD) for the off-site areas is signed

TABLE 1

CHRONOLOGY OF SITE EVENTS

Date	Event
March 1991	RI/FS for Operable Unit (OU) 1 completed
January 1992	Trial burn approved by ADPC&E and incineration of drummed waste begins
April 1992	Third emergency removal action
May 1993	Trust fund money being used for the incineration is expended
June 1993	EPA takes over incineration of drummed wastes under removal action (RA)
June 30, 1993	ROD for OU 1 is signed
July 1993	UAO issued to Hercules to conduct the remedial design (RD)/RA for the off-site areas
November 1993	Hercules commences cleanup of interceptor sewer under EPA off-site UAO
March 1994	UAO issued to Hercules to conduct the RD/RA for OU 1
September 1994	Incineration of D-wastes completed
November 1994	EPA contracts with Aptus Inc. in Coffeyville, Kansas to incinerate 3,100 drums of T-waste
1995	All RA activities for the off-site areas completed except for the excavation of Rocky Branch Creek floodplain soils
January 31, 1995	On-site incinerator permanently shut down
April 1995	RI/FS for OU 2 completed
May 1995	ESD signed by EPA to allow for off-site incineration under ROD for OU 1
September 1995	RI/FS for OU 3 completed
March 29, 1996	Final shipment of T-waste leaves site for Aptus
July 16, 1996	EPA Region 6 executes a Non-Time Critical Remedial Action Memorandum, which grants a treatability variance from the Land Disposal Restrictions treatment standard for dioxin-contaminated waste to 5 parts per billion
September 17, 1996	RODs for OU 2 and OU 3 signed; ESD signed for Off-Site Areas OU
December 10, 1996	UAOs issued to Hercules to conduct the RD/RA for OU 2 and OU 3
December 20, 1996	Non-Time Critical Removal Action authorized to dismantle, decontaminate, and dispose of the on-site incinerator and associated structures and debris
December 31, 1996	UAO issued to Hercules to dismantle, decontaminate, and dispose of the on-site incinerator and associated structures and debris
Summer 1997	Floodplain soils excavated and disposed of in the on-site landfill; all RA activities for the off-site areas completed
June 1997	Construction of the new on-site wastewater treatment plant completed, and facility begins operating
July 1997 – May 1998	RA for OU 1 and OU 2 conducted and completed
August 11, 1997	Exposure Investigation completed by Agency for Toxic Substances and Disease Registry (ATSDR) and Arkansas Department of Health (ADH); additional soil sampling requested for Jacksonville Residential Areas Superfund Site to determine extent of dioxin contamination in residential soils near Vertac site
November 1997 – May 1998	RA for OU 3 conducted and completed

TABLE 1

CHRONOLOGY OF SITE EVENTS

Date	Event
January 12, 1998	ESD for OU 2 signed by EPA Region 6 to allow for disposal of residential soils from Jacksonville Residential Areas Superfund Site in the on-site landfill
Early 1998	RA activities associated with demolition of the on-site incinerator are completed
June 24, 1998	Final inspection conducted
August 31, 1998	EPA issues preliminary close out report
September 1, 1998	EPA declares all CERCLA remediation complete at ceremony at Jacksonville, Arkansas, City Hall
October 23, 1998	U.S. District Court for the Eastern District of Arkansas finds Hercules Incorporated and Uniroyal Chemical Ltd. liable for EPA past and future CERCLA response costs in summary judgment opinion; *United States v. Vertac Chemical Corp., et al.*, Civ. No. LR-C-80-109 (E.D. Ark.), *United States v. Vertac Chemical Corp.*, 33 F.Supp.2d 769 (E.D.Ark., 1998)
August 9, 1999	U.S. District Court enters final judgment against Hercules Incorporated and Uniroyal Chemical Ltd. for EPA CERCLA response costs; *United States v. Vertac Chemical Corp., et al.*, Civ. No. LR-C-80-109 (E.D.Ark.)
January 21, 2000	Jeffrey and Brenda Shelton sue EPA to require performance of CERCLA Five-Year Review. *Shelton v. Browner*, Civ. No. 4:00CV00030 HDY (E.D.Ark.)
October 12, 2000	EPA reaches settlement, agreeing to conduct Five-Year Review in *Shelton v. Browner* (E.D. Ark.)
April 10, 2001	U.S. Eighth Circuit Court of Appeals issues opinion and order remanding the issue of divisibility of harm in the finding of joint and several liability against Hercules Incorporated to the U.S. District Court for further proceedings; *United States v. Hercules, Inc.*, 247 F.3d 706 (8th Cir., 2001)
July 30, 2001	First CERCLA Five-Year Review for the Vertac, Inc. Superfund Site is completed
December 12, 2001	U.S. District Court concludes the evidentiary hearing on issue of divisibility of harm in connection with Hercules Incorporated that was conducted from October 9 to 19, 2001 and from December 11 to 12, 2001; *United States v. Vertac Chemical Corp., et al.*, Civ. No. 4:80cv109 GH (E.D.Ark.)
March 5, 2003	All post hearing briefing is concluded by the parties in the divisibility of harm remand in U.S. District Court. *United States v. Vertac Chemical Corp., et al.*, Civ. No. 4:80cv109 CH (E.D.Ark.)
November 20, 2003	Second CERCLA Five-Year Review for the Vertac, Inc. Superfund Site is completed
November 20, 2008	Third CERCLA Five-Year Review for the Vertac, Inc. Superfund Site is completed
May 24, 2013	Settlement Agreement in the U.S. District Court to resolve any and all outstanding disputes raised in connection with the instant action and, in connection therewith, establish remedial requirements and financial obligations. United States *of America Plaintiff vs. Vertac Chemical Corporation and Hercules Incorporated Defendants*, Case No. 4:80-CV-00109-DPM, Document 2661; including Exhibit A, a Declaration of Restrictive Covenants, and two Quitclaim Deeds effecting the real property transfers in the Settlement Agreement

TABLE 2

SUMMARY OF RESPONSE ACTIONS

Phase/Operable Unit	Dates Implemented	Overview of Remedy
1. Vertac Remedy	1984-1986 O&M Ongoing	Removal of sediment from cooling water pond and equalization basin and landfilling of sediment under a cap with French drain and leachate collection system. Contaminated leachate treated on-site and discharged. Includes long-term groundwater monitoring. Ordered by Court over U. S. Environmental Protection Agency opposition.
2. Site Stabilization – off-site residential removal response; drummed waste handling	1987-1998	Site removal actions including stabilization and removal of drummed waste, tanks, vessels, process equipment, and contents. Excavation and removal of contaminated soils and sediments in residential areas and consolidation on the plant site. On-site and off-site incineration support for, and incineration of, drummed 2,4-D, 2,4,5-T, and Silvex wastes (28,500 drums).
3. Vertac Off-Site Areas	1990-1997 O&M Ongoing	Excavation of off-site contaminated sediment/soil, removal of contaminated sludge/sediment in sewer interceptors and treatment plants and contaminated Rocky Branch Creek flood plain sediments, and staging on-site, with ultimate disposal in on-site OU No. 1 RCRA Subtitle C compliant vault under the Off-Site Areas Record of Decision Amendment. Includes long-term monitoring of fish for dioxin in tissue.
4. On-site Aboveground Media (OU No. 1)	1994-1998 O&M Ongoing	On-site incineration, off-site incineration, on-site consolidation/containment of above-ground media including buildings, process equipment, leftover chemicals in the process vessels, spent activated carbon, shredded trash and pallets, and miscellaneous drummed wastes and treatment residues, and recycle/reuse of equipment. Deferral of treatment of excavated off-site soil from residential area to be addressed under OU No. 2 (disposal in on-site RCRA Subtitle C compliant landfill).

TABLE 2

SUMMARY OF RESPONSE ACTIONS

Phase/Operable Unit	Dates Implemented	Overview of Remedy
5. Soils and Underground Utilities (OU No. 2)	1996-1997	Excavation and disposal in the on-site RCRA Subtitle C compliant consolidation/ containment unit of all soils with dioxin concentrations at or above the action level of 5 parts per billion, excavation and off-site incineration of crystalline TCB and TCB-associated spill soils greater than 500 parts per million, cleaning of chemical sewer lines to remove solids and backfilling with grout, scarification of foundations and curbs to remove visible staining, and the application of epoxy sealant where staining persisted, and cover with adequate soil (typically between 18 and 24 inches) to support a vegetative cover, contoured to prevent erosion and ponding of storm water. Also addressed Vertac Off-Site Areas soil and OU No. 1 residential soil.
6. Groundwater (OU No. 3)	1996-1998 O&M Ongoing	Installation of extraction wells in the central process area to hydraulically control off-site migration of contaminated groundwater to the east, continued operation of the existing French drain system (Vertac Remedy) to impede groundwater contaminant migration to the south and west, and the proposed use of the Reasor-Hill well and MW-92 as additional extraction wells, and "Technical Impracticability Waiver" for nonaqueous-phased liquids identified in the subsurface.

NOTE:

2,4-D = 2,4-dichlorophenol
OU = operable unit
O&M = operation and maintenance
RCRA = Resource Conservation and Recovery Act
Silvex = 2,4,5-trichlorophenoxypropionic acid
TCB = tetrachlorobenzene
Vertac = Vertac Superfund Site

TABLE 3

PLUME CONCENTRATION LEVELS

Contaminant	Trigger Level*
2-Chlorophenol	6 mg/L (N)
2,4-Dichlorophenol	2 mg/L (N)
2,4-Dichlorophenoxyacetic acid (2,4-D)	210 mg/L (N)
Silvex (2,4,5-Trichlorophenoxypropionic acid or 2,4-TP)	84 mg/L (N)
Toluene	9 mg/L (N)
2,4,5-Trichlorophenol	52 mg/L (N)
2,4,6-Trichlorophenol	0.1 mg/L (C)
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	210 mg/L (N)
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)	7 ng/L (C)

NOTE:

*Plume Concentration Levels (trigger levels) established in 1996 Record of Decision for Operable Unit 3-groundwater

C = Cancer risk-based concentration
mg/L = Milligram(s) per liter
N = Noncancer risk-based concentration
ng/L = Nanograms per liter

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

Well	Date	Toluene	Phenol	Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic		Silvex	2,3,7,8-TCDD	Chlorides	Tetrachloro-benzene
				2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T				
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		*9,000*	--	*6,000*	--	*2,000*	--	--	*52,000*	*100*	*210,000*	--	*210,000*	--	*84,000*	*7*	--	--
MCLs		*1,000*	--	--	--	--	--	--	--	--	*70*	--	--	--	*50*	*0.03*	*250**	--
MW-9																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.3	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.9	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0069 J	5.80	NA
Reanalysis	12/08/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0053 J	NA	NA
Resample	12/31/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	NA
	07/06/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0083 J	NA	NA
	07/25/12	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-13																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.8	NA
	06/09/09	ND	ND	13.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.82	ND	0.51	2.10	ND	11	NA
	06/09/10	ND	ND	ND	ND	20.00	12.00	ND	22.00	ND	ND	6.60	ND	3.40	12.0	ND	18	NA
	07/06/11	NA	ND	ND	15.00	ND	ND	ND	13.00	ND	ND	ND	ND	ND	27.00	ND	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.40	0.011	20.0	NA
MW-22																		
	10/21/08	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	06/09/09	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	12/08/09	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	06/09/10	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	07/06/11	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
	07/25/12	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
MW-31R																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110.0	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130	NA
	07/06/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	84	NA
MW-36																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.23*	17	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.12*	21.0	NA
Resample	07/30/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.016	14	NA
Reanalysis	12/08/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.015	NA	NA
Resample	12/31/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0087 J	NA	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.015	20.0	NA
	07/06/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	07/25/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-66																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.0	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	17	NA

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

Well	Date	Toluene	Phenol	Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic		Silvex	2,3,7,8-TCDD	Chlorides	Tetrachloro-benzene
				2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T				
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		*9,000*	–	*6,000*	–	*2,000*	–	–	*52,000*	*100*	*210,000*	–	*210,000*	–	*84,000*	*7*	–	–
MCLs		*1,000*	–	–	–	–	–	–	–	–	*70*	–	–	–	*50*	*0.03*	*250**	–
MW-76																		
Confirm	10/21/08	5.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7	0.0058 J	44.0	NA
	06/09/09	5.4	ND	ND	16.00	ND	ND	ND	ND	ND	2.5	ND	ND	ND	1.30	ND	51	NA
	12/08/09	54.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	53	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.00	ND	57	NA
	07/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.71	0.0059 J	51	NA
MW-77																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*420*	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*440*	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*450*	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*450*	NA
	07/06/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.014	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*410*	NA
MW-84																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.0	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*16*	NA
MW-85																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.80	NA
Duplicate	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.9	NA
Field Blank	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0	NA
Pace-Split Sample	10/21/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
	06/09/09	4.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.0	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.8	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.0	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9	NA
MW-88																		
	10/21/08	12.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	36.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.8	NA
	12/08/09	5.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2	NA
	06/09/10	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0091	7.8	NA
	07/06/11	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
	07/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.7	NA
MW-91																		
	10/21/08	59.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	NA
	06/09/09	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	93	NA
	12/08/09	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	NA
	06/09/10	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	150	NA
Reanalysis	06/09/10	89.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reanalysis 2	06/09/10	9.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	07/06/11	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	07/26/12	ND	120.00	11.00	69.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	240	NA

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

Well	Date	Toluene	Phenol	Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic		Silvex	2,3,7,8-TCDD	Chlorides	Tetrachloro-benzene
				2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T				
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		*9,000*	--	*6,000*	--	*2,000*	--	--	*52,000*	*100*	*210,000*	--	*210,000*	--	*84,000*	*7*	--	--
MCLs		*1,000*	--	--	--	--	--	--	--	--	*70*	--	--	--	*50*	*0.03*	*250**	--
MW-93																		
	10/21/08	4.9	230.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	190	NA
	06/09/09	6.1	28.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	NA
	12/08/09	4.4	590.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*250*	NA
Duplicate	12/08/09	7.1	580.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*250*	NA
Field Blank	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	ND	660	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	*260*	NA
Reanalysis	06/23/10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Blank	06/09/10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
	07/06/11	1.40	48	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	07/26/12	20.0	1,200.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230	NA
MW-99																		
	10/21/08	20.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	240	NA
Duplicate	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	NA
Field Blank	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	35.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	180	NA
	07/06/11	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	07/26/12	9.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	210	NA
MW-100																		
	10/21/08	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100	NA
	06/09/09	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	110	NA
	12/08/09	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120	NA
	07/06/11	120	320.00	ND	310	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Duplicate	07/06/11	120	400.00	ND	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/26/12	*1,400*	1,800.00	1,400.00	4,600.00	ND	ND	ND	ND	ND	*760*	190.00	110.0	ND	*110.00*	ND	210	NA
Duplicate	07/26/12	*1,200*	2,200.00	1,600.00	4,800.00	ND	ND	ND	ND	ND	*910.0*	150.00	82.00	14.00	*82.00*	ND	200	NA
Field Blank	07/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
MW-101																		
	10/21/08	*8,600.0*	ND	ND	200.0	610.0	ND	ND	140.0	66.0	*100.0*	52.0	ND	41.0	ND	0.0065 J	73.0	NA
Duplicate	10/21/08	*10,000.0*	ND	ND	150.0	400.0	69.0	ND	93.0	54.0	23.0	30.0	ND	26.0	ND	ND	71.0	NA
Field Blank	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	*5,600.0*	ND	ND	100.0	ND	14.0	ND	51.0	21.0	ND	5.1	ND	7.5	ND	ND	85.0	NA
Duplicate	06/09/09	*6,300.0*	ND	ND	140.0	ND	19.0	ND	64.0	23.0	ND	3.1	ND	5.4	ND	ND	85.0	NA
Field Blank	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	*1,000.0*	ND	ND	9.6	19.0	ND	ND	ND	ND	ND	1.4	ND	1.2	ND	ND	75.0	NA
Duplicate	12/08/09	*2,900.0*	ND	ND	28.0	21.0	ND	ND	ND	ND	ND	6.2	ND	4.1	ND	ND	73.0	NA
Field Blank	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	24.0	ND	ND	ND	ND	ND	ND	ND	ND	0.7	0.9	ND	1.3	ND	ND	130.0	NA
Duplicate	06/09/10	210	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.20	ND	2.40	ND	ND	130	NA
Field Blank	06/09/10	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	07/06/11	45	ND	ND	ND	ND	ND	ND	ND	ND	9.00	78.00	25.00	1.90	33.00	NA	NA	NA
Duplicate	07/06/11	37	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Blank	07/06/11	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/26/12	80	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	NA
Duplicate	07/26/12	80	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200	NA
Field Blank	07/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

				Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic			2,3,7,8-		Tetrachloro-
		Toluene	Phenol	2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T	Silvex	TCDD	Chlorides	benzene
Well	Date	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		***9,000***	–	***6,000***	–	***2,000***	–	–	***52,000***	***100***	***210,000***	–	***210,000***	–	***84,000***	*7*	–	–
MCLs		***1,000***	–	–	–	–	–	–	–	–	***70***	–	–	–	***50***	***0.03***	***250****	–
MW-102																		
	10/21/08	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120	NA
	06/09/09	37.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	170	NA
	12/08/09	58.0	96.00	ND	160.00	ND	ND	ND	ND	ND	3.70	ND	0.81	ND	ND	ND	200	NA
	06/09/10	***2,700.0***	5,500.00	1,100.00	5,900.00	ND	ND	ND	ND	ND	***440.00***	ND	64.00	ND	***54.00***	ND	*310*	NA
	07/06/11	***1,100***	2,100.00	ND	ND	ND	ND	ND	ND	ND	7.1	ND	ND	ND	ND	NA	NA	NA
Duplicate	07/06/11	***1,100***	2,100.00	ND	ND	ND	ND	ND	ND	ND	17	ND	ND	ND	ND	NA	NA	NA
Field Blank	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/26/12	***3,500.0***	3,100.0	3,000.0	7,300.0	1,300.0	ND	ND	ND	ND	***7,400.0***	700.0	1,500.0	190.0	***220.0***	ND	*330*	NA
MW-103																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0071 J	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.006 J	ND	NA
Reanalysis	12/08/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0062 J	NA	NA
Resample	12/31/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Duplicate	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	07/06/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0069 J	NA	NA
	07/26/12	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
PZ-142																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
PZ-146																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0094 J	ND	NA
Resample	10/15/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
LW-1																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.7	NA
Reanalysis	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
LW-2																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.60	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.3	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10	NA

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

Well	Date	Toluene	Phenol	Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic		Silvex	2,3,7,8-TCDD	Chlorides	Tetrachloro-benzene
				2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T				
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		*9,000*	--	*6,000*	--	*2,000*	--	--	*52,000*	*100*	*210,000*	--	*210,000*	--	*84,000*	*7*	--	--
MCLs		*1,000*	--	--	--	--	--	--	--	--	*70*	--	--	--	*50*	*0.03*	*250**	--
LW-3																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38.0	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
LW-4R																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.2	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	53	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44	NA
LW-5																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18.0	NA
Pace-Split Sample	10/21/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0092 J	NA	NA
	06/09/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	27	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.0	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	28	NA
	07/06/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
	07/25/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.054*	74	NA
Resample	10/15/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0073 J	NA	NA
Reanalysis	10/15/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*0.048*	NA	NA
Resample	12/31/12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.021	NA	NA
Resample	02/14/13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
Pace-Split Sample	02/14/13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
Rocky Branch Creek																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.018 JA	7.4	NA
Pace-Split Sample	10/21/08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
	07/14/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.031*	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.026	ND	NA
Reanalysis	12/08/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.019	NA	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.092*	ND	NA
	08/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013	NA	NA
	09/17/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
001																		
	10/21/08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.014	8.3	NA
	07/14/09	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.012	ND	NA
	12/08/09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	*0.048*	ND	NA
Reanalysis	12/08/09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.013	NA	NA
	06/09/10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	NA
	08/12/11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0093 J	NA	NA
Reanalysis	08/12/11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0087 JQ	NA	NA
	09/17/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	NA

TABLE 4

ANALYTICAL RESULTS FOR GROUNDWATER MONITORING WELLS, PIEZOMETERS, AND ROCKY BRANCH CREEK

				Chlorophenols		Dichlorophenols		Trichlorophenols			Dichlorophenoxyacetic		Trichlorophenoxyacetic			2,3,7,8-		Tetrachloro-
		Toluene	Phenol	2-	4-	2,4-	2,6-	2,3,6-	2,4,5-	2,4,6-	2,4-D	2,6-D	2,4,5-T	2,4,6-T	Silvex	TCDD	Chlorides	benzene
Well	Date	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ng/L	mg/L	ug/L
PCLs		*9,000*	--	*6,000*	--	*2,000*	--	--	*52,000*	*100*	*210,000*	--	*210,000*	--	*84,000*	*7*	--	--
MCLs		*1,000*	--	--	--	--	--	--	--	--	*70*	--	--	--	*50*	*0.03*	*250**	--
END OF SAMPLING RESULTS																		

NOTE:

Reporting Units	Results reported in micrograms per liter (ug/L) or parts per billion (ppb) for all compounds except as noted below.
	2,3,7,8-TCDD reported in nanograms per liter (ng/L) or parts per trillion (ppt)
	Method 1613B used to analyze 2,3,7,8-TCDD after 6/2006, units are picograms per liter (pg/L) or parts per quadrillion (ppq)
	Chlorides reported in milligrams per liter (mg/l) or parts per million (ppm)
Sample Quantation Limits:	Phenolics = 5 ug/l.
	2,6-D and 2,4-D = 5 ug/L
	2,3,7,8-TCDD = 0.03 ng/L, except as notes (a) where detection limit was 3 ng/L
	Toluene = 10 ug/L
	Chlorides = 0.5 mg/L

Footnotes:

(a)	Sample quantitation limit of 3 ng/L
(b)	Sample quantitation limits of 0.075 ng/L and 0.065 ng/L for LW-1 and LW-4R, respectively
(c)	Sample quantitation limit 9.55 ng/L adjusted to account 2,3,7,8-TCDD in method blank in accordance with provisions in EPA's functional guidelines
	2,3,7,8-TCDD was reported in each sample (LW-1 through LW-5) and in the method blank
(d)	Sample quantitation limits < ~4 pg/L. Analysis by STL Laboratories using Method 8290
--	Data/information not provided
*	Secondary MCL
0.15	Contaminant concentrations above MCL or PCL are highlighted in yellow and indicated by ***bold, italicized*** font
444	Contaminant concentrations above secondary MCL are highlighted in pink and indicated by *italicized* font
Silvex	Also known as 2,4,5-Trichlorophenoxypropionic acid or 2,4-TP
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
2,4-D	2,4-Dichlorophenoxyacetic
2,6-D	2,6-Dichlorophenoxyacetic
J	Estimated result; result is less than the reporting limit
JA	The analyte was positively identified, but the quantitation is an estimate
NA	Not applicable
ND	Not detected at sample quantitation limit

TABLE 5

FISH MONITORING DATA FOR BAYOU METO AND ROCKY BRANCH CREEK

Location (Station ID)	Fish Species	2,3,7,8-TCDD (ppt)											TEQ (ppt)									
		1994	1996	1998[1]	1998[1]	2000	2001[2]	2002	2004	2006	2009	2011	1994	1996	1998[1]	1998[1]	2000	2002	2004	2006	2009	2011
Arkansas Highway 13 (BM-8)	Bigmouth Buffalo	1.9	--	--	--	--	0.65	--	--	--	--	--	2.43	--	--	--	--	--	--	--	--	--
	Bigmouth Buffalo	--	--	--	--	--	0.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Bigmouth Buffalo	--	--	--	--	--	0.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Long Nose Gar	--	--	--	--	--	5.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Long Nose Gar	--	--	--	--	--	2.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Smallmouth Buffalo	--	--	--	--	--	5.6	--	--	--	0.924	0.385	--	--	--	--	--	--	--	--	1.27	0.483
	Smallmouth Buffalo	--	--	--	--	--	0.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Largemouth Bass	ND	--	--	--	--	--	--	--	--	0.521	0.56	0.18	--	--	--	--	--	--	--	0.628	0.63
	White Crappie	0.76	--	--	--	--	--	--	--	--	--	--	0.87	--	--	--	--	--	--	--	--	--
Arkansas Highway 15 (BM-6)	Bigmouth Buffalo	12.05	10.4	16	**89**	--	--	3.42	3.97	4.40	4.53	5.69	12.94	10.8	17	90	--	3.73	4.30	4.89	5.13	6.38
	Bigmouth Buffalo	13.9	--	--	--	--	--	--	--	--	--	5.87	--	--	--	--	--	--	--	--	--	6.61
	Bigmouth Buffalo	14.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Smallmouth Buffalo	--	--	--	--	7.97	--	--	--	--	--	--	--	--	--	--	8.75	--	--	--	--	--
	Largemouth Bass	7.54	10.8	10	11	6.41	--	1.94	6.17	3.57	2.19	2.53	8.01	11.1	10	11	6.66	2.03	6.40	3.78	2.35	2.74
	Largemouth Bass	--	--	8	13	7.11	--	2.82	--	2.88	--	--	--	--	9	13	7.38	2.94	--	3.08	--	--
	White Crappie	--	6.9	--	--	4.85	--	--	--	--	--	--	--	7.16	--	--	5.11	--	--	--	--	--
	Flathead Catfish	--	6.13	--	--	--	--	--	--	--	--	--	--	6.72	--	--	--	--	--	--	--	--
	Channel Catfish	--	--	37	24	--	--	--	--	--	--	--	--	--	37	24	--	--	--	--	--	--
Interstate Highway 40 (BM-5.5)	Smallmouth Buffalo	--	18.6	14	14	17.7	--	--	8.39	12.3	10.2	21.3	--	19.6	14	14	18.8	--	8.84	13.3	11.3	23
	Smallmouth Buffalo	--	--	--	--	--	--	--	--	--	10.1	--	--	--	--	--	--	--	--	--	11.1	--
	Bigmouth Buffalo	--	--	--	--	--	--	3.7	--	--	--	--	--	--	--	--	--	3.95	--	--	--	--
	Largemouth Bass	--	15.2	--	--	26.5	--	3.91	7.03	5.23	--	--	--	15.4	--	--	27.2	4.05	7.30	5.32	--	--
	Largemouth Bass	--	--	--	--	--	--	--	7.27	--	--	--	--	--	--	--	--	--	7.53	--	--	--
	Common Carp	--	--	21	38	--	--	--		--	--	--	--	--	21	38	--	--	--	--	--	--
	Black Crappie	--	--	--	--	--	--	--	--	--	1.22	--	--	--	--	--	--	--	--	--	1.37	--
	White Crappie	--	--	--	--	--	--	--	--	--	--	3.26	--	--	--	--	--	--	--	--	--	3.42
Arkansas Highway 161 (BM-5)	Bigmouth Buffalo	24.03	20.6	34	31	--	--	15.9	11.2	11.5	--	10.5	26.78	21.2	34	32	--	16.6	11.7	12.1	--	11.4
	Smallmouth Buffalo	--	--	--	--	27.3	--	--	--	--	--	--	--	--	--	--	28.1	--	--	--	--	--
	Bigmouth Buffalo	--	--	--	--	--	--	--	--	--	20.9	--	--	--	--	--	--	--	--	--	23	--
	Largemouth Bass	34.37	25.2	**125**	**180**	35	--	13.5	12.6	--	12.3	--	35.59	25.8	126	181	35.5	13.7	12.8	--	13	--
	Spotted Bass	--	--	--	--	--	--	--	--	17.3	--	8.19	--	--	--	--	--	--	--	17.9	--	8.47
	White Crappie	21.32	--	--	--	23.1	--	--	--	--	--	--	22.06	--	--	--	23.5	--	--	--	--	--
	Black Crappie	--	31.5	--	--	--	--	--	--	--	--	--	--	32.1	--	--	--	--	--	--	--	--
US Highway 67-167 (BM-3)	Bigmouth Buffalo	**87.66**	12.1	47	**63**	5.97	--	2.5	2.94	5.12	9.78	7.16	93.77	12.8	52	65	6.54	2.84	3.28	5.62	11.5	7.72
	Largemouth Bass	--	26.3	16	32	5.4	--	6.38	1.63	3.62	12	2.47	--	26.9	16	33	5.88	6.63	1.80	3.99	13.2	2.7
	White Crappie	24.04	--	16	41	--	--	--	--	--	--	--	25.97	--	17	44	--	--	--	--	--	--
	Yellow Bullhead Catfish	--	10.8	--	--	--	--	--	--	--	--	--	--	11	--	--	--	--	--	--	--	--
Rocky Branch Creek (RBC)	Bigmouth Buffalo	**69.89**	46.1	--	--	--	--	--	--	--	--	--	73.05	47.1	--	--	--	--	--	--	--	--
	Largemouth Bass	18.02	33.9	**126**	**110**	36.7	--	14.7	21.9	18.7	**80.4**	21.6	18.71	34.7	128	110	37.2	14.9	22.1	19.1	82 (63.9)[3]	21.7
	Largemouth Bass	--	--	--	--	--	--	--	--	--	**81.7**	--	--	--	--	--	--	--	--	--	83.6	--
	Bluegill Sunfish	--	**50.7**	**113**	**120**	--	--	12.4	15.3	15.3	18.8	8.96	--	52.3	114	120	--	12.6	15.5	15.6	19.3	9.03
	Bluegill Sunfish	--	--	--	--	--	--	--	--	--	18.7	--	--	--	--	--	--	--	--	--	19.2	--
	Warmouth Sunfish	--	--	--	--	28.3	--	--	--	--	--	--	--	--	--	--	28.6	--	--	--	--	--
	Flathead Catfish	--	37.4	--	--	--	--	--	--	--	--	--	--	37.5	--	--		--	--	--	--	--

TABLE 5

FISH MONITORING DATA FOR BAYOU METO AND ROCKY BRANCH CREEK

Location (Station ID)	Fish Species	2,3,7,8-TCDD (ppt)										TEQ (ppt)									
		1994	1996	1998[1]	1998[1]	2000	2001[2]	2002	2004	2006	2009	2011	1994	1996	1998[1]	1998[1]	2000	2002	2004	2006	2009	2011
Lake Dupree (LD)	Bigmouth Buffalo	--	7.17	--	--	--	--	--	1.44	5.37	5.47	4.78	--	7.53	--	--	--	--	1.57	5.74	5.82	5.01
	White Crappie	--	10.6	--	--	--	--	--	--	--	--	--	--	10.6	--	--	--	--	--	--	--	--
	Channel Catfish	--	--	--	--		--	0.84	--	--	--	--	--	--	--	--	--	1.03	--	--	--	--
	Largemouth Bass	--	22.1	--	--	5.88	--	10.2	3.67	5.77	5.83	8.9	--	22.3	--	--	6.06	10.5	3.79	6.03	6.05	9.15

NOTE:

"--"	Particular fish species not sampled during the event identified.
ppt	Parts per trillion
TCDD	Tetrachlorodibenzo-p-dioxin
TEQ	Toxcity equivalent concentrations
51	TCDD concentrations above 50 ppt indicated by **bold** font; Food and Drug Administration issued a health advisory stating that fish with 2,3,7,8-TCDD concentrations greater than 50 ppt should not be consumed (FDA, 1981 and 1983).
[1]	Samples analyzed twice due to quality assurance/quality control concerns.
[2]	Samples collected by the Arkansas Game and Fish Commission on May 5, 2001, just south of Highway 13 Bridge. No TEQ data was reported.
[3]	Analyses of secondary aliquot was 63.9 ppt, a 22% decrease but within method variablity (GBMc 2010).
Sources:	2009 data from GBMc & Associates, Hercules Incorporated 2009 Bayou Meto Fish Flesh Monitoring Report, February 19, 2010
	2011 data from GBMc & Associates, Hercules Incorporated 2011 Bayou Meto Fish Flesh Monitoring Report, October 23, 2012

TABLE 6

DETECTED CONCENTRATIONS FOR WELLS AND SAMPLING LOCATIONS OUTSIDE OF THE TECHNICAL IMPRACTICABILITY ZONE

	2,3,7,8-TCDD (ng/L)										
Well	**10/21/08**	**06/09/09**	**07/14/09**	**12/08/09**	**06/09/10**	**07/06/11**	**07/25/12**	**10/15/12[1]**	**12/31/12[1]**	**2/14/13**	**Comments**
LW-5	--[2]	--	NS	--	--	--	**0.054**	0.0073 J **0.048**[3]	--	--[2]	Two exceedances above MCL
RBC	--	NS	**0.031**	--	**0.092**	--[4]	--[5]	NS	NS	NS	Two exceedances above MCL
001	--	NS	--	**0.048** 0.013[3]	--	--[4]	--[5]	--	--	--	One exceedance above MCL

NOTE:

0.054	= Contaminant concentrations above MCL are indicated by **bold** font
--	= Sample not detected or below the PCL and MCL
(1)	= Resample
(2)	= Split sample sent to alternate laboratory
(3)	= Sample reanalyzed
(4)	= Sample analyzed on 08/12/11
(5)	= Sample analyzed on 09/17/12
001	= Outfall 001 at Rocky Branch Creek (storm water sampling location)
2,3,7,8-TCDD	= 2,3,7,8-Tetrachlorodibenzo-p-dioxin
J	= Estimated result
MCL	= Maximum Contaminant Level
ng/L	= Nanogram per liter
NS	= Not sampled
PCL	= Plume Concentration Level
RBC	= Rocky Branch Creek Outfall (storm water sampling location)

2,3,7,8-TCDD MCL = 0.03 ng/L
2,3,7,8-TCDD PCL = 7 ng/L

TABLE 7

DETECTED CONCENTRATIONS FOR WELLS INSIDE OF THE TECHNICAL IMPRACTICABILITY ZONE

2,3,7,8-TCDD (ng/L)								
Well	**10/21/08**	**06/09/09**	**07/30/09**	**12/08/09**	**06/09/10**	**07/06/11**	**07/25/12**	**Comments**
MW-36	**0.23**	**0.12**	--	--	--	NS	NS	Two exceedances above MCL
Toluene (ug/L)								
Well	**10/21/08**	**06/09/09**	**07/30/09**	**12/08/09**	**06/09/10**	**07/06/11**	**07/26/12**	**Comments**
MW-100	--	--	NS	--	--	--	**1,400** **1,200**(1)	Two exceedances above MCL
MW-101	**8,600** ***10,000***(1)	**5,600** **6,300**(1)	NS	**1,000** **2,900**(1)	-- --(1)	-- --(1)	-- --(1)	Six exceedances above MCL; one exceedance above the PCL
MW-102	--	--	NS	--	**2,700**	**1,100** **1,100**(1)	**3,500**	Four exceedances above MCL
2,4-Dichlorophenoxyacetic (ug/L)								
Well	**10/21/08**	**06/09/09**	**07/30/09**	**12/08/09**	**06/09/10**	**07/06/11**	**07/26/12**	**Comments**
MW-100	--	--	NS	--	--	--	**760** **910**(1)	Two exceedances above MCL
MW-101	**100** 23(1)	-- --(1)	NS	-- --(1)	-- --(1)	-- --(1)	-- --(1)	One exceedance above MCL
MW-102	--	--	NS	--	440	-- --(1)	**7,400**	Two exceedances above MCL
Silvex (2,4,5-Trichlorophenoxypropionic acid) (ug/L)								
Well	**10/21/08**	**06/09/09**	**07/30/09**	**12/08/09**	**06/09/10**	**07/06/11**	**07/26/12**	**Comments**
MW-100	--	--	NS	--	--	--	**110** **82**(1)	Two exceedances above MCL
MW-102	--	--	NS	--	**54**	-- --(1)	**220**	Two exceedances above MCL

NOTE:

0.23 = Contaminant concentrations above MCL are indicated by **bold** font
10,000 = Contaminant concentrations above PCL are indicated by ***bold italicized*** font
-- = Sample not detected or below the PCL and MCL
(1) = Duplicate sample
MCL = Maximum Contaminant Level
mg/L = Milligrams per liter
ng/L = Nanogram(s) per liter
NS = Not sampled
PCL = Plume Concentration Level
ug/L = Micrograms per liter
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) MCL = 0.03 ng/L; PCL = 7 ng/L
2,4-Dichlorophenoxyacetic (2,4-D) MCL = 70 ug/L; PCL = 210,000 ug/L
Silvex (2,4,5-Trichlorophenoxypropionic acid) MCL = 50 ug/L; PCL = 84,000 ug/L
Toluene MCL = 1,000 ug/L; PCL = 9,000 ug/L

TABLE 8

LIST OF INTERVIEWEES

Name	Title/Position	Organization	Date Survey Completed
Tim Hassett	Site Project Manager	Hercules, Inc.	August 15, 2013
David Jeros	Project Manger	Terracon Consultants, Inc.	July 15, 2013
Phillip Carisle	Vice President	Concerned Citizens Coalition	June 4, 2013
Gary Fletcher/ James Whisker, P.E.	Mayor	City of Jacksonville/ City Engineer	June 5, 2013
Shirley Louie	Associate Branch Chief for Epidemiology	Arkansas Department of Health	June 5, 2013
Annette Cusher	Engineer Supervisor	Arkansas Department of Environmental Quality	June 24, 2013
Dianna Kilburn	Geology Supervisor	Arkansas Department of Environmental Quality	June 18, 2013

TABLE 9

CHANGES IN TOXICITY VALUES

COC	ROD Toxicity Parameter	Value (Units)	Source	Updated Toxicity Parameter	Value (Units)	Source
2,3,7,8-TCDD	SFO	1.5E+5 $(mg/kg\text{-}day)^{-1}$	EPA 1994	SFO	1.3E+5 $(mg/kg\text{-}day)^{-1}$	CalEPA
	SFD	3.0E+5 $(mg/kg\text{-}day)^{-1}$	EPA 1992	SFD	1.3E+5 $(mg/kg\text{-}day)^{-1}$	CalEPA (1)
	CSF_i	1.5E+5 $(mg/kg\text{-}day)^{-1}$	EPA 1994	IUR	3.8E+1 $(\mu g/m^3)^{-1}$	CalEPA
	RfD_o	NTV	--	RfD_o	7.0E-10 $(mg/kg\text{-}day)^{-1}$	IRIS
	RfD_d	NTV	--	RfD_d	7.0E-10 $(mg/kg\text{-}day)^{-1}$	IRIS (1)
	RfD_i	NTV	--	RfC_i	4.0E-8 mg/m^3	CalEPA
2,4,6-Trichlorophenol	SFO	1.1E-2 $(mg/kg\text{-}day)^{-1}$	IRIS 1995	SFO	1.1E-2 $(mg/kg\text{-}day)^{-1}$	IRIS
	SFD	2.2E-2 $(mg/kg\text{-}day)^{-1}$	IRIS 1995	SFD	1.1E-2 $(mg/kg\text{-}day)^{-1}$	IRIS
	CSF_i	1.1E-2 $(mg/kg\text{-}day)^{-1}$	IRIS 1995	IUR	3.1E-6 $(\mu g/m^3)^{-1}$	IRIS
	RfD_o	1.0E-1 (mg/kg-day)	ORD	RfD_o	1.0E-3 (mg/kg-day)	PPRTV
	RfD_d	5.0E-2 (mg/kg-day)	Isomer	RfD_d	1.0E-3 (mg/kg-day)	PPRTV
	RfD_i	1.0E-1 (mg/kg-day)	ORD	RfC_i	NTV	--
Toluene	RfD_o	2.0E-1 (mg/kg-day)	IRIS 1995	RfD_o	8.0E-2 (mg/kg-day)	IRIS
	RfD_d	1.8E-2 (mg/kg-day)	IRIS 1995	RfD_d	8.0E-2 (mg/kg-day)	IRIS (1)
	RfD_i	NC	--	RfC_i	5.0E+0 mg/m^3	IRIS

NOTE:

(1) The oral slope factor was used for dermal exposure based upon USEPA GIABS value.

CSF_i Inhalation Cancer Slope Factor
COC Contaminant of concern
IRIS Integrated Risk Information System
IUR Inhalation Unit Risk
kg Kilogram
mg Milligram
NC Not complete pathway
NTV No toxicity value
GIABS Gastrointestinal Absorption
RfC_i Inhalation Reference Concentration
RfD_i Inhalation Reference Dose
RfD_o Oral Reference Dose
RfD_d Dermal Reference Dose
ROD Record of Decision
SFD Slope Factor - Dermal
SFO Slope Factor - Oral
µg Microgram
NTV No toxicity value
PPRTV Provisional Peer Reviewed Toxicity Values

TABLE 10

ISSUES IDENTIFIED

Issue	Affects Remedy Protectiveness	
	Short-Term	Long-Term
Dioxin Reassessment OU Off-Site Areas—The U.S. Environmental Protection Agency (EPA) released the final non-cancer dioxin reassessment publishing a non-cancer toxicity value, or reference dose (RfD), for 2,3,7,8-TCDD in the Integrated Risk Information System (IRIS) in February of 2012. The soil remedial action goals were re-evaluated as part of this fourth five-year review to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD. At the time of the remedial action, the cleanup level was 1.0 parts per billion (ppb) for Off-Site Areas including residential and agricultural areas. Available data was not sufficient to determine residual soil exposure levels for comparison to protective levels using the RfD.	Deferred	Deferred
Dioxin Reassessment OU2 On-Site Soils—The on-site soil remedial action goals were reviewed to determine whether residual soil levels at the site are protective based on the recently issued IRIS RfD for 2,3,7,8-TCDD. At the time of the remedial action, the cleanup level for OU2 On-Site Soils (EPA 1996b) was 5.0 parts per billion. A full evaluation of the existing site data has not been conducted and, therefore, a full determination of the protectiveness of the on-site soil cleanup level cannot be provided at this time.	Deferred	Deferred
Groundwater Sample Exceedances—The Annual Progress Reports and the analytical groundwater data indicated Maximum Contaminant Level (MCL) exceedances for 2,3,7,8-TCDD in monitoring well LW-5, at the Rocky Branch Creek sampling point, and Outfall 001. These sample locations are outside of the Technical Impracticability (TI) zone. The data indicated that monitoring well MW-36, located inside the TI zone, was above the MCL for 2,3,7,8-TCDD. In addition, three other monitoring wells located within the TI zone were above the MCL and/or the plume concentration level for toluene, 2,4-dichlorophenoxy-acetic, and/or Silvex.	No	Yes
Treated Water Discharge Limitation Exceedances—Low-level exceedances of the discharge limitation for 2,3,7,8-TCDD have been identified in 10 of the discharge monitoring reports (DMRs) 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 were below the limits of detection. The reason for the exceedances was not determined. The analytical data reporting limits submitted for several parameters do not meet current required Minimum Quantification Levels in the DMRs and the reported analytical results do not indicate whether or not the water quality standards of the receiving stream are being maintained.	No	No

TABLE 10

ISSUES IDENTIFIED

Issue	Affects Remedy Protectiveness	
	Short-Term	Long-Term
Site-Wide Groundwater Monitoring Plan—The Site-Wide Groundwater Monitoring Plan was revised in April 2009, but modifications to the sampling schedule and list of parameters were implemented in 2011 and 2012 based on discussions with the EPA. At the time of this report, the 2013 sampling schedule and list of parameters were under development. The 2009 plan has not been revised to reflect these ongoing modifications.	No	No
Fish Flesh Monitoring in the Rocky Branch Creek and Bayou Meto—The fish in Rocky Branch Creek and Bayou Meto are 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. Additionally, EPA has required that fish tissue sampling taken for the site remedy be analyzed toward the recommended fish tissue dioxin screening level of 0.7 parts per trillion (ppt). All of the fish tissue samples except for three of four samples collected at the lower reaches of the Bayou Meto (State Highway 13) during 2009 and 2011 exceed the EPA recommended screening level of 0.7 ppt and in 2009 two of the samples collected from the Rocky Branch Creek (reach nearest the Vertac site) had sample results greater than 50 ppt which historically is the level at which FDA issues a health advisory stating that fish should not be consumed. Hercules was directed per the third five-year review to carry out the regularly scheduled 2008 fish flesh sampling by no later than January 31, 2009. This task was not accomplished during the identified timeframe but was conducted in July/August 2009.	No	Yes
Engineering Controls, Perimeter Fence—Engineering controls include the maintenance of the site fence. A section of the perimeter fencing located on the west side of the Resource Conservation and Recovery Act, Subtitle C landfill (Operational Unit [OU]1 landfill) is damaged and opened. Multiple patch repairs were observed during the site visit but appear to be ineffective in preventing animal activity which has been identified as the reason for the opening in the fence.	No	Yes

NOTE:

DMR = Discharge monitoring report
EPA = U.S. Environmental Protection Agency
FDA = Food and Drug Administration
IRIS = Integrated Risk Information System
MCL = Maximum Contaminant Level
OU = Operable Unit
ppt = Parts per trillion
RfD = Reference dose
TCDD = Tetrachlorodibenzo-p-dioxin
TI = Technical Impracticability

TABLE 11

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Remedy Protectiveness (Yes/No)	
					Short-Term	Long-Term
Dioxin Reassessment OU Off-Site Areas	Additional data collection and evaluation are needed to complete the re-evaluation of the dioxin Off-Site Areas soil cleanup. It is currently unknown whether unacceptable exposure off-site exists. Sampling should focus on areas near residential homes and target areas of potential human contact. Data from sampling should be used to determine if residual soil dioxin levels are protective of human health based on the new 2,3,7,8-TCDD RfD.	Hercules, Inc.	U.S. Environmental Protection Agency (EPA)	Before the Next Five-Year Review	Deferred	Deferred
Dioxin Reassessment OU2 On-Site Soils	Available site data should be fully evaluated. Considerations include the IRIS RfD for dioxin (EPA 2012a), and the use of appropriate soil dioxin detection limits and soil dioxin sampling protocols. Evaluation of the existing site data will determine whether additional sampling is needed in order to determine whether exposure concentrations of on-site soils are considered protective.	Hercules, Inc.	EPA	Before the Next Five-Year Review	Deferred	Deferred
Groundwater Sample Exceedances	The recurring low level exceedances of the Maximum Contaminant Levels and plume concentration levels in groundwater monitoring wells and the Rocky Branch Creek should be evaluated to determine the reason for the observed exceedances.	Hercules, Inc.	EPA	Ongoing	No	Yes

TABLE 11

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Remedy Protectiveness (Yes/No)	
					Short-Term	Long-Term
Treated Water Discharge Limitation Exceedances	The reason for the continued discharge limitation exceedances of 2,3,7,8-TCDD should be investigated and modifications should be implemented to eliminate this issue. The analytical data reporting limits for the Discharge Monitoring Reports need to meet the current Minimum Quantification Levels as identified by the Arkansas Department of Environmental Quality (ADEQ) and the dissolved values for metals should be monitored and reported.	Hercules, Inc.	ADEQ/EPA	Within 1 year of the Final Fourth Five-Year Review Report	No	No
Site-Wide Groundwater Monitoring Plan	The Site-Wide Groundwater Monitoring Plan may be updated. If a change to the Operation and Maintenance Plan is necessary, then an official change request should be submitted to the ADEQ for review and consideration in accordance with the 2013 Settlement Agreement. A copy of the Settlement Agreement is included as Attachment 6 of the Fourth Five-Year Review Report.	Hercules, Inc.	ADEQ/EPA	Within 1 year of the Final Fourth Five-Year Review Report	No	No
Fish Flesh Monitoring in Rocky Branch Creek and Bayou Meto	EPA continues to require that fish tissue sampling taken for the site remedy be analyzed toward the fish tissue dioxin screening level of 0.7 parts per trillion, as recommended by EPA guidance. EPA continues to require that fish tissue dioxin sampling be performed every two years. For the next five-year review, the sampling schedule is identified as occurring in 2013, 2015, and 2017. The Fish Flesh Monitoring Reports associated with these three fish tissue sampling events should be made readily available for review during the fifth five-year review which is to occur in 2018.	Hercules, Inc.	EPA	Ongoing	No	Yes

TABLE 11

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Remedy Protectiveness (Yes/No)	
					Short-Term	Long-Term
Engineering Controls Perimeter Fencing	The open section of the perimeter fence near the OU1 landfill needs to be repaired and reinforced due to the repetitive nature of the animal activity causing damage to the fencing in that specific area.	Hercules, Inc.	EPA	Within 1 year of the Final Fourth Five-Year Review Report	No	Yes

NOTE:

ADEQ = Arkansas Department of Environmental Quality
EPA = U.S. Environmental Protection Agency
OU = Operable Unit
TCDD = Tetrachlorodibenzo-p-dioxin

ATTACHMENT 2

DOCUMENTS REVIEWED

DOCUMENTS REVIEWED

Arkansas Department of Environmental Quality (ADEQ). 2013a. "ADEQ-Dianna Kilburn Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." June 18.

ADEQ. 2013b. "ADEQ-Annette Cusher Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." Received on July 2.

ADEQ. 2013c. ADEQ Letter address to Mr. Philip Allen, P.E. U.S. EPA, Region 6-"Vertac, Inc. Superfund Site, Jacksonville, Pulaski County, Arkansas, Discharge Monitoring Reports (DMR) – January, February, March & April 2013, EPA ID No. ARD000023440; AFIN No. 60-00028." July 24.

ADEQ. 2013d. "Wastewater Operator Licensing Data Files, Water Division." Online Address: http://www.adeq.state.ar.us/water/branch_enforcement/wwl/wwlicdata_sql.aspx. Accessed August 20, 2013.

Arkansas Department of Health (ADH). 2013. "ADH-Shirley Louie Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." June 5.

Arkansas Pollution Control & Ecology Commission (APC&EC). 1996. "Discharge Limits for Vertac Superfund Site." July 11.

APC&EC. 1997. "Dioxin-2,3,7,8 TCDD permit limit at Outfall 002, Vertac Superfund Site, Jacksonville, Arkansas." September 25.

APC&EC. 2008. "Regulation No. 3, Licensing of Wastewater Treatment Plant Operators"; Arkansas Pollution Control and Ecology Commission, 501-682-0656." March 15.

APC&EC. 2011. "Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas"; Arkansas Pollution Control and Ecology Commission, 501-682-0656. September 26.

APC&EC. 2013. "Regulation No. 6, Regulations for State Administration of the National Pollutant Discharge Elimination System (NPDES)"; Arkansas Pollution Control and Ecology Commission, 501-682-0656. February 9.

Ashland Incorporated (Ashland, also known as Hercules). 2010a. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 2/1/2010 To 2/28/2010." February.

Ashland. 2010b. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 3/1/2010 To 3/31/2010." March.

Ashland. 2010c. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 4/1/2010 To 4/30/2010." April.

Ashland. 2010d. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 5/1/2010 To 5/31/2010." May.

DOCUMENTS REVIEWED

Ashland. 2010e. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 6/1/2010 To 6/30/2010." June.

Ashland. 2010f. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 7/1/2010 To 7/31/2010." July.

Ashland. 2010g. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 8/1/2010 To 8/31/2010." August.

Ashland. 2010h. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 9/1/2010 To 9/30/2010." September.

Ashland. 2010i. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 10/1/2010 To 10/31/2010." October.

Ashland. 2010j. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 11/1/2010 To 11/30/2010." November.

Ashland. 2010k. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 12/1/2010 To 12/31/2010." December.

U.S. Census Bureau (Census). 2012. "State & County QuickFacts, Jacksonville (city), Arkansas." http://quickfacts.census.gov/qfd/states/05/0534750.html. Accessed July 29, 2013.

City of Jacksonville (COJ). 2013. "COJ-Gary Fletcher (Mayor)/James Whisker, P.E. (City Engineer) Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." June 5.

Concerned Citizens Coalition (CCC). 2013. "CCC-Phillip Carlisle Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." June 4.

U.S. Environmental Protection Agency (EPA). 1984. "Ambient Water Quality Criteria for 2,3,7,8-Tetrachlorodibenzo-p-dioxin." EPA 440/5-84-007. February.

EPA. 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A) (Interim Final). Report No. EPA/540/1-89/002. Office of Emergency and Remedial Response." December.

EPA. 1990. "Record of Decision, Vertac Superfund Site Off-Site Areas." September 27.

EPA. 1993. "Record of Decision, Vertac Onsite Operable Unit 1." June 30.

EPA. 1994. "Unilateral Administrative Order for the Remedial Design and Remedial Action at the Vertac Inc. Superfund Site Onsite Operable Unit 1." CERCLA Docket No. CERCLA 6-10-94. March 24.

EPA. 1995a. "Memorandum Evaluation of surface soil cleanup level contaminated with 2,3,7,8-TCDD TEQs at Vertac, Inc. Superfund Site." From Ghassan Khoury, Toxicologist to Rick Ehrhart, RPM. April 11.

DOCUMENTS REVIEWED

EPA. 1995b. "Explanation of Significant Differences [regarding Operable Unit No. 1, Onsite Above-Ground Media]." May 25.

EPA. 1996a. Memorandum "The Determination of Health Based Plume Concentration Limits (PCLs) for Ground Water Containment at the Vertac Superfund Site, Jacksonville, Arkansas." From Philip Dellinger to Administrative Record File, Vertac Operable Unit 3. June 5.

EPA. 1996b. "Record of Decision, Vertac Superfund Site, Jacksonville, Arkansas, Operable Unit #2, Soil, Foundations and Underground Utilities." Final. September 17.

EPA. 1996c. "Declaration for the Amended Record of Decision [amending the Vertac Superfund Site Off-Site Areas Record of Decision dated September 27, 1990]." September 17.

EPA. 1996d. "Record of Decision, Vertac Superfund Site, Jacksonville, Arkansas, Operable Unit #3, Ground Water." Final. September 17.

EPA. 1996e. "Unilateral Administrative Order for the Remedial Design and Remedial Action at the Vertac, Inc., Superfund Site, Operable Unit 2, Soils and Underground Utilities." CERCLA Docket No. CERCLA 6-01-97. December 10.

EPA. 1996f. "Unilateral Administrative Order for the Remedial Design and Remedial Action at the Vertac, Inc., Superfund Site, Operable Unit 3, Ground Water." CERCLA Docket No. CERCLA 6-02-97. December 10.

EPA. 1996g. "Unilateral Administrative Order for the Dismantling, Decontamination, and Consolidation within the On-Site Hazardous Waste Landfill of the On-Site Incinerator and Associated Structures and Debris, and Incinerator Ash and Pallets at the Vertac, Inc., Superfund Site." CERCLA Docket No. CERCLA 06-04-97. December 31.

EPA. 1998. "Explanation of Significant Differences to the September 1996 Record of Decision, Vertac, Inc. Superfund Site, Operable Unit 2, Jacksonville, Arkansas." January 12.

EPA. 2000a. "Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups." EPA 540-F-00-005. September.

EPA. 2001. "Comprehensive Five-Year Review Guidance." EPA 540-R-01-007. June.

EPA. 2006. "National Recommended Water Quality Criteria." Office of Water, Office of Science and Technology (4304T).

EPA. 2008. "Third Five-Year Review Report for the Vertac Incorporated Superfund Site, Jacksonville, Pulaski County, Arkansas." November 20.

EPA. 2011a. Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance", OSWER Directive 9355.7-18. September 13.

EPA. 2011b. Updated Five-Year Review Summary Form. OSWER – 9200.2-105. December 9.

DOCUMENTS REVIEWED

EPA. 2012a. "EPA Non-Cancer Toxicity Value for Dioxin and CERCLA/RCRA Cleanups." Online Address: http://www.epa.gov/superfund/policy/remedy/sfremedy/remedies/dioxinsoil.html. Accessed July 9, 2013.

EPA. 2012b. "Environmental Assessment, Dioxin." Online Address: http://cfpub.epa.gov/ncea/CFM/nceaQFind.cfm?keyword=Dioxin. Accessed August 23, 2013.

EPA. 2013a. "Vertac Superfund Site, Jacksonville, Arkansas; EPA ID# ARD000023440; Site ID: 0600023. May." Online Address: http://www.epa.gov/region6/6sf/pdffiles/vertac-ar.pdf. Accessed August 9, 2013.

EPA. 2013b. Regional Screening Level (RSL) Fish Ingestion Table (TR = 1E-6, HQ=1). May. Online Address: http://www.epa.gov/reg3hwmd/risk/human/pdf/MAY_2013_FISH_THQ1.pdf. Accessed August 20, 2013.

EPA. 2013c. "Procedures for Re-evaluating Dioxin During Five-Year Reviews at Superfund Sites." July.

Food and Drug Administration (FDA). 1981. "FDA Advised Great Lakes States to Monitor Dioxin-Contaminated Fish." FDA Talk Paper dated August 28. In: Food Drug Cosmetic Law Reports, Paragraph 41, 321. Commerce Clearing House, Inc. September 8.

FDA. 1983. "Statement by Sanford A. Miller, Director, Bureau of Foods, FDA, before the Subcommittee on Natural Resources, Agriculture Research and Environment, U.S. House of Representatives." June 30.

Federal Remediation Technologies Roundtable (FRTR). 2013. "In-Situ Treatment Technology Optimization." Accessed August 16, 2013.

GBMc & Associates (GBMc). 2010. "Hercules Incorporated 2009 Bayou Meto Fish Flesh Monitoring Report." February 19.

GBMc. 2012. "Hercules Incorporated 2011 Bayou Meto Fish Flesh Monitoring Report." October 23.

Hercules Incorporated (Hercules). 2008a. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 6/1/2008 To 6/30/2008." June.

Hercules. 2008b. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 7/1/2008 To 7/31/2008." July.

Hercules. 2008c. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 8/1/2008 To 8/31/2008." August.

Hercules. 2008d. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 9/1/2008 To 9/30/2008." September.

Hercules. 2008e. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 10/1/2008 To 10/31/2008." October.

DOCUMENTS REVIEWED

Hercules. 2008f. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 11/1/2008 To 11/30/2008." November.

Hercules. 2008g. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 12/1/2008 To 12/31/2008." December.

Hercules. 2009a. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 1/1/2009 To 1/31/2009." January.

Hercules. 2009b. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 2/1/2009 To 2/28/2009." February.

Hercules. 2009c. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 3/1/2009 To 3/31/2009." March.

Hercules. 2009d. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 4/1/2009 To 4/30/2009." April.

Hercules. 2009e. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 5/1/2009 To 5/31/2009." May.

Hercules. 2009f. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 6/1/2009 To 6/30/2009." June.

Hercules. 2009g. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 7/1/2009 To 7/31/2009." July.

Hercules. 2009h. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 8/1/2009 To 8/31/2009." August.

Hercules. 2009i. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 9/1/2009 To 9/30/2009." September.

Hercules. 2009j. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 10/1/2009 To 10/31/2009." October.

Hercules. 2009k. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 11/1/2009 To 11/30/2009." November.

Hercules. 2009l. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 12/1/2009 To 12/31/2009." December.

Hercules. 2010. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 1/1/2010 To 1/31/2010." January.

Hercules. 2011a. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 1/1/2011 To 1/31/2011." January.

Hercules. 2011b. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 2/1/2011 To 2/28/2011." February.

DOCUMENTS REVIEWED

Hercules. 2011c. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 3/1/2011 To 3/31/2011." March.

Hercules. 2011d. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 4/1/2011 To 4/30/2011." April.

Hercules. 2011e. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 5/1/2011 To 5/31/2011." May.

Hercules. 2011f. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 6/1/2011 To 6/30/2011." June.

Hercules. 2011g. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 7/1/2011 To 7/31/2011." July.

Hercules. 2011h. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 8/1/2011 To 8/31/2011." August.

Hercules. 2011i. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 9/1/2011 To 9/30/2011." September.

Hercules. 2011j. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 10/1/2011 To 10/31/2011." October.

Hercules. 2011k. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 11/1/2011 To 11/30/2011." November.

Hercules. 2011l. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 12/1/2011 To 12/31/2011." December.

Hercules. 2012a. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 1/1/2012 To 1/31/2012." January.

Hercules. 2012b. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 2/1/2012 To 2/29/2012." February.

Hercules. 2012c. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 3/1/2012 To 3/31/2012." March.

Hercules. 2012d. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 4/1/2012 To 4/31/2012." April.

Hercules. 2012e. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 5/1/2012 To 5/31/2012." May.

Hercules. 2012f. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 6/1/2012 To 6/30/2012." June.

Hercules. 2012g. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 7/1/2012 To 7/31/2012." July.

DOCUMENTS REVIEWED

Hercules. 2012h. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 8/1/2012 To 8/31/2012." August.

Hercules. 2012i. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 9/1/2012 To 9/30/2012." September.

Hercules. 2012j. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 10/1/2012 To 10/31/2012." October.

Hercules. 2012k. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 11/1/2012 To 11/30/2012." November.

Hercules. 2012l. "Vertac Site Permit Conditions Monitoring Report, Interim Water Quality Limitations for Outfall 002, Monitoring Period From 12/1/2012 To 12/31/2012." December.

Hercules. 2013. "Hercules-Timothy Hassett Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." Received on August 16.

Terracon Consultants, Inc. (Terracon). 2008a. "Site Wide Operations and Maintenance Manual, Vertac Site, Jacksonville, Arkansas." Revised March.

Terracon. 2008b. "Hercules-Vertac Site Discharge Monitoring – June 2008." August 25.

Terracon. 2008c. "Hercules-Vertac Site Discharge Monitoring – July 2008." September 10.

Terracon. 2008d. "Hercules-Vertac Site Discharge Monitoring – September 2008." October 28.

Terracon. 2008e. "Hercules-Vertac Site Discharge Monitoring – October 2008." December 4.

Terracon. 2008f. "Hercules-Vertac Site Discharge Monitoring – November 2008." December 31.

Terracon. 2009a. "Draft Annual Progress Report, January 2008 – December 2008, Groundwater Monitoring, Operable Unit 3, Vertac Site, Jacksonville, Arkansas." March.

Terracon. 2009b. "Site-Wide Groundwater Monitoring Plan, Vertac Site, Jacksonville, Arkansas." April.

Terracon. 2009c. "Hercules-Vertac Site Discharge Monitoring – June 2009." July 24.

Terracon. 2009d. "Hercules-Vertac Site Discharge Monitoring – July 2009." August 26.

Terracon. 2009e. "Hercules-Vertac Site Discharge Monitoring – August 2009." October 12.

Terracon. 2010a. "Construction Quality Assurance Certification Report, Slope Repair and Final Cover Improvements, Vertac Sediment Vault Landfill, Jacksonville, Arkansas." January 30.

DOCUMENTS REVIEWED

Terracon. 2010b. "Response to ADEQ Notice of Deficiencies, CQA Certification Report: Repair and Final Cover Improvements, Vertac Sediment Vault Landfill, EPA ID No. ARD000023440, AFIN: 60-00028, Terracon Project 35097123." April 16.

Terracon. 2010c. "Draft Annual Progress Report, January 2009 – December 2009, Groundwater Monitoring, Operable Unit 3, Vertac Site, Jacksonville, Arkansas." May.

Terracon. 2010d. "Hercules-Vertac Site Discharge Monitoring – April 2010." June 1.

Terracon. 2010e. "Hercules-Vertac Site Discharge Monitoring – May 2010." July 2.

Terracon. 2010f. "Response to ADEQ Notice of Deficiencies (NOD) Comments, CQA Certification Report: Repair and Final Cover Improvements, Vertac Sediment Vault Landfill, EPA ID No. ARD000023440, AFIN: 60-00028, Terracon Project 35097123." July 13.

Terracon. 2010g. "Hercules-Vertac Site Discharge Monitoring – June 2010." August 2.

Terracon. 2010h. "Hercules-Vertac Site Discharge Monitoring – July 2010." August 31.

Terracon. 2010i. "Hercules-Vertac Site Discharge Monitoring – August 2010." September 24.

Terracon. 2010j. "Hercules-Vertac Site Discharge Monitoring – September 2010." October 25.

Terracon. 2010k. "Hercules-Vertac Site Discharge Monitoring – October 2010." November 23.

Terracon. 2011a. "Annual Progress Report, January 2010 – December 2010, Groundwater Monitoring, Operable Unit 3, Vertac Site, Jacksonville, Arkansas." March.

Terracon. 2011b. E-mail correspondence between David Jaros/Terracon and Philip Allen/EPA. Subject: "Vertac-Groundwater Sampling Schedule; including attachments: 2011-2012 sampling schedule.xls, and notes 2.24.11.docx." June 23.

Terracon. 2011c. "Hercules-Vertac Site Discharge Monitoring – September 2011." October 31.

Terracon. 2012a. "Annual Progress Report, January 2011 – July 2011, Groundwater Monitoring, Operable Unit 3, Vertac Site, Jacksonville, Arkansas." April.

Terracon. 2012b. "Hercules-Vertac Site Discharge Monitoring – August 2012." October 1.

Terracon. 2012c. "Hercules-Vertac Site Discharge Monitoring – September 2012." October 26.

Terracon. 2012d. "Hercules-Vertac Site Discharge Monitoring – October 2012." November 26.

Terracon. 2012e. "Hercules-Vertac Site Discharge Monitoring – November 2012." December 31.

Terracon. 2013a. "Annual Progress Report, August 2011 – December 2012, Groundwater Monitoring, Operable Unit 3, Vertac Site, Jacksonville, Arkansas." July.

Terracon. 2013b. "Terracon-David Jaros Survey, Superfund Five-Year Review Site Survey, Vertac Inc. Superfund Site, ARD000023440, Jacksonville, Pulaski County, Arkansas." July 15.

DOCUMENTS REVIEWED

TestAmerica Laboratories, Inc. (TestAmerica). 2013. Analytical Report, Job Number: 680-81545-1, Job Description: HERC Vertac GW Semi-Annual July 2012, for Ashland, Inc., Ashland Hercules Research Center." June 3.

ATTACHMENT 3

SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE VISIT CHECKLIST

I. SITE INFORMATION

Site Name: Vertac, Inc., Superfund Site	**Date of Inspection:** June 4, 2013
Location and Region: Jacksonville, Arkansas/Region 6	**EPA ID:** ARD000023440
Agency, office, or company leading the five-year review: U.S. Environmental Protection Agency, Region 6	**Weather/temperature:** 83°F, wind 2 mph ENE, sunny, partial clouds

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Ground water pump and treatment
- ☒ Surface water collection and treatment
- ☐ Other (Monitored natural attenuation)

Attachments: ☒ Inspection team roster attached ☒ Site map attached (See Figure 2 of report)

II. INTERVIEWS (Check all that apply)

1. O&M Site Manager David Jaros, P.G. (Name) | Site Manager (Title) | July 15, 2013 (Date)

Interviewed: ☐ by mail ☒ at office ☐ by phone Phone no. 501-847-9292, Ext 318

Problems, suggestions: ☒ Report attached (See Attachment 5)

2. O&M Staff Thomas Earl Pilgrim (Name) | Senior Technician (Title) | June 4, 2013 (Date)

Interviewed: ☐ by mail ☒ at site ☐ by phone Phone no. _____

Problems, suggestions: ☐ Report attached (Verbal discussion during site visit)

3. Local regulatory authorities and response agencies (i.e.; State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.). Fill in all that apply.

Agency Arkansas Department of Environmental Quality (ADEQ)

Contact Annette Cusher (Name) | Engineer Supervisor (Title) | July 2, 2013 (Date) | 501-682-0841 (Phone no.)

Problems, suggestions: ☒ Report attached (See Attachment 5)

Agency ADEQ

Contact Dianna Kilburn (Name) | Geology Supervisor (Title) | June 18, 2013 (Date) | 501-682-0844 (Phone no.)

Problems, suggestions: ☒ Report attached (See Attachment 5)

4. Other interviews (optional): ☒ Reports attached to Five-Year Review Report

Mr. Phillip Carlisle, Concerned Citizens Coalition, 501-985-4038, June 5, 2013

Ms. Shirley Louie, Arkansas Department of Health, 501-661-2833; June 5, 2013

Mayor , City of Jacksonville, 501-982-3146; June 5, 2013

Mr. Tim Hassett, Hercules Inc., 302-995-3456; August 16, 2013

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☒ O&M manual (long term monitoring plan)	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☐ Up to date	☐ N/A

Remarks: Copy of documents kept onsite and at the Terracon offices

2. Site-Specific Health and Safety Plan	☒ Readily available	☐ Up to date	☐ N/A
☒ Contingency plan/emergency response plan	☒ Readily available	☐ Up to date	☐ N/A

Remarks:

3. O&M and OSHA Training Records	☒ Readily available	☐ Up to date	☐ N/A

Remarks: Site manager and site technician maintain 8-hour refresher training, first aid, and CPR; as of June 30, 2013 the wastewater operating licenses for the site operator and the site manager had expired, per the site manager the required training classes have been taken and the appropriate paperwork was submitted to the ADEQ Water Division but the renewed licenses have yet to be received.

4. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A
6. Settlement Monument Records	☐ Readily available	☐ Up to date	☒ N/A
7. Ground Water Monitoring Records	☒ Readily available	☒ Up to date	☐ N/A
8. Leachate Extraction Records	☒ Readily available	☒ Up to date	☐ N/A

9. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A

Remarks:

10. Daily Access/Security Logs ☒ Readily available ☒ Up to date ☐ N/A

Remarks: Monthly inspection, walk/check the perimeter.

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State ☐ PRP in-house

☒ Contractor for PRP ☐ Other _____

2. O&M Cost Records

☐ Readily available ☐ Up to date ☒ Funding mechanism/agreement in place

☐ Original O&M cost estimate ☐ Breakdown attached

Total annual cost by year for review period, if available

	Date		Date	Total Cost*		
From	2009	to	2010	$500,000	- ☐	Breakdown attached
From	2010	to	2011	$1,035,000	- ☐	Breakdown attached
From	2011	to	2012	$460,000	- ☐	Breakdown attached
From	2012	to	2013	$480,000	- ☐	Breakdown attached

* Average annual costs per Mr. Tim Hassett, Hercules Inc. Project Manager

3. Unanticipated or Unusually High O&M Costs During Review Period

Remarks: In 2010, the expense of the rip-rap repair of the sedimentation vault (Mount Vertac) was incurred and cost approximately $430,000 to complete.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. Fencing damaged ☒ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Openings in fence are repaired as they are discovered. Currently, one opening was observed during the site visit which appeared to have been caused by a deer or other large animal; this location had multiple patches that have failed, therefore, replacement and possibly reinforcement of this section of fence appears to be necessary. This section of fence was west of the OU1 landfill.

B. Other Access Restrictions

1. Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Signs along the fencing and at the gates were observed although limited due to the amount of vegetation growing along the fence line. ADEQ suggested new or updated signage may be appropriate.

C. Institutional Controls

1. Implementation and enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by) Alarm service, self-reporting

Frequency Buildings with continuous alarmed monitoring at night, weekdays technician at the site.

Responsible party/agency Hercules, Inc.

Contact Mr. Tim Hassett (Name) Project Manager (Title) August 16, 2013 (Date) 302-995-3456 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☒ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: A Declaration of Restrictive Covenants dated May 23, 2013, (Exhibit A of Case 4:80-CV-00109-DPM) identified the site as subject to "Institutional Controls" depicted in a plat map included in Exhibit "1" of the court documents.

D. General

1. Vandalism/trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks: In February 2009, the Police Department was notified of trespassing at the site and an incident report was completed. The fence which had been cut was repaired. On December 31, 2011, the Jacksonville Fire Department responded to and extinguished a grass fire which occurred at the site.

2. Land use changes onsite ☒ N/A

Remarks: No onsite land use changes were observed during the site visit.

3. Land use changes offsite ☒ N/A

Remarks: No offsite land use changes were observed on the day of the site visit.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☒ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: On site roads are showing some deterioration but were fully functional at the time of the site visit.

B. Other Site Conditions

Remarks:

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent _____ Depth _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths _____ Widths _____ Depths _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks: _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent Less than three inches in diameter Depth Estimated at approximately 4 inches
   Remarks: Holes noted near riser pipes of the leachate collection system.

5. **Vegetative Cover** ☒ Grass ☒ Cover properly established ☒ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: Some tree debris was observed in the sedimentation basis located to the south of the OU1 landfill.

6. **Alternative Cover** (armored rock, concrete, etc.) ☐ N/A
   Remarks: Armored rock (rip-rap) on all sides of "Mount Vertac"; installation completed in 2010.

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent _____ Depth _____
   Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	☐ Areal extent _____
☐ Ponding	☐ Location shown on site map	☐ Areal extent _____
☐ Seeps	☐ Location shown on site map	☐ Areal extent _____
☐ Soft subgrade	☐ Location shown on site map	☐ Areal extent _____

   Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map
   ☒ No evidence of slope instability
   Areal extent _____
   Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. Flows Bypass Bench ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

2. Bench Breached ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

3. Bench Overtopped ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

C. Letdown Channels ☒ Applicable ☐ N/A

(Channel lined with erosion control mats, rip rap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks: _____

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks: _____

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks: _____

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks: _____

5. Obstructions Type Tree debris observed in the sedimentation basis, but the letdown channels were clear of obstruction.

☐ No obstructions ☐ Location shown on site map

Areal extent _____ Size _____

Remarks: _____

6. Excessive Vegetative Growth Type _____

☒ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow

☐ Location shown on site map Areal extent _____

Remarks: _____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. Gas Vents ☐ Active ☒ Passive
☒ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

2. Gas Monitoring Probes
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☒ N/A
Remarks: _____

3. Monitoring Wells (within surface area of landfill)
☐ Evidence of leakage at penetration ☐ Needs O&M ☒ N/A
Remarks: _____

4. Leachate Extraction Wells
☒ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: There are no leachate extraction wells but there are leachate collection sumps.

5. Settlement Monuments ☐ Located ☐ Routinely surveyed ☒ N/A
Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. Gas Treatment Facilities
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs O&M
Remarks: _____

2. Gas Collection Wells, Manifolds, and Piping ☐ Good condition ☐ Needs O&M
Remarks: _____

3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs O&M ☐ N/A
Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. Outlet Pipes Inspected ☐ Functioning ☐ N/A
Remarks: _____

2. Outlet Rock Inspected ☐ Functioning ☐ N/A
Remarks: _____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. Siltation Areal extent _____ Size _____
☐ N/A ☒ Siltation not evident
Remarks: _____

2. Erosion Areal extent _____ Depth _____
☐ N/A ☒ Erosion not evident
Remarks: _____

3. Outlet Works ☒ Functioning ☐ N/A
Remarks: _____

4. Dam ☒ Functioning ☐ N/A
Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. Deformations ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks: _____

2. Degradation ☐ Location shown on site map ☐ Degradation not evident
Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. Siltation ☐ Location shown on site map ☒ Siltation not evident
Areal extent _____ Depth _____
Remarks: _____

2. Vegetative Growth ☐ Location shown on site map ☐ N/A
☒ Vegetation does not impede flow
Areal extent _____ Type _____
Remarks: _____

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____
Remarks: _____

4. Discharge Structure ☒ Functioning ☐ N/A
Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent _____ Depth _____
   Remarks: _____

2. **Performance Monitoring** Type of monitoring _____
   ☐ Performance not monitored Frequency _____ ☐ Evidence of breaching
   Head differential _____
   Remarks: _____

IX. GROUND WATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Ground Water Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☒ All required wells located ☐ Needs O&M ☐ N/A
   Remarks: Observed wells appeared to be in working order.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs O&M
   Remarks: System pipelines are buried underground. There is a maintenance building located near the groundwater extraction system. The groundwater recovery building contains pumps, valves with sampling ports, and an equalization tank for transferring the extracted groundwater to the wastewater treatment facility.

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks: _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☒ Good condition ☐ Needs O&M
   Remarks: Surface water is collected within the secondary containment of the holding tanks (equalization tanks) on the outside of the wastewater treatment facility. The sumps transport the water into the wastewater treatment facility.

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs O&M
   Remarks: All appeared to be in working order at the time of the site visit.

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. Treatment Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☒ Carbon absorbers
☒ Filters Two sand filters
☐ Additive (e.g., chelation agent, flocculent) _____
☒ Others pH adjustment tank
☒ Good condition ☐ Needs O&M
☒ Sampling ports properly marked and functional
☒ Sampling/maintenance log displayed and up to date
☒ Equipment properly identified
☒ Quantity of ground water treated annually 9-12 million gallons
☐ Quantity of surface water treated annually _____

Remarks: The wastewater treatment plant is maintained and in good condition. The amount of water treated annual is dependent upon the amount of rainfall that year.

2. Electrical Enclosures and Panels (Properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs O&M

Remarks: _____

3. Tanks, Vaults, Storage Vessels

☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs O&M

Remarks: _____

4. Discharge Structure and Appurtenances

☐ N/A ☒ Good condition ☐ Needs O&M

Remarks: _____

5. Treatment Building(s)

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored

Remarks: _____

6. Monitoring Wells (Pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks: _____

D. Monitored Natural Attenuation ☐ Applicable ☒ N/A

1. Monitoring Wells (Natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled (quarterly) ☐ Good condition
☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site that are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Plume containment with extraction wells on the east side of the site near the groundwater recovery building, and a French drain located on the west and south sides of the site surrounding the capped areas. Several burial areas onsite: Sedimentation Vault Landfill (also known as Mount Vertac), the Northern Burial Area (north of Mount Vertac), and the Reasor-Hill Burial Area (south of Mount Vertac). A Resource Conservation and Recovery Act Subtitle C landfill (OU1 landfill) is located on the northeast portion of the site.

B. Adequacy of O&M

The O&M activities appear to be adequate. Maintenance of landfill caps (some tree removal observed), collection of landfill leachate, groundwater collection and transfer to the wastewater treatment plant (WWTP), groundwater collection and transfer from French drain to WWTP. O&M of WWTP, collection of discharge water, groundwater samples, other asssociated activities. Daily, weekly, monthly, and yearly activities and reporting for the site.

C. Early Indicators of Potential Remedy Failure

Observed during the review of supporting documents: PCL and multiple MCL exceedances of 2,3,7,8-TCDD noted in wells located inside/outside of the Technical Impracticability zone; low-level exceedances of 2,3,7,8-TCDD observed in the monthly discharge monitoring reports (resampling/reanalysis of samples is conducted when this occurs but the reason for the exceedances has not been determined.)

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

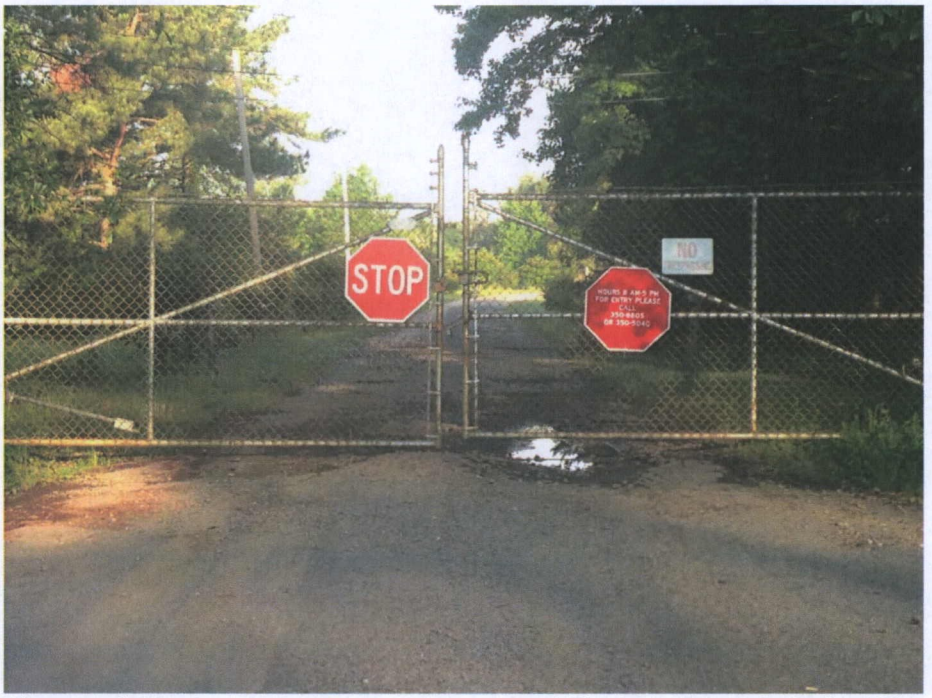
Requests to decrease the once every two years fish flesh monitoring events to once every five years prior to the next five-year review is made on a regular basis. The onsite operator and project manager request the reduction of the analyte list when possible. Requests are submitted to ADEQ and/or EPA and only implemented with prior approval.

INSPECTION TEAM ROSTER

Name	Organization	Title
April Ballweg	EA Engineering	Project Manager
Annette Cusher	ADEQ	Engineer Supervisor
Dianna Kilburn	ADEQ	Geologist Supervisor
Candice Brock	ADEQ	geologist
Douglas Putnam	ADEQ	Epidemiologist
MOSTAFA MEHRAN	ADEQ	ENGINEER
TIM WASSON	ASHLAND/HPC	PROJECT MGR
David Jaros	Terracon	Site Manager
David Hopkins	Terracon	Project Manager
Rocco McDonald	GBM/Absa	Project Scientist
Jody Adams	Terracon	Project geologist
THOMAS PILGRIM	"	SR. TECH
PHILIP ALLEN	EPA	RPM

ATTACHMENT 4

SITE INSPECTION PHOTOGRAPHS



Photograph No. 1 Site: Vertac Inc. Superfund Site
Description: View of a site gate located at Hill Road driveway, note signs and chain with lock securing the gate
Date: June 4, 2013 Direction: East

Photograph No. 2 Site: Vertac Inc. Superfund Site
Description: Front entryway of the Wastewater Treatment Plant (WWTP)
Date: June 4, 2013 Direction: East

Photograph No. 3 Site: Vertac Inc. Superfund Site
Description: View of former Central Processing Area from the road due north of the decontamination pad
Date: June 4, 2013 Direction: North

Photograph No. 4 Site: Vertac Inc. Superfund Site
Description: Concrete decontamination pad for large equipment, located north of the WWTP
Date: June 4, 2013 Direction: East

Photograph No. 5 Site: Vertac Inc. Superfund Site
Description: View of the south side of sedimentation vault (Mount Vertac), armored with rip rap (previously a vegetative cover in 2008)
Date: June 4, 2013 Direction: North

Photograph No. 6 Site: Vertac Inc. Superfund Site
Description: View of north side of sedimentation vault; entire side has been armored with rip rap
Date: June 4, 2013 Direction: South

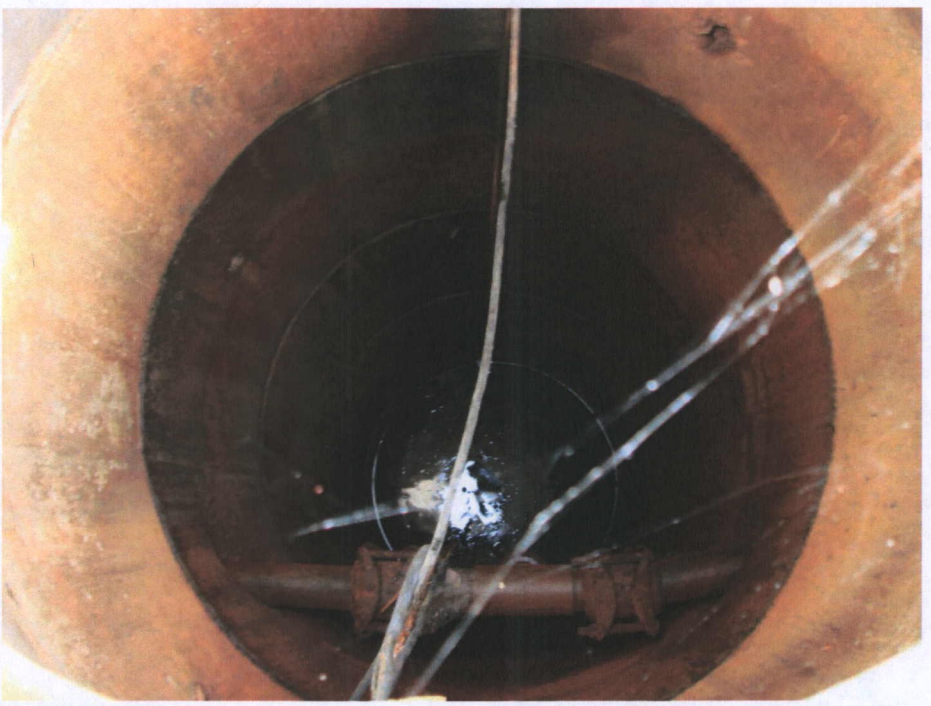
Photograph No. 7 Site: Vertac Inc. Superfund Site
Description: View looking down the northwest corner of the sedimentation vault
Date: June 4, 2013 Direction: Northwest

Photograph No. 8 Site: Vertac Inc. Superfund Site
Description: View looking down the northeast corner of the sedimentation vault; rip-rap covers all sides of the sedimentation vault
Date: June 4, 2013 Direction: Northeast

Photograph No. 9 Site: Vertac Inc. Superfund Site
Description: View of the gravel access road on the east side of the sedimentation vault
Date: June 4, 2013 Direction: West-southwest

Photograph No. 10 Site: Vertac Inc. Superfund Site
Description: View looking up from the southwest corner of the sedimentation vault, note rip-rap on west and south slopes (south slope previously a vegetative cover in 2008)
Date: June 4, 2013 Direction: Northeast

Photograph No. 11 Site: Vertac Inc. Superfund Site
Description: View of French drain manhole (MH5A) located to the southwest of the sedimentation vault
Date: June 4, 2013 Direction: NA



Photograph No. 12 Site: Vertac Inc. Superfund Site
Description: Interior of French drain manhole MH5A, note low level of ground water in manhole
Date: June 4, 2013 Direction: NA

Photograph No. 13 Site: Vertac Inc. Superfund Site
Description: Monitoring well LW-5 located southeast of OU1 landfill, well casing and identification in poor condition but scheduled for repainting and labeling soon
Date: June 4, 2013 Direction: West

Photograph No. 14 Site: Vertac Inc. Superfund Site
Description: Interior view of monitoring well LW-5.
Date: June 4, 2013 Direction: NA

Photograph No. 15 Site: Vertac Inc. Superfund Site
Description: East side of Resource Conservation and Recovery Act (RCRA), Subtitle C OU1 landfill
Date: June 4, 2013 Direction: West

Photograph No. 16 Site: Vertac Inc. Superfund Site
Description: Electrical control box to provide electricity for leachate riser pumps.
Date: June 4, 2013 Direction: Northwest

Photograph No. 17 Site: Vertac Inc. Superfund Site
Description: East side of OU1 landfill where access pipes for leachate collection and detection system sumps are located (arrows indicate each set of pipes)
Date: June 4, 2013 Direction: Northwest

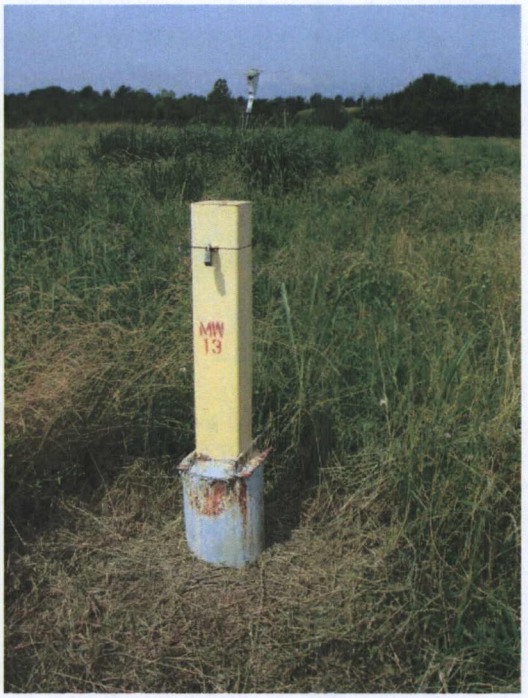
Photograph No. 18 Site: Vertac Inc. Superfund Site
Description: View of rock letdown channel on the southeast corner of the OU1 landfill
Date: June 4, 2013 Direction: Northwest

Photograph No. 19 Site: Vertac Inc. Superfund Site
Description: Area located northeast of OU1; ponds created from beaver dams along the Rocky Branch Creek just beyond the access road
Date: June 4, 2013 Direction: Northeast

Photograph No. 20 Site: Vertac Inc. Superfund Site
Description: Fence on east side of OU1 landfill; animal activity (deer) climbing through the fence. Multiple repairs observed due to various types of fence at location.
Date: June 4, 2013 Direction: West

Photograph No. 21 Site: Vertac Inc. Superfund Site
Description: Top of OU1 landfill (RCRA Subtitle C); note two passive gas vents (arrows indicate each vent)
Date: June 4, 2013 Direction: North-northwest

Photograph No. 22 Site: Vertac Inc. Superfund Site
Description: Overview of OU1 landfill cap; established vegetation observed
Date: June 4, 2013 Direction: North



Photograph No. 23 Site: Vertac Inc. Superfund Site
Description: Monitoring well MW-13 located on the north side of the site
Date: June 4, 2013 Direction: South

Photograph No. 24 Site: Vertac Inc. Superfund Site
Description: Monitoring well MW-96 located south of the OU1 landfill
Date: June 4, 2013 Direction: East

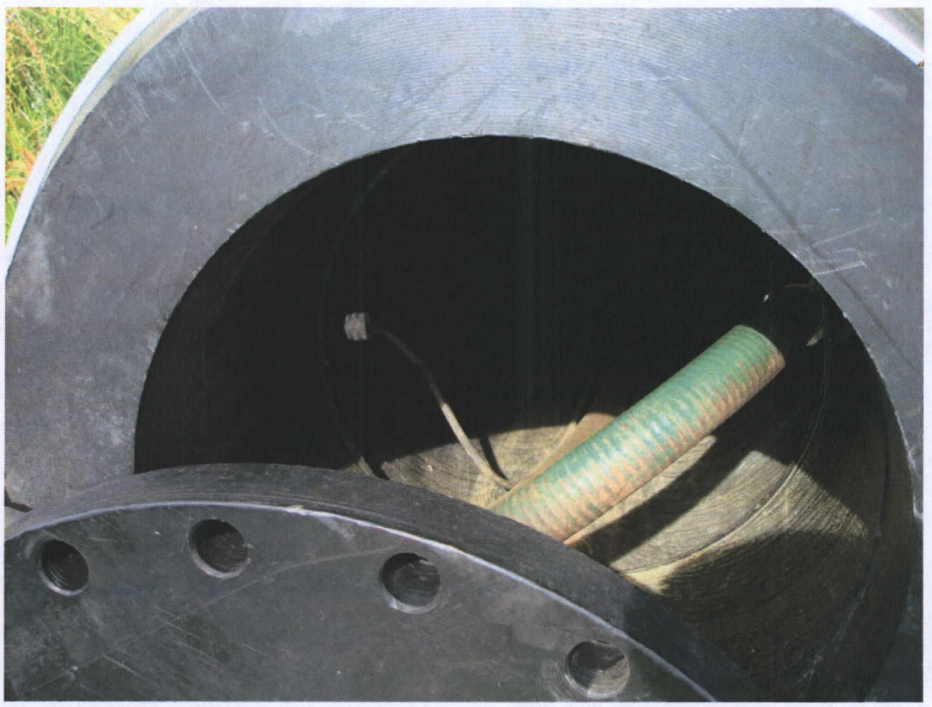
Photograph No. 25 Site: Vertac Inc. Superfund Site
Description: Overview of Reasor-Hill landfill located south of the sedimentation vault
Date: June 4, 2013 Direction: South

Photograph No. 26 Site: Vertac Inc. Superfund Site
Description: Access road located west of the sedimentation vault and west of the interior fenceline
Date: June 4, 2013 Direction: North

Photograph No. 27 Site: Vertac Inc. Superfund Site
Description: Letdown channel on the south side of OU1 landfill; tree debris observed
Date: June 4, 2013 Direction: Southeast

Photograph No. 28 Site: Vertac Inc. Superfund Site
Description: View of sedimentation basin located on south side of OU1 landfill
Date: June 4, 2013 Direction: Southeast

Photograph No. 29 Site: Vertac Inc. Superfund Site
Description: Top view of OU1 landfill access pipes for leachate collection and detection system sumps
Date: June 4, 2013 Direction: East



Photograph No. 30 Site: Vertac Inc. Superfund Site
Description: Open access and view of internal components of leachate collection pipe
Date: June 4, 2013 Direction: NA

Photograph No. 31 Site: Vertac Inc. Superfund Site
Description: Hole located above the leachate system piping due to animal activity; holes filled during O&M activities once identified
Date: June 4, 2013 Direction: NA

Photograph No. 32 Site: Vertac Inc. Superfund Site
Description: Access road located at southwest corner of OU1 landfill
Date: June 4, 2013 Direction: South-southwest

Photograph No. 33 Site: Vertac Inc. Superfund Site
Description: Rocky Branch Creek outlet channel (Outfall 001) where stormwater samples are collected
Date: June 4, 2013 Direction: NA

Photograph No. 34 Site: Vertac Inc. Superfund Site
Description: View of manhole cover and access point
Date: June 4, 2013 Direction: NA

Photograph No. 35 Site: Vertac Inc. Superfund Site
Description: Overview of Former Central Processing Area; note Groundwater Recovery Building (GWRB) in the background (indicated by arrow)
Date: June 4, 2013 Direction: East

Photograph No. 36 Site: Vertac Inc. Superfund Site
Description: Overview of Former Central Processing Area to the southeast; note Wastewater Treatment Building in background (indicated by arrow)
Date: June 4, 2013 Direction: Southeast

Photograph No. 37 Site: Vertac Inc. Superfund Site
Description: Man gate located at northern side of the site; note Recycling Buildings in background (formally a storage shed used to store drums during construction activities)
Date: June 4, 2013 Direction: North

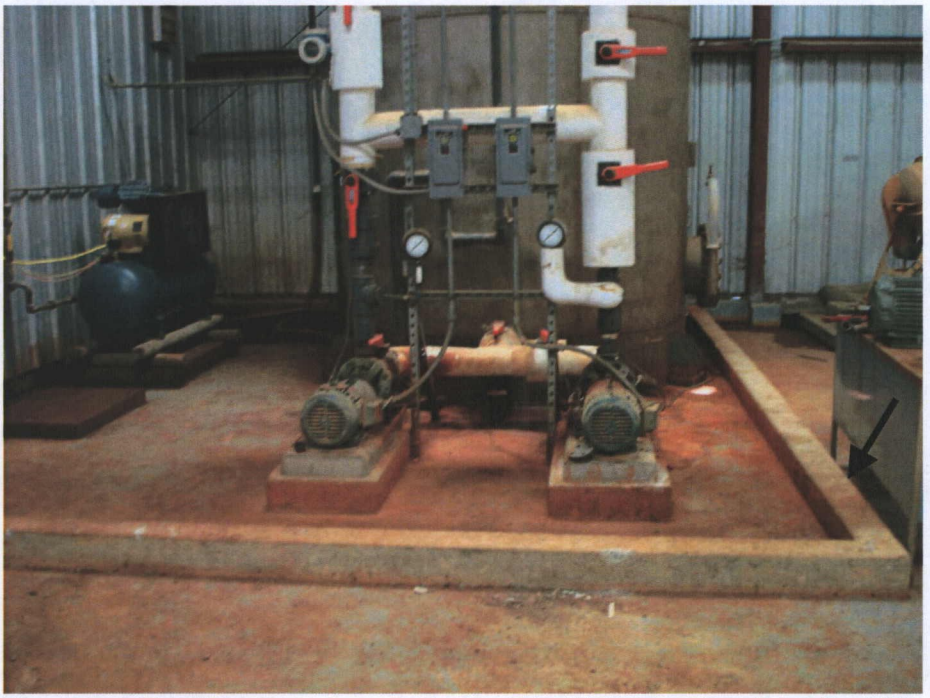
Photograph No. 38 Site: Vertac Inc. Superfund Site
Description: Overview of Former Central Processing Area to the northeast; note buildings used by the City of Jacksonville in background
Date: June 4, 2013 Direction: North

Photograph No. 39 Site: Vertac Inc. Superfund Site
Description: Extraction well, EX-4 located on the northeast portion of the site
Date: June 4, 2013 Direction: North

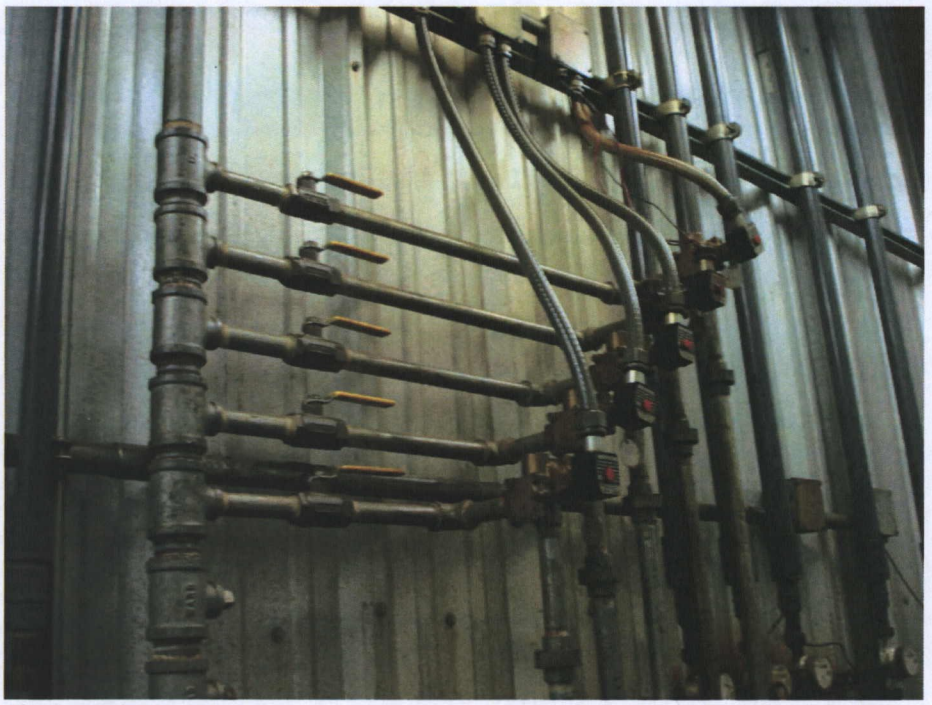
Photograph No. 40 Site: Vertac Inc. Superfund Site
Description: Overview of Former Central Processing Area to the northeast; note buildings used by the City of Jacksonville in background
Date: June 4, 2013 Direction: Northeast

Photograph No. 41 Site: Vertac Inc. Superfund Site
Description: View of GWRB located on the east side of Parcel 1 near extraction wells
Date: June 4, 2013 Direction: South

Photograph No. 42 Site: Vertac Inc. Superfund Site
Description: Holding tank located inside of the GWRB used to collect extracted groundwater which is then transferred to the WWTP for treatment
Date: June 4, 2013 Direction: NA



Photograph No. 43 Site: Vertac Inc. Superfund Site
Description: View of GWRB equipment such as piping, pumps, air compressor, all located within an area of secondary containment (arrow indicates concrete berm)
Date: June 4, 2013 Direction: NA



Photograph No. 44 Site: Vertac Inc. Superfund Site
Description: Ball valves controlling air to pneumatic pumps located in a small room of the GWRB near the equalization tank
Date: June 4, 2013 Direction: NA

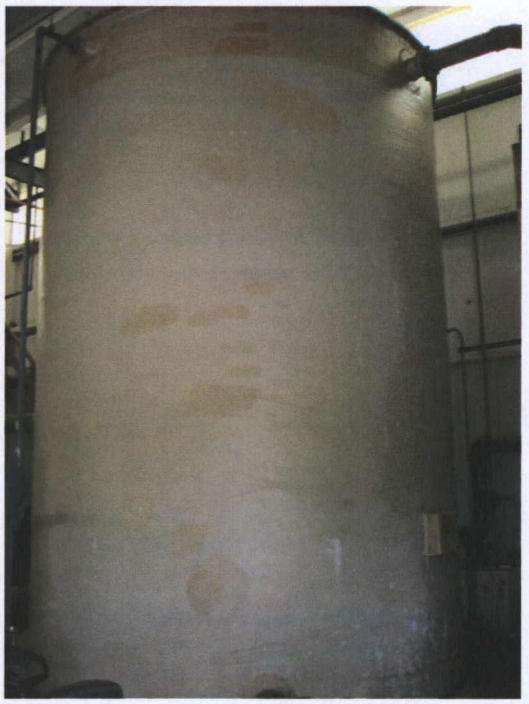
Photograph No. 45 Site: Vertac Inc. Superfund Site
Description: View of monitoring wells MW-88 located southwest of the GWRB
Date: June 4, 2013 Direction: Southwest

Photograph No. 46 Site: Vertac Inc. Superfund Site
Description: On-site access road located north of the Wastewater Treatment Plant
Date: June 4, 2013 Direction: West

Photograph No. 47 Site: Vertac Inc. Superfund Site
Description: Secured access gate located northeast of the GWRB (no longer in use)
Date: June 4, 2013 Direction: Northeast

Photograph No. 48 Site: Vertac Inc. Superfund Site
Description: View of equalization tanks (75,000 gallons each) outside of the WWTP holding water from the French drain and groundwater extraction system
Date: June 4, 2013 Direction: East

Photograph No. 49 Site: Vertac Inc. Superfund Site
Description: Three-vessel carbon adsorption system located within the WWTP building
Date: June 4, 2013 Direction: NA



Photograph No. 50 Site: Vertac Inc. Superfund Site
Description: Treated water tank, water exits through an overflow weir and is discharged through the top pipe
Date: June 4, 2013 Direction: NA

Photograph No. 51 Site: Vertac Inc. Superfund Site
Description: Elevated pH neutralization tank located in WWTP building
Date: June 4, 2013 Direction: NA

Photograph No. 52 Site: Vertac Inc. Superfund Site
Description: Drums of chemicals located beneath and connected to the pH neutralization tank
Date: June 4, 2013 Direction: NA

ATTACHMENT 5

INTERVIEW RECORDS

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site		**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas		**Date:**
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Annette Custer	**Title:** Engineer Supervisor	**Organization:** Arkansas Department of Environmental Quality
Telephone No.: 501 682-0841 **E-Mail Address:** Custer@adeq.state.ar.us	**Street Address:** 5301 Northshore Drive **City, State, Zip:** North Little Rock, Arkansas 72118	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?
The remedial action work has been satisfactory. The repairs to the sediment vault appear to have stabilized the slope. Groundwater monitoring did not occur according to the O&M plan during the entire 5 years. The reporting limits for the monthly discharge sampling should be evaluated to ensure current AP & EC Regulation No. 2 is being complied with.

2. From your perspective, what effect has continued remedial operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance? The continued remedial operations have had a positive effect on the community. I am unaware of any ongoing community concerns regarding O&M activity.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:**

Survey Questions (Continued)

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe the purpose and results.
   ADEQ conducts annual site visits with EPA. ADEQ reviews monthly discharge monitoring reports and annual groundwater reports.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, or anything that required emergency response from local authorities? If so, please provide details.
   ADEQ is not aware of any emergency response incidents at the site.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.
   There have been no complaints regarding Vertac.

6. Are you aware of any problems or difficulties encountered since the third five-year review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe any changes and impacts.
   Hercules and EPA have ended the order. ADEQ and Hercules have an order for the O+M at the site. A new IC is in place and a holding company owned by Hercules owns the site.

7. Have there been any changes in the wastewater treatment plant discharge limits?
   The limits have been lowered in Regulation No.2; lower method detection limits for the chemicals of concern should be obtained.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:**

Survey Questions (Continued)

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

There are no changes to the standards which would call into question the effectiveness of the remedies.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted? NO

10. Do you feel well-informed about the site's activities and progress?

Yes, ADEQ is well informed about site activities and progress.

11. Do you have any comments, suggestions, or recommendations regarding the site?

I have no comments.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site		**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas		**Date:** 18 June 2013
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Dianna Kilburn	**Title:** Geologist Supervisor	**Organization:** Arkansas Department of Environmental Quality
Telephone No.: 501-682-0844 **E-Mail Address:** kilburn@adeq.state.ar.us	**Street Address:** 5301 Northshore Dr. **City, State, Zip:** North Little Rock, AR 72118	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?

Fairly stable. Consistancy of monitoring and reporting needs to be improved.

2. From your perspective, what effect has continued remedial operations at the site had on the surrounding community? Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

No ongoing community concerns to my knowledge. Students from Arkansas universities make inquiries related to school projects.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:**

Survey Questions (Continued)

3. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe the purpose and results.

All routine or other communications related to the site come from EPA Region 6 or are a carbon copy of information sent from the PRP to the EPA Region 6 RPM.

4. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, or anything that required emergency response from local authorities? If so, please provide details.

5/2009 slope failure on sedimentation vault - repaired 12/2009 - Engineering aspect.

5. Have there been any complaints, violations, or other incidents related to the site that required a response by your office? If so, please summarize the events and result.

None known

6. Are you aware of any problems or difficulties encountered since the third five-year review which have impacted progress or resulted in a change in operations and maintenance procedures? Please describe any changes and impacts.

DMR - outfall 002 May - June 2009 exceedences for dioxin. Investigation ~~as~~ of cause not complete. Updating the reporting limits for several constituents should be part of this 5-year review.

7. Have there been any changes in the wastewater treatment plant discharge limits?

Correspondence between ADEQ and EPA to bring the water treatment plant discharge limits up to current compliance requirements are ongoing and expected to be resolved concurrently or soon after this 5-year review.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:**

Survey Questions (Continued)

8. Have there been any changes in state environmental standards since the previous five-year review period which may call into question the current protectiveness or effectiveness of the remedial action?

No, but the discharge limits have not been revised since 2007.

9. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted?

Further discussions are needed regarding the ground water monitoring plan. Opportunities for optimization will be a part of those discussions.

10. Do you feel well-informed about the site's activities and progress?

Annual reports and regularly scheduled sampling events should be the norm.

11. Do you have any comments, suggestions, or recommendations regarding the site?

Based on the current institutional Controls and the recent site visit, new or updated signage may be appropriate.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site		**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas		**Date:** June 5, 2013
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Shirley Louie	**Title:** Branch Chief	**Organization:** Arkansas Department of Health
Telephone No.: 501-661-2833 **E-Mail Address:** Shirley.louie@arkansas.gov	**Street Address:** 4815 West Markham Street, Slot–32 **City, State, Zip:** Little Rock, Arkansas 72205-3867	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?

   Going well. No adverse site conditions.

2. From your perspective, what effects have continuing remedial actions at the site had on the surrounding community?

   No contact with community. Quiet.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:** June 5, 2013

Survey Questions (Continued)

3. Are you aware of any ongoing community concerns regarding the remedial actions at the site?

   No.

4. Are you aware of community concerns regarding future use of the site?

   No, community may not be aware of any future use of the site.

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

   No.

6. Do you feel well-informed about the site's condition and status?

   Ms. Louie receives information if anything, such as an emergency action, happens at the site. All okay. More than adequate. Ms. Louie has been receiving discharge reports now since last five-year review.

7. Do you have any comments, suggestions, or recommendations regarding the site?

   Nothing.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440	
Location: Jacksonville, Pulaski County, Arkansas	**Date:** June 4, 2013	
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Phillip Carlisle	**Title:** Vice President	**Organization:** Concerned Citizens Coalition
Telephone No.: 501-985-4038 **E-Mail Address:** phillip.carlisle@invpro.com	**Street Address:** 2227 West Main Street, Suite 5 **City, State, Zip:** Jacksonville, Arkansas 72076	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?

   Everything better today than five years ago. Mr. Carlisle visits the site on a regular basis.

2. From your perspective, what effects have continuing remedial actions at the site had on the surrounding community?

   All better than five years ago. Fire tower and police firing range now on site.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:** June 4, 2013

Survey Questions (Continued)

3. Are you aware of any ongoing community concerns regarding the remedial actions at the site?

   No.

4. Are you aware of community concerns regarding future use of the site?

   No.

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

   No.

6. Do you feel well-informed about the site's condition and status?

   Yes.

7. Do you have any comments, suggestions, or recommendations regarding the site?

   No. All good.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440	
Location: Jacksonville, Pulaski County, Arkansas	**Date:** June 5, 2013	
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Gary Fletcher/ James Whisker, P.E.	**Title:** Mayor/ City Engineer	**Organization:** City of Jacksonville
Telephone No.: 501-982-3146 **E-Mail Address:** gfletcher@cityof jacksonville.net	**Street Address:** #1 Municipal Drive, P.O. Box 126 **City, State, Zip:** Jacksonville, Arkansas 72078	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?

   Looks great.

2. From your perspective, what effects have continuing remedial actions at the site had on the surrounding community?

   None.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY	
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440
Location: Jacksonville, Pulaski County, Arkansas	**Date:** June 5, 2013

Survey Questions (Continued)

3. Are you aware of any ongoing community concerns regarding the remedial actions at the site?

   No.

4. Are you aware of community concerns regarding future use of the site?

   No.

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

   No. None occurred that they are aware of.

6. Do you feel well-informed about the site's condition and status?

   Yes.

7. Do you have any comments, suggestions, or recommendations regarding the site?

   No. Doing great.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440	
Location: Jacksonville, Pulaski County, Arkansas	**Date:**	
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: Timothy Hassett	**Title: Remediation Project Manager**	**Organization:** Hercules Incorporated
Telephone No.: 302-995-3456 **E-Mail Address:** tdhassett@ashland.com	**Street Address: 500 Hercules Road** **City, State, Zip: Wilmington, DE 19808**	
Survey Questions		

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?
   The Terracon team is doing a very good job operating the site. The repair of the Sediment Vault went very well and we had funds left over to complete the rip/rap of all remaining faces of the Sediment Vault as a preventative measure. In addition, Hercules recently assumed ownership of the southern parcel, developed institutional controls in conjunction with EPA/ADEQ and signed and Operation and Maintenance agreement with ADEQ.

2. Please describe the reports available that document the remedy has been functioning as planned since the period covered by the third five-year review (i.e., since November 2008).
   Refer to Terracon Survey

Survey Questions (Continued)

3. Please describe the onsite operations and maintenance (O&M) staff and activities.
   Operations and maintenance is performed primarily by Terracon, Inc and activities include; 1) maintenance of capped areas, containment cell, sediment vault, 2) operation of french drain and groundwater extraction and groundwater treatment systems, and 3) discharge monitoring and reporting, and groundwater monitoring and reporting. Fish tissue monitoring and reporting is performed biennially by GBMc and Associates.

4. Please describe any changes in O&M requirements, maintenance schedules, or sampling routines since the period covered by the third five-year review (i.e., since November 2008).
   Refer to Terracon Survey

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?
   Refer to Terracon Survey

6. Please describe any difficulties encountered or unanticipated costs demonstrated since the period covered by the third five-year review (i.e., since November 2008).
   Refer to Terracon Survey

7.

8. Have there been opportunities to optimize O&M or sampling efforts? Please describe the changes, desired resultant cost savings, and improved efficiency.
   Refer to Terracon Survey

9. Please cite each O&M manual update submitted since the period covered by the third five-year review (i.e., since November 2008).
   Refer to Terracon Survey

10. Do you have any comments, suggestions, or recommendations regarding the site?
    Hercules would like to optimize the groundwater and discharge monitoring programs and have proposed several reductions in monitoring that do not compromise protection of human health and the environment. These have been agreed to by EPA and ADEQ on a year by year basis and we would like to have these become more permanent and modify the O&M manual accordingly.

SUPERFUND FIVE-YEAR REVIEW SITE SURVEY		
Site Name: Vertac Superfund Site	**EPA ID No.:** ARD000023440	
Location: Jacksonville, Pulaski County, Arkansas	**Date:** July 15, 2013	
Contact Made By:		
Name: Philip Allen	**Title:** Remedial Project Manager	**Organization:** U.S. EPA
Telephone No.: (214) 665-8516 **E-Mail:** allen.philip@epa.gov	**Street Address:** 1445 Ross Avenue, Suite 1200 **City, State, Zip:** Dallas, Texas 75202	
Name: April Ballweg	**Title:** Project Engineer	**Organization:** EA Engineering, Science, and Technology, Inc.
Telephone No.: (972) 459-5019 **E-Mail:** aballweg@eaest.com	**Street Address:** 405 S. Highway 121, Building C, Suite 100 **City, State, Zip:** Lewisville, Texas 75067	
Individual Contacted:		
Name: David Jaros	**Title:** Site Manager	**Organization:** Terracon
Telephone No.: 501.847-9292 **E-Mail Address:** dgjaros@terracon.com	**Street Address:** 25809 I-30 South **City, State, Zip:** Bryant, AR, 72022	

Survey Questions

The purpose of the five-year review is to evaluate the implementation and performance of the remedy, and to confirm that human health and the environment continue to be protected by the remedial actions that have been performed at the site. This interview is being conducted as a part of the fourth five-year review for the Vertac Superfund Site. The period covered by this five-year review is from the completion of the third five-year review in November 2008 to the current completion of this review.

1. What is your overall impression of the remedial action work conducted at the site since the period of the third five-year review (i.e., since November 2008)?

   In my opinion, the collection and treatment of impacted groundwater has been performed in accordance with OU-3. The remediation system has been well maintained and has operated in compliance with the requirements of the O&M Manual.

2. Please describe the reports available that document the remedy has been functioning as planned since the period covered by the third five-year review (i.e., since November 2008)?

   The following reports document that the remediation systems have functioned as planned:

   - Monthly Discharge Monitoring Reports
   - Annual Progress Reports
   - O&M Manual Inspection Forms

Survey Questions (Continued)

3. Please describe the onsite operations and maintenance (O&M) staff and activities.

The O&M staff consists of the following individuals:

- David Hopkins – Project Manager, Terracon
- David Jaros - Site Manager, Terracon
- Earl Pilgrim – Senior Technician, Terracon
- Jody Adams – Staff Environmental Scientist, Terracon

The onsite O&M staff performs the daily tasks associated with operating and maintaining the site in compliance with the Site-Wide Operations and Maintenance Manual.

4. Please describe any changes in O&M requirements, maintenance schedules, or sampling routines since the period covered by the third five-year review (i.e., since November 2008).

The ADEQ, EPA, and the facility agreed on a reduced list of parameters, reduced number of wells, and sampling frequency for the years 2010, 2011, and 2012. Beginning in 2010, the site began annual groundwater sampling as opposed to semiannual sampling from previous years. In 2011, the site performed annual sampling with a reduced parameter list and numbers of wells. In 2012 (the year before the Five Year Review) most of the wells and the full list of parameters were sampled during the annual sampling event.

The facility changed an internal sampling schedule associated with the influent and effluent water samples collected from the carbon beds. The facility collected influent and effluent samples to calculate the loading on the lead bed. Noting the pattern of carbon exchanges over a 10 years period, most of the sampling was discontinued.

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, trespassing, or emergency response from local authorities?

There was a grass fire on 12/31/2011 that the Jacksonville Fire Department responded to and extinguished. A report was made of the incident. In February of 2009, the Police Department was called due to trespassing at the facility. The trespassers cut a fence that was then repaired. The Police filed a report of the incident.

6. Please describe any difficulties encountered or unanticipated costs demonstrated since the period covered by the third five-year review (i.e., since November 2008).

In May of 2009, a slope failure occurred on the north slope of the Sedimentation Vault. As a result of the slope failure and attempts to repair it, the facility placed rip-rap on the north and south face to prevent any further slope failures.

7. Have there been opportunities to optimize O&M or sampling efforts? Please describe the changes, desired resultant cost savings, and improved efficiency.

The ADEQ, EPA, and the facility agreed on a reduced list of parameters, reduced number of wells, and sampling frequency for the years 2010, 2011, and 2012. The cost savings was approximately $30,000.00 per year.

The internal sampling schedule associated with the influent and effluent carbon samples was greatly reduced. This had an approximately $30,000 per year analytical cost saving over the previous sampling schedule.

8. Please cite each O&M manual update submitted since the period covered by the third five-year review (i.e., since November 2008).The O&M manual was last officially updated in August 2009.

9. Do you have any comments, suggestions, or recommendations regarding the site? I feel the site is well managed and operated in compliance with the O&M Manual.

ATTACHMENT 6

COURT DOCUMENTS – CASE 4:80-CV-00109-DPM

IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF ARKANSAS
WESTERN DIVISION

UNITED STATES OF AMERICA PLAINTIFF

vs. CASE NO. 4:80-CV-00109-DPM

VERTAC CHEMICAL CORPORATION
and HERCULES INCORPORATED DEFENDANTS

NOTICE OF FILING EXECUTED DOCUMENTS

Pursuant to the Court's Order of May 8, 2013, Hercules, Incorporated hereby submits herewith the following documents in signed and final form:

1. The Settlement Agreement among Hercules Incorporated, East Bay Realty, Vertac Chemical Corporation, the State of Arkansas, its Commissioner of State Lands, and its Department of Environmental Quality (together with its Exhibit A, a Declaration of Restrictive Covenants applicable to the Vertac property) in the form previously approved by the Court;
2. Two Quitclaim Deeds effecting the real property transfers in the Settlement Agreement, as recorded with the Pulaski County Clerk.

Hercules wishes to express its gratitude for the Court's guidance and patience in the process culminating in the Settlement Agreement.

Hercules Incorporated respectfully submits that this case is now ready to be closed.

Respectfully submitted,

WRIGHT, LINDSEY & JENNINGS LLP
200 West Capitol Avenue, Suite 2300
Little Rock, AR 72201
(501) 371-0808
FAX: (501) 376-9442
EMAIL: nnorton@wlj.com

By */s/ N.M. Norton*
N.M. Norton (74114)
J. Mark Davis (79276)
Attorneys for Hercules Incorporated

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document has been sent to all parties by ECF/Electronic mail this 24th day of May, 2013

/s/ N.M. Norton
N.M. Norton

IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF ARKANSAS
WESTERN DIVISION

UNITED STATES OF AMERICA
PLAINTIFF

VS. NO. 4:80-109-DPM

VERTAC CHEMICAL CORPORATION

AND HERCULES INCORPORATED
DEFENDANTS

SETTLEMENT AGREEMENT

This Settlement Agreement (hereinafter "Settlement Agreement") shall resolve any and all outstanding disputes raised in connection with the instant action and, in connection therewith, establish remedial requirements and financial obligations of Hercules Incorporated, its successors and assigns (hereinafter "Hercules") associated with the Vertac Chemical Corporation Site located at Marshall Road, Jacksonville, Arkansas and consisting of approximately 93 acres of land (hereinafter the "Site"). This Settlement Agreement is entered into by and among Hercules, East Bay Realty Services, Inc. (a wholly owned subsidiary of Hercules), Lee Thalheimer, Receiver for the Vertac Chemical Corporation (the "Receiver") on behalf of Vertac Chemical Corporation ("Vertac"), and the State of Arkansas on behalf of the Arkansas Commissioner of State Lands and the Arkansas Department of Environmental Quality (hereinafter "ADEQ") to resolve the disputes between them in this action.

RECITALS

1. The Site is located at 1600 Marshall Road, Jacksonville, Pulaski County, Arkansas 72076. The legal description of the Site is attached as Exhibit 1 to the Declaration of Restrictive Covenants attached hereto as Exhibit A.
2. Hercules owned the Site from December 1961 until July 1976, when it sold the Site to Transvaal, a predecessor in interest to Vertac. (The other portions of a larger parcel were subsequently transferred by the State of Arkansas to the City of Jacksonville after the larger parcel's taxes became delinquent).
3. Vertac operated a phenoxy herbicide manufacturing facility on the Site.
4. On March 4, 1980, United States of America, on behalf of the United States Environmental Protection Agency ("EPA) filed the action entitled United States of America v. Vertac Chemical Corporation, et al, C.A. No. LR-C-80-109 and the State of Arkansas, on behalf of the Arkansas Department of Pollution Control and Ecology (now the Arkansas Department of Environmental Quality, also known as "ADEQ") brought the

action entitled Arkansas Department of Pollution Control and Ecology v. Vertac Chemical Corporation, et al., C.A. No. LR-C-80-110. These actions named as defendants Vertac and Hercules. The actions alleged violations of various legal obligations, including those under the Resource Conservation and Recovery Act (RCRA), 42 USC Sections 6901, et seq.

5. These actions were consolidated and are known by the caption of the matter referenced above.
6. On January 18, 1982, the Court entered a Consent Decree in the actions among USEPA, ADEQ and Vertac (the "1982 Consent Decree"), which required, inter alia, that Vertac follow certain practices in its operations relating to generation, storage, transfer, treatment and disposal of chemical wastes and wastewaters generated from its (then) ongoing operations, study various onsite and offsite areas for potential remediation, propose remedial work and, upon approval, implement the approved work.
7. The 1982 Consent Decree also required Vertac to provide financial assurance to provide for the continuation and maintenance of effectiveness of all monitoring and remedial actions taken or to be taken pursuant to the Consent Decree or decrees of the Court for the term of the Consent Decree. The 1982 Consent Decree was to continue in force for 30 years from the date that Vertac ceased manufacturing operations on the Site.
8. Hercules did not assume any obligations under the 1982 Consent Decree at the time it was entered.
9. On July 18, 1984, the Court entered an Order requiring Vertac to implement the terms of proposed remedial activity, as proposed by ADEQ. Vertac and Hercules entered into a side agreement with the ADEQ that supplemented the 1982 Consent Decree, thereby providing assurance to ADEQ that the remedial action plan contemplated in the 1982 Settlement Agreement would be implemented (the "1984 Agreement").
10. The 1984 Agreement acknowledged that the parties thereto had agreed upon a remedial action plan to address the subsurface waters at the Site and the subsurface wastes on the Site.
11. In the 1984 Agreement, Hercules agreed to guarantee Vertac's performance with respect to the subsurface wastes and provide financial assurance capped at $100,000 for work relative to the groundwater and subsurface wastes, and capped at $200,000 for the other obligations it guaranteed under such agreement. Hercules also agreed that, if Vertac defaulted on its obligations under the 1984 Agreement, Hercules would perform the remedy for a period of thirty (30) years after the date of closure of the Jacksonville plant as an active manufacturing facility. The parties agreed that the Court would have continuing jurisdiction to resolve any disputes.
12. Vertac shut down its manufacturing operations on the Site in May 1986, and thus the termination date of the 1982 Consent Decree and the 1984 Agreement became May

2016. Vertac subsequently defaulted on its obligations under the 1982 Consent Decree, which Hercules assumed to the extent required under the 1984 Agreement.

13. On September 18, 1987, the Court appointed Lee Thalheimer as Receiver for Vertac. The Court has reappointed Mr. Thalheimer on several occasions.
14. In 1992, EPA brought a separate action under CERCLA against Hercules and other parties seeking recovery of its response costs. That action (Civil Action No. LR-C-92-1370) was later consolidated with the present action.
15. The Court has adjudicated Hercules' and other parties' rights and responsibilities with respect to costs of response related to the Site under CERCLA, and, in so doing, has held Hercules responsible for substantially all the cost of response relating to the Site. Hercules has paid and satisfied the judgment amounts to EPA. The Declaratory Judgment entered by the Court also addressed EPA's future costs, such as those arising in connection with regular 5-year reviews of the CERCLA remedies.
16. In addition, Hercules has conducted extensive remediation at the Site and offsite areas under the supervision of EPA and ADEQ. All work and obligations under the various agreements and orders binding Hercules have been completed, with the exception of ongoing Operations and Maintenance on the Site, pursuant to the current Operations and Management Plan ("O&M Plan").
17. Following demolition of the manufacturing facilities and implementation of the remedial actions, the 93-acre Site contains three landfills and other waste disposal areas, as well as lands that have been remediated or that did not require remediation. There are currently two structures on the Site.
18. One structure on the Site is currently used for operation of the groundwater treatment system (a French drain system and groundwater extraction wells generate the water treated in the system). The other structure is a warehouse currently being used for groundwater flow equalization, storage of equipment and supplies used in maintenance of the Site.
19. Hercules was acquired by Ashland Inc. ("Ashland") on November 13, 2008 and is currently a wholly owned subsidiary of Ashland.
20. The ongoing activities/obligations consist primarily of conducting maintenance activities on the Site, operating the French drain system, operating the groundwater extraction system, operating the groundwater treatment system, conducting ongoing monitoring activities as specified in the O&M Plan, and maintaining financial assurance for such activities as provided in the 1984 Agreement.
21. The ADEQ and Hercules wish to resolve their disputes in connection with the underlying action and terminate the 1984 Agreement and substitute therefor this Settlement Agreement as the source of site specific requirements applicable to the Site on an ongoing basis.

22. The Receiver desires to conclude the Vertac receivership, resolve Vertac's obligations, to the extent possible, and transfer the Site to a subsidiary of Hercules for ongoing care.
23. The State of Arkansas, on behalf of the Arkansas Commissioner of State Lands, acknowledges the satisfaction of all delinquent taxes for the parcel through a separate settlement with the Receiver and hereby releases the Site from all claims, liens and encumbrances it may have relating to or arising from the non-payment of real estate taxes by the Receiver prior to the effective date of the Settlement Agreement (the "Delinquent Tax Claim") and releases the Receiver and East Bay from the Delinquent Tax Claim.
24. Hercules has agreed that its subsidiary, East Bay Realty Services, Inc. ("East Bay"), will take title to the Site, subject to the restrictive covenants that require compliance with institutional controls, which have been agreed to by EPA, ADEQ, the Receiver and Hercules. As provided below, East Bay may also carry out obligations of Hercules to the extent Hercules assigns them.
25. The parties hereto wish to resolve the remaining issues relating to this action without further litigation, and acknowledge that this Settlement Agreement is a compromise of disputed claims and that their entry into it shall not be deemed an admission of fact or liability by any party hereto in any subsequent proceeding.

AGREEMENT

The issues herein as they pertain to the Site, having been studied, evaluated and agreed upon by the Hercules, the Receiver, Arkansas Office of the Land Commissioner, and ADEQ, it is hereby agreed and stipulated as follows:

1. The Receiver shall place on the Site restrictive covenants in the form attached as Exhibit A.
2. The Receiver shall convey the Site to East Bay, subject to the restrictive covenants.
3. Hercules and East Bay shall comply with the deed restrictions placed upon the Site by the Receiver.
4. Hercules shall implement the O&M Plan, as it may be amended from time to time, as provided below.
5. This Agreement is intended by ADEQ to be an enforceable document as defined in Arkansas Pollution Control and Ecology Commission Regulation 23 (Reg 23), at section 270.1(c)(7), and, as such, the Director of ADEQ establishes in this Settlement Agreement alternative requirements for post closure care pursuant to Reg 23, section 265.110(c), and finds that it is not necessary to apply the closure requirements of Subsection G of Reg 23 because the alternative requirements will protect human health and the environment and will satisfy the closure performance standard of section 265.121(a) and (b). In addition, nothing in this Agreement limits the ability of Hercules to request or

the authority of the Director of ADEQ to determine whether or not to establish alternative requirements for financial assurance pursuant to Reg 23, section 264.140(d).

6. Hercules shall provide financial assurance as determined by the Director of ADEQ in a manner consistent with the requirements of Reg 23, Subpart H relating to post closure care (See sections 264.140 and 264.151). The amount of Financial assurance required shall be a 30 year rolling average set on the net present value of the estimated cost of the work for a third party to implement the O&M Plan for the period of 30 years. . The financial assurance mechanism and the amount of financial assurance shall be evaluated periodically as appropriate (such as when modifications to the O&M Plan are approved or at the time of the EPA 5 year review). If Hercules fails to implement the O&M Plan (including any and all modifications approved by ADEQ at that time) then ADEQ shall have the right to call the financial assurance and contract with a third party to continue required activities under the O&M Plan.
7. ADEQ reserves the right to modify the O&M Plan or this Settlement Agreement (only as is relates to future actions thereunder) as it deems necessary to ensure the operation and maintenance of the Site remains protective of human health and the environment. Prior to the effective date of such modification, ADEQ will notify Hercules of the modification in writing and will give Hercules reasonable opportunity to provide comments on it.
8. Hercules may request a modification of the O&M Plan or this Settlement Agreement (only as it relates to future actions thereunder) by submitting a written request to modify the O&M Plan to the Hazardous Waste Chief of ADEQ. The written request shall state the proposed modifications, the justifications for the proposed modification, and any other documents or information Hercules may choose to provide as justification for the proposed modifications. ADEQ shall issue an approval or denial of the modification request in writing.
9. Hercules shall take all necessary steps as provided herein, to prevent aggravating or contributing to the contamination of the air, land or water, including downward migration of contamination, from any existing source on the Site. The term existing source shall mean contamination contained in any of the onsite landfills or disposal areas identified in assessments or reports submitted by the Hercules to ADEQ.
10. Hercules shall not use or redevelop the Site in a manner that conflicts with the O&M Plan, results in a violation of the deed restriction agreed to by the parties, or differs from the procedures and requirements established in this Settlement Agreement.
11. The State of Arkansas releases Hercules, and its subsidiary, East Bay, and the Receiver for all claims asserted or that could be asserted in connection with this action and the Delinquent Tax Claim, and Hercules and the Receiver (on behalf of Vertac) release each other for all claims asserted or that could be asserted in connection with the instant

action or the activities conducted on the Site prior to the effective date of this Settlement Agreement not specifically reserved by the respective parties herein.

12. Nothing in this Settlement Agreement shall be construed as a waiver of liability for future contamination of the Site by Hercules, prior or subsequent owners, or third parties. Nor shall this Settlement Agreement waive any rights of the State of Arkansas under federal or state environmental laws except as specifically released herein.
13. The Parties have satisfied in all material respects all of their obligations under the Court's 1982 Order, the 1984 Agreement and the other administrative and judicial orders relating to the Site, except for those ongoing obligations reflected in this Settlement Agreement and the referenced O&M Plan. All additional claims and requests for relief sought from Vertac and/or Hercules in these proceedings shall be deemed satisfied and merged into the terms of this Settlement Agreement, except to the extent the parties have expressly reserved their claims, requests for relief or rights herein.
14. The term of this Settlement Agreement shall be from the effective date until the time ADEQ determines that the contamination at the site is remediated to a point that there is no longer any actual or potential threat to human health and the environment. Assessment of the site to determine if continuation of the Settlement Agreement is appropriate will be completed at the 5 year review that is due in 2018 and every 5 year review held thereafter. Hercules will be permitted to request termination of this Settlement Agreement at any time upon the basis that the additional requirements of this Settlement Agreement are not required and that the institutional controls alone will be protective of human health and the environment. Hercules' request will be submitted to ADEQ in writing. Hercules' written request will include the basis for the request and the information needed to support the basis of the request. ADEQ may accept or reject Hercules' request as a whole or in part. ADEQ will provide, in a timely manner, its decision in writing and will include the basis for its determination.
15. Access to Property. Hercules and its subsidiary, East Bay, shall provide access to the Site, and/or make reasonable efforts to obtain access to the off-site areas to which access is necessary to implement this Settlement Agreement and the O&M Plan. Hercules shall provide access to all records and documentation related to the conditions at the Site and the actions conducted pursuant to this Settlement Agreement. Such access shall be provided to ADEQ and its employees, contractors, agents, consultants, designees, and representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct actions which ADEQ determines to be necessary, in a manner consistent with the approved site Health and Safety Plan. Where action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than East Bay, Hercules shall use its best efforts to obtain all necessary access agreements within a reasonable period following

the determination of a need for such access. Hercules shall immediately notify ADEQ if after using its best efforts, it is unable to obtain such agreements. Hercules shall describe in writing its efforts to obtain access. ADEQ may then assist Hercules in gaining access, to the extent necessary to effectuate the response actions described herein, using such means as they deem appropriate.

16. Compliance With Other Laws. Hercules shall perform all actions required pursuant to this Settlement Agreement in accordance with all applicable local; state; and federal laws and regulations, except as provided in CERCLA section 121(e) and 40 C.F.R. Section 300.415(l). In accordance with 40 C.F.R. section 300.415(l), all on-site actions required pursuant to this Settlement Agreement shall, to the extent practicable, as determined by ADEQ, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) under federal environmental or state environmental or facility sitting laws.
17. Emergency Response and Notification of Releases. If any incident, or change in site conditions, during the actions conducted pursuant to this Settlement Agreement causes or threatens to cause an additional release of hazardous substances from the Site or an endangerment to the public health, welfare, or the environment, Hercules shall immediately take all appropriate action. Hercules shall take any and all actions in accordance with all applicable local, state, and federal regulations and statutes in order to prevent, abate, or minimize such release or endangerment caused or threatened by the release. Hercules shall also immediately notify the Hazardous Waste Chief of ADEQ and the National Response Center at telephone number (800) 424-8802 (or at such other numbers as may replace this number). This provision of the Settlement Agreement does not prohibit ADEQ from issuing an emergency order to Hercules or East Bay under the authority of Arkansas Water and Air Pollution Control Act, Arkansas Hazardous Waste Management Act, and the Remedial Action Trust Fund Act as well as the regulations promulgated under the authority of the respective acts referenced.
18. In addition, in the event of any release of a hazardous substance from the Site above a reportable quantity, Hercules shall immediately notify the Hazardous Waste Chief of ADEQ and the National Response Center at telephone number (800) 424-8802. Hercules shall submit a written report to ADEQ within (seven (7)) days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release.
19. Dispute Resolution. The parties to this Settlement Agreement shall attempt to resolve, expeditiously and informally, any disagreements concerning this Settlement Agreement. If Hercules object(s) to any action taken by ADEQ pursuant to this Settlement Agreement, including billings for future response costs, the Hercules shall notify ADEQ in writing of its objection(s) within 30 days of such action, unless the objection(s) has/have

been informally resolved. If after 30 days, the parties have not resolved the dispute informally, any Party may, within 45 days after the expiration or termination by written notice of the informal resolution period, file a petition with the Court, setting forth the proposal in dispute. The opposing Party will have the opportunity to file a response to the initial petition. In the event of a dispute between Hercules and ADEQ, Hercules shall have the burden of showing that its proposal is appropriate to fulfill the terms, conditions, requirements and goals of this Settlement Agreement.

20. Reservation Of Rights. Except as specifically provided in this Settlement Agreement, nothing herein shall limit the power and authority of ADEQ to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent ADEQ from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring the Hercules in the future to perform additional activities pursuant to CERCLA or any other applicable state or federal law or regulation. ADEQ reserve the right to bring an action against Hercules under section 107 of CERCLA, 42 U.S.C. Section 9607 and the Remedial Action Trust Fund Act codified at Ark. Code Ann. § 8-7-501 *et seq.*, for recovery of any response costs incurred by ADEQ related to this Settlement Agreement or the Site and not reimbursed by Hercules. The parties agree that any legal action to enforce the terms of this Settlement Agreement shall be brought in this Court and do hereby waive any objection to jurisdiction or venue.
21. Other Claims. By issuance of this Settlement Agreement, the State of Arkansas assumes no liability for injuries or damages to persons or property resulting from any acts or omissions of Hercules or East Bay. The ADEQ shall not be deemed a party to any contract entered into by Hercules, East Bay or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.
22. Except as expressly provided in herein, nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Hercules, East Bay or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the ADEQ for costs, damages, and interest under sections 106(a) and 107(a) of CERCLA, 42 U.S.C. Sections 9606(a) and 9607(a).
23. No action or decision by ADEQ pursuant to this Settlement Agreement shall give rise to any right to judicial review except as provided herein.
24. Covenant Not To Sue. Except as otherwise specifically provided in this Settlement Agreement, upon this Settlement Agreement becoming effective, ADEQ covenants not

to sue Hercules or East Bay for judicial imposition of damages or civil penalties or to take administrative action against Hercules or East Bay for any failure to perform actions agreed to in this Settlement Agreement except as otherwise reserved herein.

25. Except as otherwise specifically provided in this Settlement Agreement, in consideration of and upon Hercules' and/or East Bay's performance of its/their obligations under this Settlement Agreement, ADEQ covenants not to sue or to take administrative action against Hercules and East Bay under section 107(a) of CERCLA for recovery of past and future response costs incurred by the ADEQ in connection with this Settlement Agreement. These covenants not to sue are conditioned upon the complete and satisfactory performance by Hercules and/or East Bay of its/their obligations under this Settlement Agreement. These covenants not to sue Hercules and East Bay do not extend to any other person.
26. Additional Removal Action. If ADEQ determines that additional removal actions or remedial actions are necessary to protect public health, welfare, or the environment, if any new data or compilation of historical data establishes that the removal actions and remedial actions on the Site implemented prior to the effective date of the Settlement Agreement are not effective, ADEQ will notify Hercules of that determination in writing and will require Hercules to submit a Sampling and Analysis Plan (hereinafter "SAP") if necessary and a Work Plan for the additional removal and remedial actions. ADEQ will submit approval or denial of the proposed SAP or Work plan to Hercules in writing. Should ADEQ deny the proposed SAP or Work Plan it will provide the reasons for the denial. Upon ADEQ's approval of the SAP or Work plan, Hercules shall implement the plan for additional removal or remedial actions in accordance with the provisions and schedule contained therein.
27. Reimbursement of ADEQ costs. Periodically, the ADEQ may seek reimbursement of its oversight costs from Hercules in connection with its oversight of work at the Site. Such request shall be made in writing and shall include as back up appropriate documentation that demonstrate that the costs are recoverable under state and federal laws and regulations and that the amount sought accurately reflects ADEQ's costs of oversight. The amount sought shall be determined by multiplying the total amount of recoverable costs for the period in question by 98% (Hercules' share of responsibility pursuant to the Court's judgment in this case). If Hercules has questions about or objections to the request, it shall submit its questions or objections to ADEQ within 30 days after receipt of ADEQ's request for payment. Hercules shall pay the undisputed amount of any request within 60 days of the date of the ADEQ's request. If after 30 days the parties are unable to resolve the issues through informal discussions, the matter will be submitted to Dispute Resolution as provided in paragraph 18 of this Agreement.
28. Nothing in this Settlement Agreement is intended to be, or shall be construed as, a release or covenant not to sue for any claim or cause of action, administrative or

judicial, civil or criminal, past or future, in law or equity, that ADEQ may have against Hercules for any matter not expressly included in this Settlement Agreement or against any person, firm, or corporation, PRP, or other entity not a signatory of this Settlement Agreement.

29. Hercules may assign any of its responsibilities under this Settlement Agreement to East Bay, which shall be effective upon notice to ADEQ. However, in the event East Bay fails adequately to perform any assigned responsibilities, after ADEQ has made reasonable attempts to get East Bay to perform, upon notice, Hercules shall be obligated to perform such responsibilities in its place.
30. Parties agree that the United States District Court for the Eastern District of Arkansas retains jurisdiction of over this matter to resolve disputes under this Settlement Agreement or enforce the terms of the Settlement Agreement. However, the parties agree that if this Settlement Agreement is approved by the Court, the case file may be closed, if the Court deems such action to be appropriate. Should the Court deem it appropriate to close the case file the parties will retain the authority to petition the Court to reopen the case to enforce the Settlement Agreement or hear a dispute under this Settlement Agreement.
31. This Settlement Agreement shall be effective when approved by the Court and at that date shall be final and enforceable.
32. ADEQ, Hercules and East Bay, may amend this agreement as it relates to the obligations of Hercules and East Bay, processes and procedures hereunder and the rights and responsibilities between and among them by executing a written amendment, which shall be effective when signed by the authorized representatives of ADEQ, Hercules and East Bay; such amendments shall not require the approval of the Receiver or other representative of Vertac or by representatives of any other agency of the State of Arkansas.
33. This Settlement Agreement is signed by the authorized representatives of the Parties hereto.

Dated this 10th day of May, 2013.

HERCULES INCORPORATED

By: Eric N. Boni
Title: Vice President

Date: May 10, 2013

EAST BAY REALTY SERVICES, INC.

By: Eric N. Boni

Title: President
Date: May 10, 2013

VERTAC CHEMICAL CORPORATION

By: Lee Thalheimer

Title: Receiver
Date: May 19, 2013

STATE OF ARKANSAS
DEPARTMENT OF ENVIRONMENTAL QUALITY
COMMISSIONER OF STATE LANDS

By: KENDRA AKIN JONES
Title: Assistant Attorney General
On Behalf of the Arkansas Department of
Environmental Quality and
Arkansas Commissioner of State Lands
323 Center Street, Ste. 400
Little Rock, AR 72201
(501) 682-7383

Date: May 14, 2013

2013038627 Received: 5/23/2013 2:14:02 PM
Recorded: 05/23/2013 02:16:49 PM Filed &
Recorded in Official Records of Larry Crane,
PULASKI COUNTY CIRCUIT/COUNTY CLERK
Fees $75.00

DECLARATION OF RESTRICTIVE COVENANTS

THIS DECLARATION OF RESTRICTIVE COVENANTS (this "Agreement") is made as of May 19, 2013, by and between Lee S. Thalheimer, Receiver for Vertac Chemical Corporation ("Grantor"), and East Bay Realty Services, Inc., a Delaware corporation ("Grantee") for the purposes set forth herein.

RECITALS

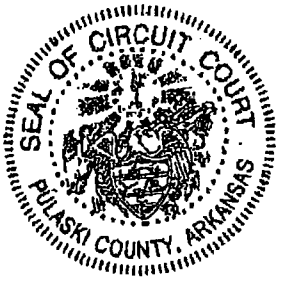
WHEREAS, Grantor is party to that certain Settlement Agreement, dated May 10, 2013, by and between Hercules Incorporated, Grantor and the State of Arkansas on behalf of the Arkansas Department of Environmental Quality ("ADEQ") to resolve any disputes between them in the action styled *United States of America v. Vertac Chemical Corporation and Hercules Incorporated,* Case No. 4:80-109-DPM, United States District Court for the Eastern District of Arkansas, Western Division (the "Settlement Agreement");

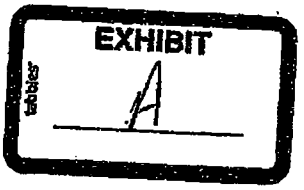
WHEREAS, Grantor, pursuant to the Settlement Agreement, has agreed to convey certain real property located in Jacksonville, Pulaski County, Arkansas more particularly described in Exhibit "1" attached to and made a part of this Agreement (the "Property") to Grantee subject to the restrictions upon future use of the Property as provided for in this Agreement;

WHEREAS, Grantee has agreed to accept conveyance of the Property by Grantor with the restrictions upon future use and further acknowledges that such restrictions will materially impair Grantee's future use of the Property or otherwise materially reduce the value of the Property for Grantee's intended purposes;

NOW, THEREFORE, in consideration of the promises and covenants hereinafter set forth, and of other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantor and Grantee hereby agree as follows:

Section 1. Restrictions. The Property conveyed contemporaneously herewith by Quitclaim Deed, dated May 19, 2013, and recorded in the real property records of Pulaski County, Arkansas, pursuant to the Settlement Agreement, (the "Deed"), is conveyed subject to the imposition of certain restrictions and limitations on use described hereinafter as the "Institutional Controls" which shall be applicable to Zone 1 and Zone 2 of the Property depicted in the plat map included in Exhibit "1" hereto and made a part hereof, as follows:





1.1: All that part of the Property contained within Zone 1 as depicted in Exhibit "1" shall be subject to the following Institutional Controls:

1.1.1 Industrial / commercial development only shall be permitted, provided however, such uses that include residential components or extended exposure to soils, such as nursing homes, day care, playgrounds, church grounds, etc. shall be excluded, unless such uses have been approved in writing by the EPA and ADEQ.

1.1.2 No groundwater usage or contact unless required by the Operations and Maintenance Plan ("O&M Plan") or for remediation.

1.1.3 No drilling or mining unless required by the O&M Plan or for remediation.

1.1.4 Soil excavation not permitted, unless conducted under a work plan that has been approved by the United States Environmental Protection Agency ("EPA") and ADEQ as meeting appropriate risk standards for the intended use and/or activities in that area (or as required by the implementation of the O&M Plan or for remediation).

1.1.5 Backfill Requirements– Only Resource Conservation and Recovery Act ("RCRA") non-hazardous soils should be brought on to the Site. Additionally, these soils shall be tested for contamination prior to being placed on site.

1.1.6 Unrestricted access for EPA and ADEQ employees, contractors, or agents to any monitoring wells, piezometers, streams, or any other media required to implement the O&M Plan for the Site.

1.1.7 No surface water usage including fishing unless approved by ADEQ and EPA.

1.1.8 No interference with the implemented remedy and compliance with the O&M Plan approved for the Site by EPA and ADEQ.

1.2: All that part of the Property contained within Zone 2 as depicted in Exhibit "1" shall be subject to the following Institutional Controls:

1.2.1 All controls for Zone 1 except 1.1.4.

1.2.2 No excavation unless required by the implementation of the O&M Plan or for EPA and ADEQ approved remediation.

1.3: The following Engineering Controls shall apply to Zone 1 and Zone 2:

1.3.1 The Property (Zones 1 and 2) will be fenced to prevent uncontrolled access. To the extent the fenced area is subdivided or a portion thereof leased, the subdivided or leased area will be fenced to restrict access to remaining portions of the Property by the new owner/occupier of the subdivided parcel.

1.3.2 Any portion of the areas not in development should maintain a vegetative cover (or other cover required by the remedy or O&M Plan) to prevent excess run off.

1.3.3 Any portion of the areas in development will need to comply with the applicable requirements for stormwater run off control.

1.4: The following Informational Devices shall be applicable to the Property:

1.4.1 Information advising that residual contamination could potentially be in the soil and groundwater shall be placed as a legend in any subsequent deed or other conveyance of the Property. Similar notice shall be included in any leases, licenses or other documents giving access or use of the all or a portion of Zone 1. Notices shall provide area specific information to the extent practicable.

1.4.2 Information advising of the location of source areas/onsite disposal areas and that residual contamination could potentially be in the soil and groundwater shall be placed as a legend in any subsequent deed or other conveyance of the Property. Similar notice shall be included in any leases, licenses or other documents giving access or use of the all or a portion of Zone 2.

1.5 Submittals. Any notice, demand, request, consent, approval, or communication relating to these covenants, including requests for exceptions from these covenants and submittal of work plans, shall be served personally or sent by first class mail, postage prepaid, or by overnight courier service, addressed as follows:

To U.S. Environmental Protection Agency:

Vertac Superfund Site Remedial Project Manager
Texas/Arkansas Branch, Superfund Division (6SP-RA)
U.S. Environmental Protection Agency Region 6
1445 Ross Ave., Suite 1200
Dallas, TX 75202

To Arkansas Department of Environmental Quality:

Chief of Hazardous Waste Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

1.5.2 Where EPA or ADEQ approval is required for any construction, excavation, redevelopment or other activity at the property, EPA or ADEQ will respond to a request for approval within ninety days after receipt of a written proposal or work plan from the requestor.

The restrictions upon use set forth in this Section 1 shall be a covenant which shall run with the land, shall be an equitable servitude on the Property, and shall be binding upon all successors, assigns, heirs and future transferees of the Property from Grantee or its successors and assigns. All parties claiming by, through or under Grantor shall be deemed to covenant with the owner of the Property hereby restricted, and its successors and assigns, to conform to and observe these covenants and restrictions. Pursuant to Section of the Settlement Agreement entitled Modifications of the Settlement Agreement, the restrictions upon use set forth in this Section 1 may be modified in writing by mutual agreement of the ADEQ and Grantee or its successors and assigns, which agreement shall be filed of record in the real estate records of Pulaski County, Arkansas.

Section 2. Material Inducement; Reliance. Grantee acknowledges that but for the restrictions upon use set forth in Section 1 of this Agreement, Grantor would not convey the Property to Grantee and Grantee's acceptance of the Property burdened by the restrictive conditions set forth in Section 1 hereof is a material inducement to Grantor to sell and convey the Property to Grantee. Grantee fully acknowledges and recognizes that Grantor's execution and delivery of the Deed to Grantee is performed in material reliance upon Grantee's acceptance of the Property subject to the restrictive covenants provided for in this Agreement.

Section 3. Indemnity. Grantee further acknowledges and recognizes that such restrictions are reasonable restraints upon use and hereby waives and relinquishes any and all of its rights to challenge or question the binding nature of such restrictions upon use and further agrees to indemnify Grantor and its successors and assigns to the full extent of all damages suffered by Grantor in the event Grantee, its successors and assigns, heirs or future transferees shall, at any time during the period of restrictions set forth hereinabove, challenge or violate the provisions of this Agreement.

Section 4. Enforcement. Grantor shall have the right to enforce, by any proceedings at law or in equity, all of the restrictions, conditions and covenants imposed by this Agreement, including the right to sue for and obtain an injunction, prohibitive or mandatory, or such other relief available at law or in equity, to prevent the breach of or to enforce the observance of the covenants and restrictions set forth in this Agreement. Grantor's

right to an injunction or any other equitable remedy shall remain in full force and effect notwithstanding the existence of an adequate remedy at law. Each owner of all or any portion of the Property, and all mortgagees, lessees, licensees, and all other persons occupying or holding any other interest in all or any portion of the Property upon the acceptance of their respective estate or occupancy, shall be deemed to have waived and relinquished any right to assert the availability of an adequate remedy at law as a defense to any injunction. The failure of Grantor to enforce any covenant, condition or restriction herein contained shall in no event be deemed as a waiver of the right to do so thereafter. Grantor shall have no affirmative duty to enforce the provisions of this Agreement in any way and the failure of Grantor to enforce the provisions of this Agreement shall not subject it to any liability arising from any type of action, claim or proceeding by any party.

Section 5. Entire Agreement. This Agreement shall be the entire agreement by and among the parties hereto and shall supersede any and all written or oral agreements between the parties in anyway relating to the future use of the Property. All capitalized terms not defined in this Agreement shall have the same meaning set forth in the Settlement Agreement.

Section 6. Counterparts. This Agreement may be executed in counterparts and each counterpart shall be an original of this Agreement.

Section 7. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Arkansas.

Section 8. Effective Date. The effective date hereof shall be the date first above written (the "Effective Date") and any and all schedules or other deadlines shall be determined in accordance with the Effective Date unless otherwise expressly agreed to by and among the Parties.

VERTAC CHEMICAL CORPORATION

By: _____
Lee S. Thalheimer, Receiver

EAST BAY REALTY SERVICES, INC.

By: _____

Title: President

ACKNOWLEDGMENT

STATE OF ARKANSAS
COUNTY OF PULASKI

On this the 14th day of May, 2013, before me, a Notary Public, personally appeared LEE S. THALHEIMER, who acknowledged himself to be the Receiver for Vertac Chemical Corporation, corporation, Grantor, and that he, as such officer, being authorized so to do, executed the foregoing instrument for the consideration, uses and purposes therein contained, by signing the name of the corporation.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

C. RAMSAY NOTARY PUBLIC ARKANSAS PULASKI COUNTY 08/1923 EXPIRES 3-10-2023

C. Ramsay
Notary Public

My Commission Expires:

3-10-2023

ACKNOWLEDGMENT

STATE OF ~~ARKANSAS~~ KENTUCKY
COUNTY OF ~~PULASKI~~ KENTON

On this the 22nd day of May, 2013, before me, a Notary Public, personally appeared Eric N. Boni, who acknowledged himself to be the President for EAST BAY REALTY SERVICES, INC., a Delaware corporation, and that he, as such officer, being authorized so to do, executed the foregoing instrument for the consideration, uses and purposes therein contained, by signing the name of the corporation.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Janet R. Cross
Notary Public

My Commission Expires:

4-15-2017

JANET R. CROSS
Notary Public, Kentucky State at Large
My Commission Expires April 15, 2017

1167810-v1

EXHIBIT 1

Tract 1

All that part of the West Half of the Northeast Quarter and a part of the East Half of the Northwest Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 2122.51 feet to the Point of Beginning of the land herein described, run thence continuing North 88 deg. 57 min. 40 sec. West along said South line for a distance of 741.07 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence North 09 deg. 01 min. 04 sec. West along said Right of Way for a distance of 474.75 feet, run thence North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 898.38 feet, run thence North 87 deg. 15 min. 11 sec. East for a distance of 451.48 feet to the center of a creek run thence South 35 deg. 43 min. 22 sec. West along said center of creek for a distance of 50.27 feet, run thence South 13 deg. 24 min. 46 sec. West along said center of creek for a distance of 60.08 feet, run thence South 01 deg. 09 min. 01 sec. West along said center of creek for a distance of 102.08 feet, run thence South 02 deg. 31 min. 41 sec. West along said center of creek for a distance of 176.14 feet, run thence South 05 deg. 39 min. 56 sec. East along said center of creek for a distance of 68.15 feet, run thence South 00 deg. 12 min. 26 sec. East along said center of creek for a distance of 19.35 feet, run thence South 31 deg. 19 min. 24 sec. East along said center of creek for a distance of 61.10 feet, run thence South 27 deg. 57 min. 55 sec. East along said center of creek for a distance of 18.58 feet, run thence South 12 deg. 03 min. 07 sec. East along said center of creek for a distance of 220.39 feet, run thence South 17 deg. 39 min. 32 sec. East along said center of creek for a distance of 99.14 feet, run thence South 11 deg. 14 min. 56 sec. East along said center of creek for a distance of 116.21 feet, run thence South 15 deg. 26 min. 06 sec. East along said center of creek for a distance of 82.40 feet, run thence South 26 deg. 55 min. 12 sec. East along said center of creek for a distance of 84.61 feet, run thence South 42 deg. 13 min. 13 sec. East along said center of creek for a distance of 153.30 feet, run thence South 53 deg. 56 min. 17 sec. East along said center of creek for a distance of 98.44 feet, run thence South 24 deg. 59 min. 27 sec. East along said center of creek for a distance of 130.82 feet to the Point of Beginning, containing 15.55 Acres, more or less.

SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
SE ¼, NW ¼ = 8.85 Acres+/-
NE ¼, NW ¼ = 0.44 Acres+/-
SW ¼, NE ¼ = 0.13 Acres+/-
SW ¼, NE ¼ = 6.13 Acres+/-

Tract 2

All that part of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet to the Point of Beginning of the land herein described, run thence North 00 deg. 24 min. 03 sec. West for a distance of 174.89 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 57.45 feet, run thence North 13 deg. 12 min. 46 sec. East for a distance of 134.13 feet to the Point of Curvature of a curve to the left with a Delta Angle of 180%%d00'00" and a Radius of 20 feet, run thence a chord bearing of North 76 deg. 47 min. 14 sec. West for a distance of 40.00 feet to the Point of Tangency of said curve to the left, run thence South 13 deg. 12 min. 46 sec. West for a distance of 142.34 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 56.44 feet, run thence North 87 deg. 40 min. 07 sec. West for a distance of 90.93 feet, run thence North 86 deg. 04 min. 59 sec. West for a distance of 62.14 feet, run thence North 80 deg. 27 min. 45 sec. West for a distance of 45.17 feet, run thence North 72 deg. 15 min. 26 sec. West for a distance of 16.60 feet, run thence North 87 deg. 14 min. 25 sec. West for a distance of 577.54 feet, run thence North 36 deg. 36 min. 08 sec. East for a distance of 38.65 feet, run thence North 24 deg. 58 min. 51 sec. East for a distance of 27.82 feet, North 18 deg. 30 min. 25 sec. East for a distance of 55.00 feet, run thence North 08 deg. 51 min. 41 sec. East for a distance of 36.66 feet, run thence North 01 deg. 07 min. 47 sec. East for a distance of 65.96 feet, run thence North 02 deg. 20 min. 35 sec. West for a distance of 92.21 feet, run thence North 05 deg. 05 min. 36 sec. East for a distance of 26.36 feet, run thence North 15 deg. 12 min. 55 sec. East for a distance of 47.25 feet, run thence North 87 deg. 17 min. 45 sec. West for a distance of 53.02 feet, run thence North 82 deg. 45 min. 13 sec. West for a distance of 24.96 feet, run thence North 74 deg. 34 min. 31 sec. West for a distance of 25.58 feet, run thence North 62 deg. 14 min. 35 sec. West for a distance of 31.35 feet, run thence North 46 deg. 08 min. 55 sec. West for a distance of 26.33 feet, run thence North 32 deg. 03 min. 11 sec. West for a distance of 26.49 feet, run thence North 20 deg. 38 min. 22 sec. West for a distance of 111.11 feet, run thence North 16 deg. 42 min. 04 sec. West for a distance of 139.68 feet, run thence North 17 deg. 49 min. 52 sec. West for a distance of 30.88 feet, run thence North 28 deg. 41 min. 44 sec. West for a distance of 29.29 feet, run thence North 54 deg. 27 min. 32 sec. West for a distance of 22.44 feet, run thence North 51 deg. 27 min. 37 sec. East for a distance of 22.34 feet, run thence North 65 deg. 42 min. 18 sec. East for a distance of 32.67 feet, run thence North 58 deg. 39 min. 47 sec. East for a distance of 67.73 feet, run thence North 55 deg. 34 min. 15 sec. East for a distance of 74.92 feet, run thence North 56 deg. 53 min. 33 sec. East for a distance of 164.91 feet, run thence North 55 deg. 02 min. 28 sec. East for a distance of 128.53 feet, run thence North 57 deg. 44 min. 02 sec. East for a distance of 35.21 feet, run thence North 45 deg. 37 min. 35 sec. East for a distance of 38.70 feet, run thence North 23 deg. 42 min. 55 sec. East for a distance of 33.76 feet, run thence North 06 deg. 38 min. 00 sec. East for a distance of 36.34 feet, run thence North 02 deg. 35 min. 58 sec. West for a distance of 28.18 feet, run thence North 06 deg. 54 min. 17 sec. West for a distance of 57.69 feet, run thence North 71 deg. 19

min. 51 sec. East for a distance of 24.61 feet, run thence North 83 deg. 45 min. 38 sec. East for a distance of 54.68 feet, run thence North 86 deg. 40 min. 45 sec. East for a distance of 115.48 feet, run thence North 88 deg. 59 min. 55 sec. East for a distance of 60.02 feet, run thence South 87 deg. 18 min. 50 sec. East for a distance of 203.04 feet, run thence North 02 deg. 37 min. 55 sec. West for a distance of 165.95 feet, run thence North 07 deg. 32 min. 05 sec. West for a distance of 272.80 feet, run thence North 32 deg. 33 min. 33 sec. West for a distance of 243.21 feet, run thence North 88 deg. 42 min. 57 sec. West for a distance of 546.10 feet, run thence North 01 deg. 18 min. 17 sec. East for a distance of 220.80 feet, run thence North 88 deg. 36 min. 32 sec. West for a distance of 1051.40 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence South 01 deg. 41 min. 55 sec. East along said Right of Way for a distance of 954.20 feet, run thence North 87 deg. 15 min. 11 sec. East for a distance of 451.48 feet to the center of a creek run thence South 35 deg. 43 min. 22 sec. West along said center of creek for a distance of 50.27 feet, run thence South 13 deg. 24 min. 46 sec. West along said center of creek for a distance of 60.08 feet, run thence South 01 deg. 09 min. 01 sec. West along said center of creek for a distance of 102.08 feet, run thence South 02 deg. 31 min. 41 sec. West along said center of creek for a distance of 176.14 feet, run thence South 05 deg. 39 min. 56 sec. East along said center of creek for a distance of 68.15 feet, run thence South 00 deg. 12 min. 26 sec. East along said center of creek for a distance of 19.35 feet, run thence South 31 deg. 19 min. 24 sec. East along said center of creek for a distance of 61.10 feet, run thence South 27 deg. 57 min. 55 sec. East along said center of creek for a distance of 18.58 feet, run thence South 12 deg. 03 min. 07 sec. East along said center of creek for a distance of 220.39 feet, run thence South 17 deg. 39 min. 32 sec. East along said center of creek for a distance of 99.14 feet, run thence South 11 deg. 14 min. 56 sec. East along said center of creek for a distance of 116.21 feet, run thence South 15 deg. 26 min. 06 sec. East along said center of creek for a distance of 82.40 feet, run thence South 26 deg. 55 min. 12 sec. East along said center of creek for a distance of 84.61 feet, run thence South 42 deg. 13 min. 13 sec. East along said center of creek for a distance of 153.30 feet, run thence South 53 deg. 56 min. 17 sec. East along said center of creek for a distance of 98.44 feet, run thence South 24 deg. 59 min. 27 sec. East along said center of creek for a distance of 130.82 feet to the South line of the Northeast Quarter of Section 24, Township 3 North, Range 11 West, run thence South 88 deg. 57 min. 40 sec. East along said South line for a distance of 1123.12 feet to the Point of Beginning, containing 52.76 acres, more or less.

SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
NE ¼, NW ¼ = 7.95 Acres+/-
NW ¼, NE ¼ = 25.25 Acres+/-
SW ¼, NE ¼ = 17.65 Acres+/-
SE ¼, NE ¼ = 1.47 Acres+/-
NE ¼, NE ¼ = 0.44 Acres+/-

Tract 3

All that part of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet to the Point of Beginning of the land herein described, run thence North 00 deg. 24 min. 03 sec. West for a distance of 174.89 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 57.45 feet, run thence North 13 deg. 12 min. 46 sec. East for a distance of 134.13 feet to the Point of Curvature of a curve to the left with a Delta Angle of 180%%d00'00" and a Radius of 20 feet, run thence a chord bearing of North 76 deg. 47 min. 14 sec. West for a distance of 40.00 feet to the Point of Tangency of said curve to the left, run thence South 13 deg. 12 min. 46 sec. West for a distance of 142.34 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 56.44 feet, run thence North 87 deg. 40 min. 07 sec. West for a distance of 90.93 feet, run thence North 86 deg. 04 min. 59 sec. West for a distance of 62.14 feet, run thence North 80 deg. 27 min. 45 sec. West for a distance of 45.17 feet, run thence North 72 deg. 15 min. 26 sec. West for a distance of 16.60 feet, run thence North 87 deg. 14 min. 25 sec. West for a distance of 577.54 feet, run thence North 36 deg. 36 min. 08 sec. East for a distance of 38.65 feet, run thence North 24 deg. 58 min. 51 sec. East for a distance of 27.82 feet, North 18 deg. 30 min. 25 sec. East for a distance of 55.00 feet, run thence North 08 deg. 51 min. 41 sec. East for a distance of 36.66 feet, run thence North 01 deg. 07 min. 47 sec. East for a distance of 65.96 feet, run thence North 02 deg. 20 min. 35 sec. West for a distance of 92.21 feet, run thence North 05 deg. 05 min. 36 sec. East for a distance of 26.36 feet, run thence North 15 deg. 12 min. 55 sec. East for a distance of 47.25 feet, run thence North 87 deg. 17 min. 45 sec. West for a distance of 53.02 feet, run thence North 82 deg. 45 min. 13 sec. West for a distance of 24.96 feet, run thence North 74 deg. 34 min. 31 sec. West for a distance of 25.58 feet, run thence North 62 deg. 14 min. 35 sec. West for a distance of 31.35 feet, run thence North 46 deg. 08 min. 55 sec. West for a distance of 26.33 feet, run thence North 32 deg. 03 min. 11 sec. West for a distance of 26.49 feet, run thence North 20 deg. 38 min. 22 sec. West for a distance of 111.11 feet, run thence North 16 deg. 42 min. 04 sec. West for a distance of 139.68 feet, run thence North 17 deg. 49 min. 52 sec. West for a distance of 30.88 feet, run thence North 28 deg. 41 min. 44 sec. West for a distance of 29.29 feet, run thence North 54 deg. 27 min. 32 sec. West for a distance of 22.44 feet, run thence North 51 deg. 27 min. 37 sec. East for a distance of 22.34 feet, run thence North 65 deg. 42 min. 18 sec. East for a distance of 32.67 feet, run thence North 58 deg. 39 min. 47 sec. East for a distance of 67.73 feet, run thence North 55 deg. 34 min. 15 sec. East for a distance of 74.92 feet, run thence North 56 deg. 53 min. 33 sec. East for a distance of 164.91 feet, run thence North 55 deg. 02 min. 28 sec. East for a distance of 128.53 feet, run thence North 57 deg. 44 min. 02 sec. East for a distance of 35.21 feet, run thence North 45 deg. 37 min. 35 sec. East for a distance of 38.70 feet, run thence North 23 deg. 42 min. 55 sec. East for a distance of 33.76 feet, run thence North 06 deg. 38 min. 00 sec. East for a distance of 36.34 feet, run thence North 02 deg. 35 min. 58 sec. West for a distance of 28.18 feet, run thence North 06 deg. 54 min. 17 sec. West for a distance of 57.69 feet, run thence North 71 deg. 19

min. 51 sec. East for a distance of 24.61 feet, run thence North 83 deg. 45 min. 38 sec. East for a distance of 54.68 feet, run thence North 86 deg. 40 min. 45 sec. East for a distance of 115.48 feet, run thence North 88 deg. 59 min. 55 sec. East for a distance of 60.02 feet, run thence South 87 deg. 18 min. 50 sec. East for a distance of 203.04 feet, run thence North 02 deg. 37 min. 55 sec. West for a distance of 165.95 feet, run thence South 88 deg. 15 min. 29 sec. East for a distance of 601.41 feet, run thence South 01 deg. 26 min. 15 sec. West for a distance of 249.33 feet, run thence South 20 deg. 59 min. 07 sec. East for a distance of 196.93 feet, run thence North 74 deg. 13 min. 58 sec. East for a distance of 113.51 feet, run thence South 78 deg. 21 min. 45 sec. East for a distance of 173.39 feet to the West Right of Way of Marshall Road, run thence South 08 deg. 54 min. 31 sec. West along said West Right of Way for a distance of 559.26 feet to the Point of Curvature of a curve to the left on said Right of Way with a Radius of 2567.39 feet and a Delta Angle of 05 deg. 40 min. 14 sec., run thence a Chord Bearing South 07 deg. 01 min. 51 sec. West for a distance of 253.99 feet, run thence North 88 deg. 18 min. 59 sec. West for a distance of 595.18, run thence South 00 deg. 24 min. 03 sec. East for a distance of 202.99 feet to the Point of Beginning, containing 43.25 Acres, more or less.
SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
SW ¼, NE ¼ = 16.58 Acres+/-
NW ¼, NE ¼ = 1.11 Acres+/-
NE ¼, NE ¼ = 4.11 Acres+/-
SE ¼, NE ¼ = 21.43 Acres+/-

Tract 4

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet, run thence North 00 deg. 24 min. 03 sec. West for a distance of 377.88 feet, run thence South 88 deg. 18 min. 59 sec. East for a distance of 258.66 feet to the West line of a Tract as described in Inst. No. 2000090000 said point being the Point of Beginning of the land herein described; run thence North 02 deg. 21 min. 25 sec. East contiguous with said tract for a distance of 962.55 feet, run thence North 44 deg. 15 min. 35 sec. West contiguous with said tract for a distance of 60.00 feet, run thence North 88 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 330.00 feet, run thence North 00 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 232.99 feet, run thence South 88 deg. 15 min. 29 sec. East for a distance of 445.73 feet, run thence South 01 deg. 26 min. 15 sec. West for a distance of 249.33 feet, run thence South 20 deg. 59 min. 07 sec. East for a distance of 196.93 feet, run thence North 74 deg. 13 min. 58 sec. East for a distance of 113.51 feet, run thence South 78 deg. 21 min. 45 sec. East for a distance of 173.39 feet to the West Right of Way of Marshall Road, run thence South 08 deg. 54 min. 31 sec. West along said West Right of Way for a distance of 559.26 feet to the Point of Curvature of a curve to the left on said Right of Way with a Radius of 2567.39 feet

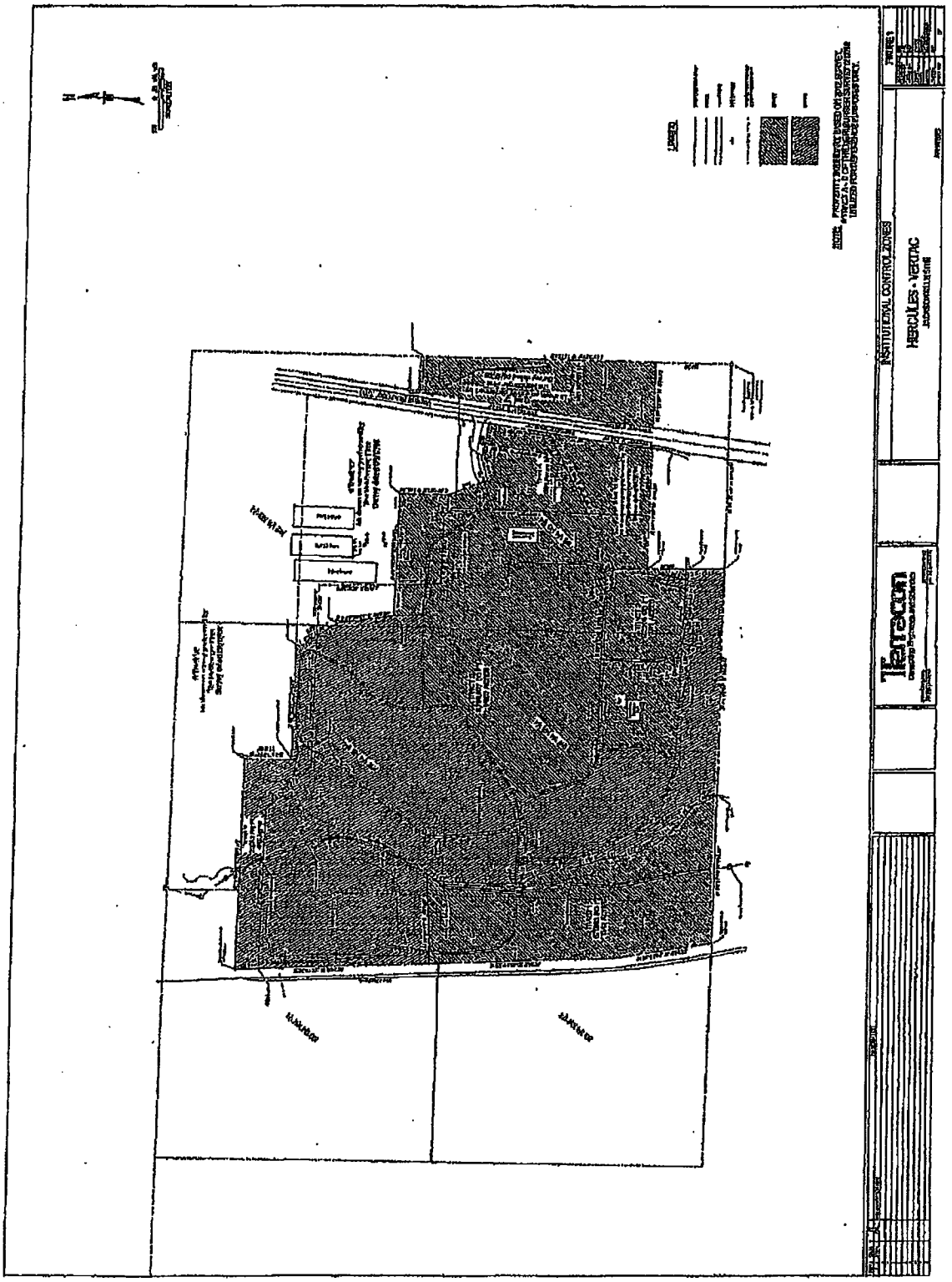
and a Delta Angle of 05 deg. 40 min. 14 sec., run thence a Chord Bearing South 07 deg. 01 min. 51 sec. West for a distance of 253.99 feet, run thence North 88 deg. 18 min. 59 sec. West for a distance of 336.49 feet to the Point of Beginning, containing 9.86 Acres, more or less.

Tract 5

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 01 deg. 23 min. 13 sec. East along the East line of the East Half of the Northeast Quarter of said Section 24 for a distance of 366.39 feet to the Point of Beginning of the land herein described; run thence North 88 deg. 18 min. 59 sec. West for a distance of 316.70 feet to the East Right of Way of Marshall Road, said point also being the Point of Curvature of a Curve to the right on said Right of Way with a Radius of 2468.39 feet and a Delta Angle of 05 deg. 36 min. 25 sec. run thence a Chord Bearing of North 07 deg. 16 min. 52 sec. East for a distance of 241.46 feet, run thence North 08 deg. 56 min. 39 sec. East along said East Right of Way for a distance of 914.67 feet, run thence South 88 deg. 38 min. 29 sec. East for a distance of 171.60 feet to the East line of the East Half of the Northeast Quarter of said Section 24, run thence South 01 deg. 23 min. 13 sec. West along said East line for a distance of 1148.63 feet to the Point of Beginning, containing 6.52 Acres, more or less.

Tract 6

All that part of the Northwest Quarter of the Northeast Quarter and a part of the Northeast Quarter of the Northwest Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 2863.58 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence North 09 deg. 01 min. 04 sec. West along said Right of Way for a distance of 474.75 feet, run thence North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 1736.73 feet to the Point of Beginning of the land herein described, run thence continuing North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 115.85, run thence South 88 deg. 36 min. 32 sec. East for a distance of 1051.40 feet, run thence South 01 deg. 18 min. 17 sec. West for a distance of 220.80 feet, run thence South 88 deg. 42 min. 57 sec. East for a distance of 546.10 feet, run thence South 32 deg. 33 min. 33 sec. East for a distance of 126.91 feet, run thence North 88 deg. 34 min. 35 sec. West for a distance of 650.07 feet, run thence North 44 deg. 15 min. 35 sec. West for a distance of 300.00 feet, run thence North 88 deg. 39 min. 35 sec. West for a distance of 797.86 feet to the Point of Beginning, containing 4.85 acres, more or less.


INSTITUTIONAL CONTROL ZONES
HERCULES - VERTAC
Transcon

2013036713
Recorded: 05/23/2013 4:10:14 PM
Recorded in Official Records of Larry Crane,
PULASKI COUNTY CIRCUIT/COUNTY CLERK
Fees $25.00

SEAL OF CIRCUIT COURT PULASKI COUNTY, ARKANSAS

QUITCLAIM DEED

KNOW ALL BY THESE PRESENT:

The **CITY OF JACKSONVILLE, ARKANSAS, GRANTOR**, for and in consideration of the sum of Ten and 00/100 Dollars ($10.00) and other good and valuable consideration, to us cash in hand paid, the receipt of which is hereby acknowledged, does hereby grant, sell, and quitclaim unto **LEE S. THALHEIMER, RECEIVER FOR VERTAC CHEMICAL COMPANY, GRANTEE**, and unto its heirs, successors, and assigns forever, the following described properties lying in the County of Pulaski and State of Arkansas, to-wit:

Tract 4

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet, run thence North 00 deg. 24 min. 03 sec. West for a distance of 377.88 feet, run thence South 88 deg. 18 min. 59 sec. East for a distance of 258.66 feet to the West line of a Tract as described in Inst. No. 2000090000 said point being the Point of Beginning of the land herein described; run thence North 02 deg. 21 min. 25 sec. East contiguous with said tract for a distance of 962.55 feet, run thence North 44 deg. 15 min. 35 sec. West contiguous with said tract for a distance of 60.00 feet, run thence North 88 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 330.00 feet, run thence North 00 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 232.99 feet, run thence South 88 deg. 15 min. 29 sec. East for a distance of 445.73 feet, run thence South 01 deg. 26 min. 15 sec. West for a distance of 249.33 feet, run thence South 20 deg. 59 min. 07 sec. East for a distance of 196.93 feet, run thence North 74 deg. 13 min. 58 sec. East for a distance of 113.51 feet, run thence South 78 deg. 21 min. 45 sec. East for a distance of 173.39 feet to the West Right of Way of Marshall Road, run thence South 08 deg. 54 min. 31 sec. West along said West Right of Way for a distance of 559.26 feet to the Point of Curvature of a curve to the left on said Right of Way with a Radius of 2567.39 feet and a Delta Angle of 05 deg. 40 min. 14 sec., run thence a Chord Bearing South 07 deg. 01 min. 51 sec. West for a distance of 253.99 feet, run thence North 88 deg. 18 min. 59 sec. West for a distance of 336.49 feet to the Point of Beginning, containing 9.86 Acres, more or less.

Tract 5

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 01 deg. 23 min. 13 sec. East along the East line of the East Half of the Northeast

Quarter of said Section 24 for a distance of 366.39 feet to the Point of Beginning of the land herein described; run thence North 88 deg. 18 min. 59 sec. West for a distance of 316.70 feet to the East Right of Way of Marshall Road, said point also being the Point of Curvature of a Curve to the right on said Right of Way with a Radius of 2468.39 feet and a Delta Angle of 05 deg. 36 min. 25 sec. run thence a Chord Bearing of North 07 deg. 16 min. 52 sec. East for a distance of 241.46 feet, run thence North 08 deg. 56 min. 39 sec. East along said East Right of Way for a distance of 914.67 feet, run thence South 88 deg. 38 min. 29 sec. East for a distance of 171.60 feet to the East line of the East Half of the Northeast Quarter of said Section 24, run thence South 01 deg. 23 min. 13 sec. West along said East line for a distance of 1148.63 feet to the Point of Beginning, containing 6.52 Acres, more or less.

Tract 6

All that part of the Northwest Quarter of the Northeast Quarter and a part of the Northeast Quarter of the Northwest Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 2863.58 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence North 09 deg. 01 min. 04 sec. West along said Right of Way for a distance of 474.75 feet, run thence North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 1736.73 feet to the Point of Beginning of the land herein described, run thence continuing North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 115.85, run thence South 88 deg. 36 min. 32 sec. East for a distance of 1051.40 feet, run thence South 01 deg. 18 min. 17 sec. West for a distance of 220.80 feet, run thence South 88 deg. 42 min. 57 sec. East for a distance of 546.10 feet, run thence South 32 deg. 33 min. 33 sec. East for a distance of 126.91 feet, run thence North 88 deg. 34 min. 35 sec. West for a distance of 650.07 feet, run thence North 44 deg. 15 min. 35 sec. West for a distance of 300.00 feet, run thence North 88 deg. 39 min. 35 sec. West for a distance of 797.86 feet to the Point of Beginning, containing 4.85 acres, more or less.

Property a/k/a 1200-1300 Marshall Road, Jacksonville, Arkansas
Pulaski County Parcel No. 22J0110000201

I hereby certify under penalty of false swearing that the legally correct amount of documentary stamps have been placed on this Instrument. If none, transaction is exempt or no consideration paid.
GRANTEE: Lee Thalheimer
Address: 124 W Cap. #0 #1r 19
Little Rock 72201

To have and to hold same unto said **LEE S. THALHEIMER, RECEIVER FOR VERTAC CHEMICAL COMPANY,** and unto its heirs and assigns forever, with all appurtenances thereunto belonging.

QUITCLAIM DEED - CITY TO THALHEIMER
Page Three

WITNESS our hands on this 1st day of March, 2013.

CITY OF JACKSONVILLE, ARKANSAS *ATTEST:*

BY: _____ _____
GARY FLETCHER, MAYOR *SUSAN DAVITT, CITY CLERK*

ACKNOWLEDGMENT

STATE OF ARKANSAS)
)
COUNTY OF PULASKI)

Be it remembered, that on this day came before me, the undersigned, a Notary Public within and for the State and County aforesaid, duly commissioned and acting, **GARY FLETCHER AND SUSAN DAVITT,** to me well known, and stated that they were duly authorized and had executed this Instrument for the consideration and purposes therein mentioned and set forth.

WITNESS my hand and official seal as such Notary Public on this 1st day of March, 2013.

_____
NOTARY PUBLIC

My Commission Expires:
April 25, 2022

INSTRUMENT PREPARED BY:
ROBERT E. BAMBURG, City Attorney
#1 Municipal Drive
Jacksonville, AR 72076
(501) 982-6303
rbamburg@cityofjacksonville.net

2013038718 Received: 5/23/2013 4:10:15 PM
Recorded: 05/23/2013 04:14:23 PM Filed &
Recorded in Official Records of Larry Crane,
PULASKI COUNTY CIRCUIT/COUNTY CLERK
Fees $50.00

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

THAT, Lee S. Thalheimer, Receiver for Vertac Chemical Corporation, an Arkansas corporation, hereafter called Grantor, for and in consideration of the sum of $10.00 and other valuable consideration paid by East Bay Realty Services, Inc., a Delaware corporation, hereafter called Grantee, the receipt of which is hereby acknowledged, the undersigned, does hereby grant, convey, sell and quitclaim unto Grantee, and unto its successors and assigns forever, the following described lands situated in Pulaski County, Arkansas:

Lands described in attached Exhibit A.

The Grantee takes the above described lands subject to the Declaration of Restrictive Covenants executed the 19th day of May, 2013, by and between the Grantor and Grantee.

TO HAVE AND TO HOLD the same unto Grantee, and unto its successors and assigns forever, with all appurtenances thereunto belonging.

IN WITNESS WHEREOF, the name of the Grantor is hereunto affixed by its Receiver this 19th day of May, 2013.

VERTAC CHEMICAL CORPORATION, GRANTOR

By: _____
Lee S. Thalheimer, Receiver

ACKNOWLEDGEMENT

STATE OF ARKANSAS)
COUNTY OF PULASKI) ss.

On the 19th day of May, 2013, before me, a notary public, personally appeared Lee S. Thalheimer, who acknowledged himself to be the Receiver for Vertac Chemical Corporation, and that he, as such officer, being authorized to do so, executed the foregoing deed for the purposes therein contained by signing his name hereto for the corporation.

IT WITNESS THEREOF, I hereunto set my hand and official seal.

_____
Notary Public

C. RAMSAY NOTARY PUBLIC ARKANSAS PULASKI COUNTY EXPIRES 3-10-2023

My Commission Expires:
3-10-2023

I certify under penalty of false swearing that at least the legally correct amount of documentary stamps have been placed on this instrument. (If none shown, exempt or no consideration paid.
Grantee or Agent: _____
Address: 200 W. Capitol, Suite 2300
Little Rock AR 72201

Prepared by:
J. Mark Davis
Wright, Lindsey & Jennings LLP
200 West Capitol Avenue, Suite 2300
Little Rock, Arkansas 72201-3699
(501) 371-0808
Facsimile: (501) 376-9442

EXHIBIT A

Tract 1

All that part of the West Half of the Northeast Quarter and a part of the East Half of the Northwest Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 2122.51 feet to the Point of Beginning of the land herein described, run thence continuing North 88 deg. 57 min. 40 sec. West along said South line for a distance of 741.07 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence North 09 deg. 01 min. 04 sec. West along said Right of Way for a distance of 474.75 feet, run thence North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 898.38 feet, run thence North 87 deg. 15 min. 11 sec. East for a distance of 451.48 feet to the center of a creek run thence South 35 deg. 43 min. 22 sec. West along said center of creek for a distance of 50.27 feet, run thence South 13 deg. 24 min. 46 sec. West along said center of creek for a distance of 60.08 feet, run thence South 01 deg. 09 min. 01 sec. West along said center of creek for a distance of 102.08 feet, run thence South 02 deg. 31 min. 41 sec. West along said center of creek for a distance of 176.14 feet, run thence South 05 deg. 39 min. 56 sec. East along said center of creek for a distance of 68.15 feet, run thence South 00 deg. 12 min. 26 sec. East along said center of creek for a distance of 19.35 feet, run thence South 31 deg. 19 min. 24 sec. East along said center of creek for a distance of 61.10 feet, run thence South 27 deg. 57 min. 55 sec. East along said center of creek for a distance of 18.58 feet, run thence South 12 deg. 03 min. 07 sec. East along said center of creek for a distance of 220.39 feet, run thence South 17 deg. 39 min. 32 sec. East along said center of creek for a distance of 99.14 feet, run thence South 11 deg. 14 min. 56 sec. East along said center of creek for a distance of 116.21 feet, run thence South 15 deg. 26 min. 06 sec. East along said center of creek for a distance of 82.40 feet, run thence South 26 deg. 55 min. 12 sec. East along said center of creek for a distance of 84.61 feet, run thence South 42 deg. 13 min. 13 sec. East along said center of creek for a distance of 153.30 feet, run thence South 53 deg. 56 min. 17 sec. East along said center of creek for a distance of 98.44 feet, run thence South 24 deg. 59 min. 27 sec. East along said center of creek for a distance of 130.82 feet to the Point of Beginning, containing 15.55 Acres, more or less.

SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
SE ¼, NW ¼ = 8.85 Acres+/-
NE ¼, NW ¼ = 0.44 Acres+/-
SW ¼, NE ¼ = 0.13 Acres+/-
SW ¼, NE ¼ = 6.13 Acres+/-

Tract 2

All that part of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet to the Point of Beginning of the land herein described, run thence North 00 deg. 24 min. 03 sec. West for a distance of 174.89 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 57.45 feet, run thence North 13 deg. 12 min. 46 sec. East for a distance of 134.13 feet to the Point of Curvature of a curve to the left with a Delta Angle of 180% %d00'00" and a Radius of 20 feet, run thence a chord bearing of North 76 deg. 47 min. 14 sec. West for a distance of 40.00 feet to the Point of Tangency of said curve to the left, run thence South 13 deg. 12 min. 46 sec. West for a distance of 142.34 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 56.44 feet, run thence North 87 deg. 40 min. 07 sec. West for a distance of 90.93 feet, run thence North 86 deg. 04 min. 59 sec. West for a distance of 62.14 feet, run thence North 80 deg. 27 min. 45 sec. West for a distance of 45.17 feet, run thence North 72 deg. 15 min. 26 sec. West for a distance of 16.60 feet, run thence North 87 deg. 14 min. 25 sec. West for a distance of 577.54 feet, run thence North 36 deg. 36 min. 08 sec. East for a distance of 38.65 feet, run thence North 24 deg. 58 min. 51 sec. East for a distance of 27.82 feet, North 18 deg. 30 min. 25 sec. East for a distance of 55.00 feet, run thence North 08 deg. 51 min. 41 sec. East for a distance of 36.66 feet, run thence North 01 deg. 07 min. 47 sec. East for a distance of 65.96 feet, run thence North 02 deg. 20 min. 35 sec. West for a distance of 92.21 feet, run thence North 05 deg. 05 min. 36 sec. East for a distance of 26.36 feet, run thence North 15 deg. 12 min. 55 sec. East for a distance of 47.25 feet, run thence North 87 deg. 17 min. 45 sec. West for a distance of 53.02 feet, run thence North 82 deg. 45 min. 13 sec. West for a distance of 24.96 feet, run thence North 74 deg. 34 min. 31 sec. West for a distance of 25.58 feet, run thence North 62 deg. 14 min. 35 sec. West for a distance of 31.35 feet, run thence North 46 deg. 08 min. 55 sec. West for a distance of 26.33 feet, run thence North 32 deg. 03 min. 11 sec. West for a distance of 26.49 feet, run thence North 20 deg. 38 min. 22 sec. West for a distance of 111.11 feet, run thence North 16 deg. 42 min. 04 sec. West for a distance of 139.68 feet, run thence North 17 deg. 49 min. 52 sec. West for a distance of 30.88 feet, run thence North 28 deg. 41 min. 44 sec. West for a distance of 29.29 feet, run thence North 54 deg. 27 min. 32 sec. West for a distance of 22.44 feet, run thence North 51 deg. 27 min. 37 sec. East for a distance of 22.34 feet, run thence North 65 deg. 42 min. 18 sec. East for a distance of 32.67 feet, run thence North 58 deg. 39 min. 47 sec. East for a distance of 67.73 feet, run thence North 55 deg. 34 min. 15 sec. East for a distance of 74.92 feet, run thence North 56 deg. 53 min. 33 sec. East for a distance of 164.91 feet, run thence North 55 deg. 02 min. 28 sec. East for a distance of 128.53 feet, run thence North 57 deg. 44 min. 02 sec. East for a distance of 35.21 feet, run thence North 45 deg. 37 min. 35 sec. East for a distance of 38.70 feet, run thence North 23 deg. 42 min. 55 sec. East for a distance of 33.76 feet, run thence North 06 deg. 38 min. 00 sec. East for a distance of 36.34 feet, run thence North 02 deg. 35 min. 58 sec. West for a distance of 28.18 feet, run thence North 06 deg. 54 min. 17 sec. West for a distance of 57.69 feet, run thence North 71 deg. 19

min. 51 sec. East for a distance of 24.61 feet, run thence North 83 deg. 45 min. 38 sec. East for a distance of 54.68 feet, run thence North 86 deg. 40 min. 45 sec. East for a distance of 115.48 feet, run thence North 88 deg. 59 min. 55 sec. East for a distance of 60.02 feet, run thence South 87 deg. 18 min. 50 sec. East for a distance of 203.04 feet, run thence North 02 deg. 37 min. 55 sec. West for a distance of 165.95 feet, run thence North 07 deg. 32 min. 05 sec. West for a distance of 272.80 feet, run thence North 32 deg. 33 min. 33 sec. West for a distance of 243.21 feet, run thence North 88 deg. 42 min. 57 sec. West for a distance of 546.10 feet, run thence North 01 deg. 18 min. 17 sec. East for a distance of 220.80 feet, run thence North 88 deg. 36 min. 32 sec. West for a distance of 1051.40 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence South 01 deg. 41 min. 55 sec. East along said Right of Way for a distance of 954.20 feet, run thence North 87 deg. 15 min. 11 sec. East for a distance of 451.48 feet to the center of a creek run thence South 35 deg. 43 min. 22 sec. West along said center of creek for a distance of 50.27 feet, run thence South 13 deg. 24 min. 46 sec. West along said center of creek for a distance of 60.08 feet, run thence South 01 deg. 09 min. 01 sec. West along said center of creek for a distance of 102.08 feet, run thence South 02 deg. 31 min. 41 sec. West along said center of creek for a distance of 176.14 feet, run thence South 05 deg. 39 min. 56 sec. East along said center of creek for a distance of 68.15 feet, run thence South 00 deg. 12 min. 26 sec. East along said center of creek for a distance of 19.35 feet, run thence South 31 deg. 19 min. 24 sec. East along said center of creek for a distance of 61.10 feet, run thence South 27 deg. 57 min. 55 sec. East along said center of creek for a distance of 18.58 feet, run thence South 12 deg. 03 min. 07 sec. East along said center of creek for a distance of 220.39 feet, run thence South 17 deg. 39 min. 32 sec. East along said center of creek for a distance of 99.14 feet, run thence South 11 deg. 14 min. 56 sec. East along said center of creek for a distance of 116.21 feet, run thence South 15 deg. 26 min. 06 sec. East along said center of creek for a distance of 82.40 feet, run thence South 26 deg. 55 min. 12 sec. East along said center of creek for a distance of 84.61 feet, run thence South 42 deg. 13 min. 13 sec. East along said center of creek for a distance of 153.30 feet, run thence South 53 deg. 56 min. 17 sec. East along said center of creek for a distance of 98.44 feet, run thence South 24 deg. 59 min. 27 sec. East along said center of creek for a distance of 130.82 feet to the South line of the Northeast Quarter of Section 24, Township 3 North, Range 11 West, run thence South 88 deg. 57 min. 40 sec. East along said South line for a distance of 1123.12 feet to the Point of Beginning, containing 52.76 acres, more or less.

SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
NE ¼, NW ¼ = 7.95 Acres+/-
NW ¼, NE ¼ = 25.25 Acres+/-
SW ¼, NE ¼ = 17.65 Acres+/-
SE ¼, NE ¼ = 1.47 Acres+/-
NE ¼, NE ¼ = 0.44 Acres+/-

Tract 3

All that part of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet to the Point of Beginning of the land herein described, run thence North 00 deg. 24 min. 03 sec. West for a distance of 174.89 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 57.45 feet, run thence North 13 deg. 12 min. 46 sec. East for a distance of 134.13 feet to the Point of Curvature of a curve to the left with a Delta Angle of 180%%d00'00" and a Radius of 20 feet, run thence a chord bearing of North 76 deg. 47 min. 14 sec. West for a distance of 40.00 feet to the Point of Tangency of said curve to the left, run thence South 13 deg. 12 min. 46 sec. West for a distance of 142.34 feet, run thence North 88 deg. 23 min. 06 sec. West for a distance of 56.44 feet, run thence North 87 deg. 40 min. 07 sec. West for a distance of 90.93 feet, run thence North 86 deg. 04 min. 59 sec. West for a distance of 62.14 feet, run thence North 80 deg. 27 min. 45 sec. West for a distance of 45.17 feet, run thence North 72 deg. 15 min. 26 sec. West for a distance of 16.60 feet, run thence North 87 deg. 14 min. 25 sec. West for a distance of 577.54 feet, run thence North 36 deg. 36 min. 08 sec. East for a distance of 38.65 feet, run thence North 24 deg. 58 min. 51 sec. East for a distance of 27.82 feet, North 18 deg. 30 min. 25 sec. East for a distance of 55.00 feet, run thence North 08 deg. 51 min. 41 sec. East for a distance of 36.66 feet, run thence North 01 deg. 07 min. 47 sec. East for a distance of 65.96 feet, run thence North 02 deg. 20 min. 35 sec. West for a distance of 92.21 feet, run thence North 05 deg. 05 min. 36 sec. East for a distance of 26.36 feet, run thence North 15 deg. 12 min. 55 sec. East for a distance of 47.25 feet, run thence North 87 deg. 17 min. 45 sec. West for a distance of 53.02 feet, run thence North 82 deg. 45 min. 13 sec. West for a distance of 24.96 feet, run thence North 74 deg. 34 min. 31 sec. West for a distance of 25.58 feet, run thence North 62 deg. 14 min. 35 sec. West for a distance of 31.35 feet, run thence North 46 deg. 08 min. 55 sec. West for a distance of 26.33 feet, run thence North 32 deg. 03 min. 11 sec. West for a distance of 26.49 feet, run thence North 20 deg. 38 min. 22 sec. West for a distance of 111.11 feet, run thence North 16 deg. 42 min. 04 sec. West for a distance of 139.68 feet, run thence North 17 deg. 49 min. 52 sec. West for a distance of 30.88 feet, run thence North 28 deg. 41 min. 44 sec. West for a distance of 29.29 feet, run thence North 54 deg. 27 min. 32 sec. West for a distance of 22.44 feet, run thence North 51 deg. 27 min. 37 sec. East for a distance of 22.34 feet, run thence North 65 deg. 42 min. 18 sec. East for a distance of 32.67 feet, run thence North 58 deg. 39 min. 47 sec. East for a distance of 67.73 feet, run thence North 55 deg. 34 min. 15 sec. East for a distance of 74.92 feet, run thence North 56 deg. 53 min. 33 sec. East for a distance of 164.91 feet, run thence North 55 deg. 02 min. 28 sec. East for a distance of 128.53 feet, run thence North 57 deg. 44 min. 02 sec. East for a distance of 35.21 feet, run thence North 45 deg. 37 min. 35 sec. East for a distance of 38.70 feet, run thence North 23 deg. 42 min. 55 sec. East for a distance of 33.76 feet, run thence North 06 deg. 38 min. 00 sec. East for a distance of 36.34 feet, run thence North 02 deg. 35 min. 58 sec. West for a distance of 28.18 feet, run thence North 06 deg. 54 min. 17 sec. West for a distance of 57.69 feet, run thence North 71 deg. 19

min. 51 sec. East for a distance of 24.61 feet, run thence North 83 deg. 45 min. 38 sec. East for a distance of 54.68 feet, run thence North 86 deg. 40 min. 45 sec. East for a distance of 115.48 feet, run thence North 88 deg. 59 min. 55 sec. East for a distance of 60.02 feet, run thence South 87 deg. 18 min. 50 sec. East for a distance of 203.04 feet, run thence North 02 deg. 37 min. 55 sec. West for a distance of 165.95 feet, run thence South 88 deg. 15 min. 29 sec. East for a distance of 601.41 feet, run thence South 01 deg. 26 min. 15 sec. West for a distance of 249.33 feet, run thence South 20 deg. 59 min. 07 sec. East for a distance of 196.93 feet, run thence North 74 deg. 13 min. 58 sec. East for a distance of 113.51 feet, run thence South 78 deg. 21 min. 45 sec. East for a distance of 173.39 feet to the West Right of Way of Marshall Road, run thence South 08 deg. 54 min. 31 sec. West along said West Right of Way for a distance of 559.26 feet to the Point of Curvature of a curve to the left on said Right of Way with a Radius of 2567.39 feet and a Delta Angle of 05 deg. 40 min. 14 sec., run thence a Chord Bearing South 07 deg. 01 min. 51 sec. West for a distance of 253.99 feet, run thence North 88 deg. 18 min. 59 sec. West for a distance of 595.18, run thence South 00 deg. 24 min. 03 sec. East for a distance of 202.99 feet to the Point of Beginning, containing 43.25 Acres, more or less.
SUBJECT TO: Any easements or Right of Ways of record.
Acreages:
SW¼, NE ¼ = 16.58 Acres+/-
NW ¼, NE ¼ = 1.11 Acres+/-
NE ¼, NE ¼ = 4.11 Acres+/-
SE ¼, NE ¼ = 21.43 Acres+/-

Tract 4

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 999.39 feet, run thence North 00 deg. 24 min. 03 sec. West for a distance of 377.88 feet, run thence South 88 deg. 18 min. 59 sec. East for a distance of 258.66 feet to the West line of a Tract as described in Inst. No. 2000090000 said point being the Point of Beginning of the land herein described; run thence North 02 deg. 21 min. 25 sec. East contiguous with said tract for a distance of 962.55 feet, run thence North 44 deg. 15 min. 35 sec. West contiguous with said tract for a distance of 60.00 feet, run thence North 88 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 330.00 feet, run thence North 00 deg. 38 min. 35 sec. West contiguous with said tract for a distance of 232.99 feet, run thence South 88 deg. 15 min. 29 sec. East for a distance of 445.73 feet, run thence South 01 deg. 26 min. 15 sec. West for a distance of 249.33 feet, run thence South 20 deg. 59 min. 07 sec. East for a distance of 196.93 feet, run thence North 74 deg. 13 min. 58 sec. East for a distance of 113.51 feet, run thence South 78 deg. 21 min. 45 sec. East for a distance of 173.39 feet to the West Right of Way of Marshall Road, run thence South 08 deg. 54 min. 31 sec. West along said West Right of Way for a distance of 559.26 feet to the Point of Curvature of a curve to the left on said Right of Way with a Radius of 2567.39 feet

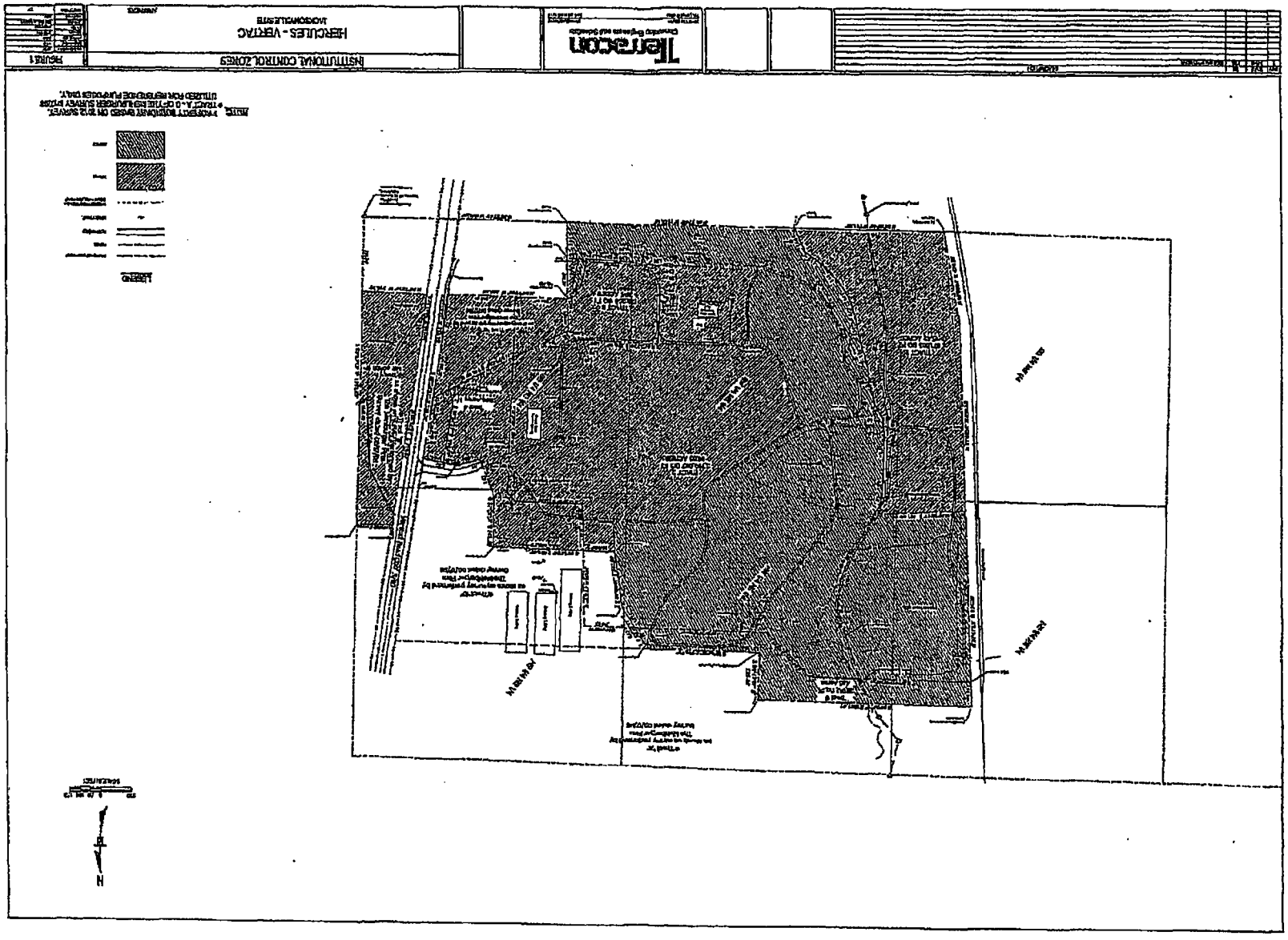
and a Delta Angle of 05 deg. 40 min. 14 sec., run thence a Chord Bearing South 07 deg. 01 min. 51 sec. West for a distance of 253.99 feet, run thence North 88 deg. 18 min. 59 sec. West for a distance of 336.49 feet to the Point of Beginning, containing 9.86 Acres, more or less.

Tract 5

All that part of the East Half of the Northeast Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 01 deg. 23 min. 13 sec. East along the East line of the East Half of the Northeast Quarter of said Section 24 for a distance of 366.39 feet to the Point of Beginning of the land herein described; run thence North 88 deg. 18 min. 59 sec. West for a distance of 316.70 feet to the East Right of Way of Marshall Road, said point also being the Point of Curvature of a Curve to the right on said Right of Way with a Radius of 2468.39 feet and a Delta Angle of 05 deg. 36 min. 25 sec. run thence a Chord Bearing of North 07 deg. 16 min. 52 sec. East for a distance of 241.46 feet, run thence North 08 deg. 56 min. 39 sec. East along said East Right of Way for a distance of 914.67 feet, run thence South 88 deg. 38 min. 29 sec. East for a distance of 171.60 feet to the East line of the East Half of the Northeast Quarter of said Section 24, run thence South 01 deg. 23 min. 13 sec. West along said East line for a distance of 1148.63 feet to the Point of Beginning, containing 6.52 Acres, more or less.

Tract 6

All that part of the Northwest Quarter of the Northeast Quarter and a part of the Northeast Quarter of the Northwest Quarter of Section 24 Township 3 North, Range 11 West, Pulaski County, Arkansas and being more fully described as follows; Commencing at the Southeast Corner of the Southeast Quarter of the Northeast Quarter of said Section 24 and run thence North 88 deg. 57 min. 40 sec. West along the South line of the Southeast Quarter of the Northeast Quarter of said Section 24 for a distance of 2863.58 feet to the East Right of Way of the Arkansas Ordinance Plant Railroad, run thence North 09 deg. 01 min. 04 sec. West along said Right of Way for a distance of 474.75 feet, run thence North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 1736.73 feet to the Point of Beginning of the land herein described, run thence continuing North 01 deg. 41 min. 55 sec. West along said Right of Way for a distance of 115.85, run thence South 88 deg. 36 min. 32 sec. East for a distance of 1051.40 feet, run thence South 01 deg. 18 min. 17 sec. West for a distance of 220.80 feet, run thence South 88 deg. 42 min. 57 sec. East for a distance of 546.10 feet, run thence South 32 deg. 33 min. 33 sec. East for a distance of 126.91 feet, run thence North 88 deg. 34 min. 35 sec. West for a distance of 650.07 feet, run thence North 44 deg. 15 min. 35 sec. West for a distance of 300.00 feet, run thence North 88 deg. 39 min. 35 sec. West for a distance of 797.86 feet to the Point of Beginning, containing 4.85 acres, more or less.


HERCULES - VERTAC
JACKSONVILLE SITE
Terracon

ATTACHMENT 7

PUBLIC NOTICES

Maumelle MONITOR | The Times (North Little Rock) | SHERWOOD VOICE | JACKSONVILLE PATRIOT

☐ ☐ ☐ ☑

PROOF OF PUBLICATION AND INVOICE FOR LEGAL ADVERTISING

Bill to: Sundance Consulting
620 Jefferson St. NE
Albuquerque NM
87109

Central Arkansas Newspapers

MAIL PAYMENT TO:
Central Arkansas Newspapers
P. O. Box 428
North Little Rock, AR 72115

Reference # 401651

AD COPY:

VERTAC SUPERFUND SITE
INITIAL PUBLIC NOTICE
U.S. EPA Begins Fourth Five-Year Review of Site Remedy
May 2013

The U.S. Environmental Protection Agency (EPA) Region 6 is conducting the Fourth Five-Year Review at the Vertac Superfund Site. This review is required by Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, also known as "CERCLA" or "Superfund," 42 U.S.C. §9621(c). The purpose of this review is to assure that human health and the environment are being protected by remedial actions taken at the Vertac Superfund Site.

The Vertac Superfund Site is located in Jacksonville, Arkansas, and was an herbicide manufacturing facility from the 1950s to 1987. During that time, the Vertac facility manufactured 2,4-dichlorophenoxy acetic acid (2,4-D). From 1957 to 1979, it manufactured 2,4,5-trichlorophenoxy acetic acid (2,4,5-T). From 1964 to 1968, an *Agent Orange* blend of these two chemicals was produced. Production of 2,4,5-T produces dioxin, which the facility was contaminated with. The site was the subject of both State and EPA enforcement and cleanup actions. In 1990, EPA approved a remedial action for the Vertac Off-Site areas. Additional EPA remedial actions were approved in 1993 for process equipment and buildings; in 1996 for on-site soils and debris; and in 1996 for ground water. Remedial action began in late 1993. EPA and the State performed site stabilization and incineration of over 28,000 dioxin contaminated drums, both on and off-site, through a series of removal and other response actions, from 1987 to 1998. All site response was completed by September 1, 1998.

The EPA will publish a final public notice when the review is completed and the results are available for review at the following information repositories:

Jacksonville City Hall, 1 Municipal Drive, Jacksonville, Arkansas 72078 Tel: (501) 982-3181

Arkansas Department of Environmental Quality, 8001 National Drive, Little Rock, Arkansas 72219 Tel: (501) 682-0744

Questions concerning the Vertac Superfund Site should be directed to Philip Allen at (214) 665-8516 or 1-800-533-3508 (toll-free). Information on the Vertac Superfund Site can be found via the Internet at *http://www.epa.gov/region6/6sf/pdffiles/vertac-ar.pdf*.

The legal advertising ran on the following dates:

5-23-13

TOTAL CHARGES: $ 116.25

PROOF OF PUBLICATION
STATE OF ARKANSAS
COUNTY OF PULASKI

I do solemnly swear that I am an employee of Stephens Media LLC, owner of said weekly newspaper printed and published in said County, State of Arkansas: That I was an employee of Stephens Media LLC at and during the publication of the annexed legal advertising in the case of:

Public Notice

pending in the _____ Court, in said County and at the dates of the several publications of said advertisement stated above, and that during said periods and at said dates said newspaper was printed and has a bona fide circulation in said County, and had a bona fide circulation therein for the period of more than one month before the date of the first publication of said advertisement, and that said advertisement was published in the regular weekly issue of said newspaper as stated above.

Priscilla Campbell

Subscribed and sworn to before me this 19th day of June 2013

Notary Public Jamie Mahoney

My commission expires 7-28-18

JAMIE MAHONEY NOTARY PUBLIC LONOKE CO., ARKANSAS COMMISSION EXPIRES JULY 28, 2018 12367342

NEWS

receipts for March, the latest month available, was $244,687, the worse March since 2010, and the worse since

2 Locations
918 W. Main St. Jacksonville 501-982-3125
204 N. Second St. Cabot 501-843-6553

843-5551 or 1-888-711-0145
www.zellastrashservice.com

Touching lives. Securing futures.®
MEA0312 *Registered representative. Securities offered through MWA Financial Services Inc., a wholly owned subsidiary of Modern Woodmen of America.

Weems Family Funeral Services

104 W. 5th St. • Carlisle, AR 72024
870-552-1500
www.weemsfamilyfuneralservices.com
We offer full traditional plans, direct cremation plans, veteran plans or we can customize a funeral plan to meet your family's needs. We accept all burial policies.

Arkansas FUNERAL CARE
Funeral Service & Casket $995
Direct Cremation $575
Complete Church Plan & Casket $2490
501-982-3400
SERVING ALL OF ARKANSAS
arkansasfuneralcare.com

Sherwood Moose Lodge
4000 E. Kiehl • Sherwood • 835-1200

Every Tuesday & Thursday Night
– OPEN TO PUBLIC –
Doors Open at 5:00pm
Minipacks 6:00pm
Hardpacks 7:00pm
Up to $7500 Payout Nightly Includes up to 2 ($1000 Progressive Jackpots)
Coupon
Good For One FREE Back Up Pack
Limit 1 per person. Expires 06/07/13

VERTAC SUPERFUND SITE
INITIAL PUBLIC NOTICE
U.S. EPA Begins Fourth Five-Year Review of Site Remedy
May 2013

The U.S. Environmental Protection Agency (EPA) Region 6 is conducting the Fourth Five-Year Review at the Vertac Superfund Site. This review is required by Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, also known as "CERCLA" or "Superfund," 42 U.S.C. §9621(c). The purpose of this review is to assure that human health and the environment are being protected by remedial actions taken at the Vertac Superfund Site.

The Vertac Superfund Site is located in Jacksonville, Arkansas, and was an herbicide manufacturing facility from the 1950s to 1987. During that time, the Vertac facility manufactured 2,4-dichlorophenoxy acetic acid (2,4-D). From 1957 to 1979, it manufactured 2,4,5-trichlorophenoxy acetic acid (2,4,5-T). From 1964 to 1968, an *Agent Orange* blend of these two chemicals was produced. Production of 2,4,5-T produces dioxin, which the facility was contaminated with. The site was the subject of both State and EPA enforcement and cleanup actions. In 1990, EPA approved a remedial action for the Vertac Off-Site areas. Additional EPA remedial actions were approved in 1993 for process equipment and buildings; in 1996 for on-site soils and debris; and in 1996 for ground water. Remedial action began in late 1993. EPA and the State performed site stabilization and incineration of over 28,000 dioxin contaminated drums, both on and off-site, through a series of removal and other response actions, from 1987 to 1998. All site response was completed by September 1, 1998.

The EPA will publish a final public notice when the review is completed and the results are available for review at the following information repositories:

Jacksonville City Hall, 1 Municipal Drive, Jacksonville, Arkansas 72078 Tel: (501) 982-3181

Arkansas Department of Environmental Quality, 8001 National Drive, Little Rock, Arkansas 72219 Tel: (501) 682-0744

Questions concerning the Vertac Superfund Site should be directed to Philip Allen at (214) 665-8516 or 1-800-533-3508 (toll-free). Information on the Vertac Superfund Site can be found via the Internet at *http://www.epa.gov/region6/6sf/pdffiles/vertac-ar.pdf.*