Five-Year Review Report

Second Five-Year Review Report
for the
American Creosote Works Superfund Site
Winnfield, Winn Parish, Louisiana

September 2005

PREPARED BY:

CH2M HILL
Contract Number 68-W6-0036
Work Assignment Number 133-FRFE-06ZZ

PREPARED FOR:

Region 6
United States Environmental Protection Agency
Dallas, Texas

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SECOND FIVE-YEAR REVIEW
American Creosote Works Superfund Site
EPA ID# LAD000239814
Winnfield, Winn Parish, Louisiana

This memorandum documents the United States Environmental Protection Agency's (EPA's) performance, determinations, and approval of the American Creosote Works Superfund Site (Site) Second Five-Year Review under section 121(c) of the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA), 42 United States Code (USC) '9621(c), as provided in the attached Second Five-Year Review Report prepared by CH2M HILL, Inc., on behalf of EPA.

<u>Summary of Five-Year Review Findings</u>

The second five-year review for this Site indicates that the remedial actions set forth in the decision document for this Site continue to be implemented as planned. The southern portion of the Site has been made available for reuse. The northern portion is a secure, fenced facility primarily made up of two waste storage areas, a fluids extraction and injection system (well field), and the Process Liquids Treatment System (PLTS). Highly contaminated surface soils and wastes that were present in the area referred to as the 'Tar Mat' were addressed through the initial Remedial Action (RA) using onsite incineration. The resultant incinerator ash was placed in the Tar Mat area excavation and buried under a 3 feet thick clay cap. Approximately 7000 cubic yards of soil that contained low-levels of contamination were excavated and buried in the Waste Cell. Contaminated ground water and Dense Non-Aqueous Phase Liquids (DNAPL) is extracted from the shallow ground water by the fluids extraction system and treated by the PLTS. The treated effluent is then either discharged offsite to Creosote Branch creek or re-injected into the shallow and deep aquifers through the in-situ bioremediation system. O&M at the Site is conducted by EPA's RAC6 contractor CH2M HILL. The Site is secure and well maintained. Based on the data review, site inspection, interviews, and technical assessment, it appears the remedy is generally functioning as intended by the decision document.

To ensure continued protectiveness, however, seven issues are identified in the second five-year review for this Site. These issues do not currently affect the protectiveness of the remedy, but need to be addressed to ensure continued protectiveness and performance. These issues include:

(1) The in-situ bioremediation system currently does not remediate soil contamination in the vadose zone. This was an issue identified in the First Five-Year Review Report, and the EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review.

(2) Contamination exists in shallow ground water above the site remediation goals on the down-gradient side of the recovery trench. The presence of oil in monitor well SMW-2 was noted during the first five-year review. Investigation activities conducted at the Site in 2003 determined that the contamination is the result of a source or sources that existed on the down-gradient side of the recovery trench in the area of SMW-2 and piezometer SP-9 prior to construction of the trench. EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review. Also, contamination is present in shallow ground water above the Site remediation goals at monitor well MW-2A.

(3) Data has not been collected to assess current conditions in Creosote Branch creek. Contamination present in Creosote Branch creek and wetlands near the Site were not addressed as part of the RA. The Record of Decision (ROD) determined that remediation in these areas would cause more harm to the ecosystem than it would do good. However, the ROD states that the selected remedy would include ecological monitoring after implementation of the remedy. The extent of this monitoring was

to include an evaluation of wetlands and streams as considered appropriate by the EPA and Louisiana Department of Environmental Quality (LDEQ). To-date, no consistent monitoring of Creosote Branch creek has been performed. Since completion of the first five-year review, it has been verified that Site ground water is contaminated on the down-gradient side of the recovery trench in two areas (as indicated in Item No. 2 above). No ground water monitoring locations currently exist between these two areas and Creosote Branch creek. Also, low levels of contaminants are present in ground water on the north side of Creosote Branch creek opposite monitor well SMW-2. Finally, one interviewee indicated that creosote was observed in the creek at the Highway 167 bridge/creek crossing, where a new bridge is being constructed.

Operational data indicates that the recovery trench does maintain an inward ground water hydraulic gradient. Also, past creosote seeps and staining observed in the banks of Creosote Branch creek are no longer present. However, there is not enough data to determine if contaminated Site ground water is discharging to the creek. Also, no ecological monitoring has been performed to determine if conditions in the creek have improved since the incineration portion of the RA was completed and the ground water remedy was implemented.

(4) During ground water sampling activities conducted in March 2003, several carcinogenic Polynuclear Arromatic Hydrocarbons (PAHs) were detected in deep ground water at monitor well DMW-2. The reported concentrations were estimated at below the reporting limits. However, the reported concentrations for the carcinogenic PAHs resulted in a total Benzo (a) Pyrene (B(a)P) equivalent concentration of 0.87 micrograms per liter (µg/L), which was above the remediation goal of 0.20 µg/L. Deep ground water at the Site has not been sampled since March 2003, and except for the areas near sumps S-1 and S-5, the deep ground water is not addressed by the remediation systems at the Site.

(5) The ROD recognized that the pace of ground water and in-situ bioremediation would be slow. Also, the ROD included a provision to evaluate the system performance after 5 to 10 years of operation to determine if the remediation goals could be achieved. The remediation system has been operating for almost nine years. However, due to operational problems encountered during the first 4 years of operation, lack of appropriate data collection activities in the first 4 years of operation, enhancements and improvements made to Site O&M procedures since the first five-year review, and implementation of a more comprehensive Site monitoring program, this evaluation has not been performed.

(6) The Site remediation goals do not include the Maximum Contaminant Level (MCL) for pentachlorophenol (PCP). PCP is present in shallow Site monitor wells at concentrations that are above its MCL of 1 µg/L. The ROD did not set a remediation goal for PCP, but the ROD did state that the MCLs were Applicable or Relevant and Appropriate Requirements (ARARs) for the Site.

(7) There remains a piezometer in the well field area that is not constructed according to LDEQ/LaDOT requirements. This was an issue identified during the first five-year review. The recommendation that the piezometer (referred to as the ‘White Tube’) be sampled, abandoned, and replaced if necessary, has not been implemented, and this remains an issue for the second five-year review.

Actions Needed

To address the issues identified during the second five-year review, the following recommendations and follow-up actions have been identified for the ACW Site:

(1) The design and construction changes planned for the in-situ bioremediation system should be completed. The EPA has tasked CH2M HILL to perform infiltration testing to obtain data to support design and construction changes for the in-situ bioremediation system. Additional injection capacity is planned to remediate soil contamination present in the vadose zone. If left untreated, the soil contamination would continue to act as a long-term source of ground water contamination and increase the time required to achieve the ground water remediation goals for the Site.

(2) The ground water contamination that is present down-gradient of the recovery trench should be addressed. The EPA has tasked CH2M HILL to install two additional recovery wells in the trench gap (near SMW-2 and piezometer SP-9). Construction of the two new wells is planned to occur in July 2005. These two new wells should address the ground water contamination in this area. Ground water contaminated above the Site remediation goals also exists down-gradient of the recovery trench at monitor well MW-2A. Although water level monitoring indicates that the recovery trench maintains an inward hydraulic gradient in the area of this monitor well, no monitor wells exist between MW-2A and Creosote Branch creek. Therefore, the down-gradient extent of the contamination is unknown. It is recommended that the installation of an additional monitor well be considered to verify that contaminated ground water is not migrating towards Creosote Branch creek in this area.

(3) After the ground water issue described in item 2 above is addressed, and before the next five-year review, surface water and sediment sampling of Creosote Branch creek should be conducted to confirm conditions in the creek. The ROD states that ecological monitoring of streams and wetlands would be performed following completion of the RA. As noted in item 2 above, ground water contamination above Site remediation goals is now known to be present on the down-gradient side of the recovery trench. Also, one interviewee expressed concerns regarding the presence of contamination in Creosote Branch creek. Creosote seeps and staining were not observed during the Site inspection, however, which indicates the conditions in the creek have improved since implementation of the RA. Therefore, it is recommended the ground water issues identified in item 2 be addressed first, and then follow-up be performed to confirm the status of contamination in the creek. The data could be used to determine how conditions have changed in the creek since completion of the incineration portion of the RA and to verify that Site ground water is not adversely affecting surface water quality in the creek.

(4) Monitor well DMW-2 should be sampled and the samples analyzed using lower reporting limits to verify the presence or absence of carcinogenic PAH contamination in the deep aquifer. The reporting limits for the analysis should be low enough to verify whether or not carcinogenic PAH concentrations exceed a B(a)P equivalent concentration of 0.20 µg/L. Several sampling events should be conducted to verify the absence of contamination. If the presence of contamination above the remediation goal is confirmed at this location, monitoring of the deep aquifer should be expanded, and additional actions should be evaluated to address the contamination.

(5) The remediation systems' ability to achieve the remediation goals for ground water should be evaluated as stipulated in the ROD prior to or during the next five-year review**.** The ROD provided for conducting an evaluation of the selected remedy after five to ten years of operation to determine if the remediation goals are achievable within a reasonable timeframe. The remediation system has

been in operation for almost nine years. It is recommended that the evaluation be conducted prior to or at the time of the third five-year review.

The ROD left open the ability to implement contingency measures if it is determined that it is technically impracticable to achieve and maintain the remediation goals in Site ground water. These measures could include continued pumping at rates sufficient to contain the plume, waiving the chemical-specific ARARs for the cleanup of ground water in those portions of the aquifer where it is deemed technically impracticable to achieve further concentration reductions, and the implementation of institutional controls to restrict access to those areas of the aquifer where contaminant concentrations remain above the remediation goals. The first five-year review states that the residential land-use scenario, used to determine the remediation goals, may no longer be appropriate for the Site. It is also recommended that the evaluation of the remediation system include an assessment of the appropriateness of the remediation goals relative to current Site conditions and current and future land and ground water use.

To assist with the completion of this assessment, it is further recommended that the long-term monitoring program be carefully examined to ensure that the necessary data required to complete the assessment is being collected. If further data collection activities are determined to be necessary, then they should be incorporated into the Field Operations Plan.

(6) The ROD does not specifically state a remediation goal for PCP in ground water. However, the ROD does list the MCLs as ARARs for the Site. PCP is detected in many wells at concentrations above the MCL. If restoration of ground water to its beneficial use as a drinking water supply remains a remedial objective then the MCL for PCP should be included as a remediation goal.

(7) The piezometer (identified as the 'White Tube') is not constructed according to LDEQ and LaDOT requirements. The first five-year review recommended that the piezometer be sampled, abandoned, and replaced if necessary. This recommendation is also made by this second five-year review.

Determinations

I have determined that the remedy for the American Creosote Works Superfund Site is protective of human health and the environment in the short term, and will remain so provided the action items identified in the Five-Year Review Report are addressed as described above.

for Samuel E. Coleman, P.E.
Director, Superfund Division
U.S. Environmental Protection Agency, Region 6

Date

9/19/05

CONCURRENCES

FIVE-YEAR REVIEW
American Creosote Works Superfund Site
EPA ID# LAD000239814

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List of Acronyms

ACW	American Creosote Works Superfund Site
ARARs	Applicable or Relevant and Appropriate Requirements
B(a)P	Benzo (a) Pyrene
bgs	below ground surface
BHHRA	Baseline Human Health Risk Assessment
BOD	Biological Oxygen Demand
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
ERA	Ecological Risk Assessment
EPA	United States Environmental Protection Agency
ERCS	Emergency Response Cleanup Services
F	Fahrenheit
FR	Federal Register
FS	Feasibility Study
GAC	Granular Activate Carbon
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High Density Polyethylene
LAC	Louisiana Administrative Code
LaDOT	Louisiana Department of Transportation
LDEQ	Louisiana Department of Environmental Quality
LDR	Land Disposal Restrictions
LNAPL	Light Non-Aqueous Phase Liquids
MCL	Maximum Contaminant Level
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAPL	Non-Aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
OSWER	Office of Solid Waste and Emergency Response
OWRB	Oklahoma Water Resources Board
OWS	Oil/Water Separator
PAH	Polynuclear Arromatic Hydrocarbon
PCP	Pentachlorophenol
PLTS	Process Liquids Treatment System
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act

SVOC	Semi-Volatile Organic Compound
TBCs	To Be Considered standards
TCDD	Tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalency Factor
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
UAO	Unilateral Administrative Order
USC	United States Code
VOC	Volatile Organic Compound
µg/L	micrograms per liter
µg/kg	micrograms per kilogram

Executive Summary

Pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation & Liability Act ("CERCLA" or "Superfund"), 42 United States Code (USC) §9621(c), the second five-year review of the remedy in place at the American Creosote Works Superfund Site ("Site" or "ACW Site") located in Winnfield, Winn Parish, Louisiana, was completed in June 2005. The results of the five-year review indicate that the remedy completed to-date is currently protective of human health and the environment in the short term. Overall, the remedial actions performed appear to be functioning as designed, and the Site has been maintained appropriately. No deficiencies were noted that currently impact the protectiveness of the remedy, although several issues were identified that require further action to ensure the continued protectiveness of the remedy.

Remediation of the ACW Site has been handled through emergency removal actions, and a Remedial Action (RA). Two emergency removal actions were conducted to address imminent threats of releases of hazardous substances to the environment. These actions resulted in the consolidation and solidification of liquids and waste sludges in the onsite Waste Cell, fencing of the Site, the decontamination and dismantling of site buildings and process equipment, and the construction of drainage features to redirect surface water away from the most heavily contaminated portions of the site.

Through the RA defined by the Record of Decision (ROD), highly contaminated soils and waste material in an area of the Site identified as the Tar Mat was excavated and incinerated onsite. The resultant ash was then returned to the excavation and placed under a three feet thick clay cap. Approximately 7000 cubic yards of soil that contained low-levels of contamination were excavated and buried in the Waste Cell. A fluids recovery system was constructed to extract contaminated ground water and Non-Aqueous Phase Liquids (NAPLs) from the shallow ground water at the Site. A Process Liquids Treatment System (PLTS) was constructed to treat the extracted ground water and NAPL. Finally, an in-situ bioremediation system was constructed to remediate contaminated subsurface soils at the Site by amending and injecting a portion of the PLTS effluent back into the shallow ground water.

Under the statutory requirements of Section 121(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), P. L. 99-499, and the subordinate provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300.430(f) (4) (ii), performance of five-year reviews are required for sites where hazardous substances remain onsite above levels that allow for unrestricted use and unrestricted exposure. Such are the factual circumstances at the ACW Site. The first five-year review at the ACW Site was completed in August 2000.

During the second five-year review period, Operations and Maintenance (O&M) activities at the Site have continued. O&M activities include extraction of contaminated ground water and NAPL from the shallow aquifer, treatment of the extracted ground water and NAPL in the PLTS, discharge of the treated effluent not used by the in-situ bioremediation system to Creosote Branch creek, amending and re-injecting a portion of the PLTS effluent through the in-situ bioremediation system, ground water monitoring activities, inspection and maintenance of the capped Waste Cell and Tar Mat ash disposal areas, inspection and maintenance of the site fence, and maintenance of the fluid extraction system, PLTS, and in-situ bioremediation system. Site O&M is conducted by the United States Environmental Protection Agency's (EPA's) RAC6 contractor CH2M HILL. CH2M HILL staffs the Site with 2 full-time employees and one night-time security guard. The Site appears to be operating appropriately and well maintained. Approximately 6 million gallons of ground water and 16,000 gallons of NAPL are removed by the fluids extraction system and treated by the PLTS each year.

During the second five-year review, seven issues were identified that do not currently affect the protectiveness of the remedies for the Site. The following recommendations and follow-up actions have been identified for the Site to address these issues:

1. **Complete the design and construction changes planned for the in-situ bioremediation system.** The EPA has tasked CH2M HILL to perform infiltration testing to obtain data to support design and construction changes for the in-situ bioremediation system. Additional injection capacity is planned to remediate soil contamination present in the vadose zone. If left untreated, the soil contamination would continue to act as a long-term source of ground water contamination, and increase the time required to achieve the ground water remediation goals for the Site. Design and construction of the additional in-situ bioremediation system components should be completed to address this contamination.

2. **Address the ground water contamination that is present down-gradient of the recovery trench.** The EPA has tasked CH2M HILL to install two additional recovery wells down-gradient of the trench gap in the area of monitor well SMW-2 and piezometer SP-9. Construction of the two new wells is planned to occur in July 2005. These two new wells should address the ground water contamination in this area. Ground water contaminated above the Site remediation goals also exists down-gradient of the

recovery trench at monitor well MW-2A. Although water level monitoring indicates that the recovery trench maintains an inward hydraulic gradient in the area of this monitor well, no monitor wells exist between MW-2A and Creosote Branch creek. Therefore, the down-gradient extent of the contamination is unknown. It is recommended that the installation of an additional monitor well be considered to verify that contaminated ground water is not migrating towards Creosote Branch creek in this area.

3. **After the ground water issue described in item 2 above is addressed, and before the next five-year review, perform surface water and sediment sampling of Creosote Branch creek to confirm conditions in the creek.** The ROD states that ecological monitoring of streams and wetlands would be performed following completion of the RA. As noted in item 2 above, ground water contamination above Site remediation goals is now known to be present on the down-gradient side of the recovery trench. Also, one interviewee expressed concerns regarding the presence of contamination in Creosote Branch creek. Creosote seeps and staining were not observed during the Site inspection, however, which indicates the conditions in the creek have improved since implementation of the RA. Therefore, it is recommended the ground water issues identified in item 2 be addressed first, and then follow-up be performed to confirm the status of contamination in the creek. The data could be used to determine how conditions have changed in the creek since completion of the incineration portion of the RA and to verify that Site ground water is not adversely affecting surface water quality in the creek.

4. **Sample monitor well DMW-2 and analyze the samples using lower reporting limits to verify the presence or absence of carcinogenic Polynuclear Arromatic Hydrocarbon (PAH) contamination in the deep aquifer.** It is recommended that monitor well DMW-2 be sampled, and the samples should be analyzed using reporting limits that are low enough to verify whether or not carcinogenic PAH concentrations exceed a Benzo (a) Pyrene (B(a)P) equivalent concentration of 0.20 µg/L. Several sampling events should be conducted to verify the absence of contamination. If the presence of contamination above the remediation goal is confirmed at this location, monitoring of the deep aquifer should be expanded, and additional actions should be evaluated to address the contamination.

5. **Evaluate the site remediation systems' ability to achieve the remediation goals for ground water prior to or during the next five-year review.** The ROD provided for conducting an evaluation of the selected remedy after five to ten years of operation to determine if the site remediation goals are achievable within a reasonable timeframe. The remediation system at the Site has been in operation for

almost nine years. It is recommended that the evaluation of the site remediation systems' ability to achieve the remediation goals for ground water be conducted prior or during the third five-year review.

The ROD left open the ability to implement contingency measures if it is determined that it is technically impracticable to achieve and maintain the remediation goals in ground water. These measures could include continued pumping at rates sufficient to contain the plume, waiving the chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for the cleanup of ground water in those portions of the aquifer where it is deemed technically impracticable to achieve further concentration reductions, and the implementation of institutional controls to restrict access to those areas of the aquifer where contaminant concentrations remain above the remediation goals. The first five-year review states that the residential land-use scenario, used to determine the remediation goals, may no longer be appropriate for the Site. It is also recommended that the evaluation of the remediation system include an assessment of the appropriateness of the remediation goals relative to current site conditions and current and future land and ground water use.

To assist with the completion of this assessment, it is further recommended that the long-term monitoring program be carefully examined to ensure that the necessary data required to complete the assessment is being collected. If further data collection activities are determined to be necessary, then they should be incorporated into the Field Operations Plan.

6. **Include the Maximum Contaminant Level (MCL) for pentachlorophenol (PCP) as a remediation goal in site ground water.** The ROD does not specifically state a remediation goal for PCP in ground water. However, the ROD does list the MCLs as ARARs for the Site. PCP is detected in many site wells at concentrations above the MCL. If restoration of ground water to its beneficial use as a drinking water supply remains a remedial objective, then the MCL for PCP should be included as a remediation goal.

7. **Abandon the piezometer identified as the 'White Tube'.** The piezometer (identified as the 'White Tube') is not constructed according to Louisiana Department of Environmental Quality (LDEQ) and Louisiana Department of Transportation (LaDOT) requirements. The first five-year review recommended that the piezometer be sampled, abandoned, and replaced if necessary. This recommendation is also made by this second five-year review.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name (from WasteLAN): American Creosote Works Superfund Site

EPA ID (from WasteLAN): LAD000239814

Region: EPA Region 6	**State:** Louisiana	**City/County:** Winnfield, Winn Parish

SITE STATUS

NPL Status: O Final _ Deleted _ Other (specify):

Remediation status (choose all that apply): _ Under Construction O Operating O Complete

Multiple OUs? _ Yes O No	**Construction completion date:** June 4, 1999

Has site been put into reuse? _ Yes (partially) O No

REVIEW STATUS

Reviewing agency: O EPA _ State _ Tribe _ Other Federal Agency:

Author: EPA Region 6, with support from RAC6 contractor CH2M HILL, Inc.

Review period: October 2000 through May 2005

Date(s) of site inspection: May 16 and 17, 2005

Type of review:

O Statutory
_ Policy
_ Post-SARA
_ Non-NPL Remedial Action Site
_ Regional Discretion
_ Pre-SARA
_ NPL-Removal only
_ NPL State/Tribe-lead

Review number: _ 1 (first) O 2 (second) _ 3 (third) _ Other (specify):

Triggering action:

_ Actual RA Onsite Construction
_ Construction Completion
_ Other (specify):
O Actual RA Start
_ Recommendation of Previous Five-Year Review Report

Triggering action date (from WasteLAN): August 2000

Due date (five years after triggering action date): August 2005

Issues: Operations and Maintenance (O&M) is ongoing at the Site, and based on the data review, site inspection, interviews, and technical assessment, it appears the remedy is functioning as intended by the decision documents. To ensure continued protectiveness, seven issues were identified in the second five-year review for this site, as described in the following paragraphs. These issues do not currently affect the protectiveness of the remedy, although they need to be addressed to ensure continued protectiveness.

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1. **The in-situ bioremediation system currently does not remediate soil contamination in the vadose zone.** This was an issue identified in the First Five-Year Review Report. The EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review.

2. **Contamination exists in shallow ground water above the site remediation goals on the down-gradient side of the recovery trench.** The presence of oil in monitor well SMW-2 was noted during the first five-year review. Investigation activities conducted at the Site in 2003 determined that the contamination was the result of a source or sources that existed on the down-gradient side of the recovery trench in the area of SMW-2 and piezometer SP-9 prior to construction of the trench. The EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review. Also, contamination is present in shallow ground water above the site remediation goals at monitor well MW-2A.

3. **Data has not been collected to assess current conditions in Creosote Branch creek.** Contamination present in Creosote Branch creek and wetlands near the Site were not addressed as part of the RA. The ROD determined that remediation in these areas would cause more harm to the ecosystem than it would do good. However, the ROD states that the selected remedy would include ecological monitoring after implementation of the remedy. The extent of this monitoring was to include an evaluation of wetlands and streams as considered appropriate by the EPA and LDEQ. To-date, no consistent monitoring of Creosote Branch creek has been performed. Since completion of the first five-year review, it has been verified that site ground water is contaminated on the down-gradient side of the recovery trench in two areas (as indicated in Item No. 2 above). No ground water monitoring locations currently exist between these two areas and Creosote Branch creek. Also, low levels of contaminants are present in ground water on the north side of Creosote Branch creek opposite monitor well SMW-2. Finally, one interviewee indicated that creosote was observed in the creek at the Highway 167 bridge/creek crossing, where a new bridge is being constructed.

   Operational data indicates that the recovery trench does maintain an inward ground water hydraulic gradient. Also, past creosote seeps and staining observed in the banks of Creosote Branch creek are no longer present. However, there is not enough data to determine if contaminated site ground water is discharging to the creek. Also, no ecological monitoring has been performed to determine if conditions in the creek have improved since the incineration portion of the RA was completed and the ground water remedy was implemented.

4. **Carcinogenic PAHs have been detected in deep ground water.** During ground water sampling activities conducted in March 2003, several carcinogenic PAHs were detected in deep ground water at monitor well DMW-2. The reported concentrations were estimated at below the reporting limits. However, the reported concentrations for the carcinogenic PAHs resulted in a total B(a)P equivalent concentration of 0.87 µg/L, which was above the remediation goal of 0.20 µg/L. Deep ground water at the Site has not been sampled since March 2003, and except for the areas near sumps S-1 and S-5, the deep ground water is not addressed by the remediation systems at the Site.

Five-Year Review Summary Form

5. Evaluate the site remediation systems to determine if the site remediation goals are achievable. The ROD recognized that the pace of ground water and in-situ bioremediation would be slow. Also, the ROD included a provision to evaluate the system performance after 5 to 10 years of operation to determine if the remediation goals could be achieved. In 2003, it was estimated that approximately 462,000 gallons of NAPL were present at the Site and that approximately 30 to 50 percent of the NAPL could be recovered through the current remediation system. The un-recovered NAPL would remain in the subsurface and continue to be a source of dissolved phase ground water contamination for the foreseeable future.

The remediation system has been operating for almost nine years. However, due to operational problems encountered during the first 4 years of operation, lack of appropriate data collection activities in the first 4 years of operation, enhancements and improvements made to site O&M procedures since the first five-year review, and implementation of a more comprehensive site monitoring program, this evaluation has not been performed. It would not be inappropriate to perform the system evaluation at this time.

6. Site remediation goals do not include the MCL for PCP. PCP is present in shallow site monitor wells at concentrations that are above its MCL of 1 µg/L. The ROD did not set a remediation goal for PCP, but the ROD did state that the MCLs were ARARs for the Site.

7. There remains a piezometer in the well field area that is not constructed according to LDEQ/LaDOT requirements. This was an issue identified during the first five-year review. The recommendation that the piezometer (referred to as the 'White Tube') be sampled, abandoned, and replaced if necessary has not been implemented, and this remains an issue for the second five-year review.

Recommendations and Follow-up Actions: The following recommendations and follow-up actions have been defined for the Site:

1. **Complete the design and construction changes planned for the in-situ bioremediation system.** The EPA has tasked CH2M HILL to perform infiltration testing to obtain data to support design and construction changes for the in-situ bioremediation system. Additional injection capacity is planned to remediate soil contamination present in the vadose zone. If left untreated, the soil contamination would continue to act as a long-term source of ground water contamination and increase the time required to achieve the ground water remediation goals for the Site. The design and construction changes planned for the in-situ bioremediation system should be completed.

2. **Address the ground water contamination that is present down-gradient of the recovery trench.** The EPA has tasked CH2M HILL to install two additional recovery wells in the trench gap (near SMW-2 and piezometer SP-9). Construction of the two new wells is planned to occur in July 2005. These two new wells should address the ground water contamination in this area. Ground water contaminated above the site remediation goals also exists down-gradient of the recovery trench at monitor well MW-2A. Although water level monitoring indicates that the recovery trench maintains an inward hydraulic gradient in the area of this monitor well, no monitor wells exist between MW-2A and Creosote Branch creek. Therefore, the down-gradient extent of the contamination is unknown. It is recommended that the installation of an additional monitor well be considered to verify that contaminated ground water is not migrating towards Creosote Branch creek in this area.

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3. **After the ground water issue described in item 2 above is addressed, and before the next five-year review, perform surface water and sediment sampling of Creosote Branch creek to confirm conditions in the creek.** The ROD states that ecological monitoring of streams and wetlands would be performed following completion of the RA. As noted in item 2 above, ground water contamination above Site remediation goals is now known to be present on the down-gradient side of the recovery trench. Also, one interviewee expressed concerns regarding the presence of contamination in Creosote Branch creek. Creosote seeps and staining were not observed during the Site inspection, however, which indicates the conditions in the creek have improved since implementation of the RA. Therefore, it is recommended the ground water issues identified in item 2 be addressed first, and then follow-up be performed to confirm the status of contamination in the creek. The data could be used to determine how conditions have changed in the creek since completion of the incineration portion of the RA and to verify that Site ground water is not adversely affecting surface water quality in the creek.

4. **Sample monitor well DMW-2 and analyze the samples using lower reporting limits to verify the presence or absence of carcinogenic PAH contamination in the deep aquifer.** It is recommended that monitor well DMW-2 be sampled, and the samples should be analyzed using reporting limits that are low enough to verify whether or not carcinogenic PAH concentrations exceed a B(a)P equivalent concentration of 0.20 µg/L. Several sampling events should be conducted to verify the absence of contamination. If the presence of contamination above the remediation goal is confirmed at this location, monitoring of the deep aquifer should be expanded, and additional actions should be evaluated to address the contamination.

5. **Evaluate the site remediation systems' ability to achieve the remediation goals for ground water prior to or during the next five-year review.** The ROD provided for conducting an evaluation of the selected remedy after five to ten years of operation to determine if the site remediation goals are achievable within a reasonable timeframe. The remediation system at the Site has been in operation for almost nine years. It is recommended that the evaluation of the site remediation systems' ability to achieve the remediation goals for ground water be conducted prior to or at the time of the third five-year review.

   The ROD left open the ability to implement contingency measures if it is determined that it is technically impracticable to achieve and maintain the remediation goals in site ground water. These measures could include continued pumping at rates sufficient to contain the site plume, waiving the chemical-specific ARARs for the cleanup of ground water in those portions of the aquifer where it is deemed technically impracticable to achieve further concentration reductions, and the implementation of institutional controls to restrict access to those areas of the aquifer where contaminant concentrations remain above the remediation goals. The first five-year review states that the residential land-use scenario, used to determine the remediation goals, may no longer be appropriate for the Site. It is also recommended that the evaluation of the remediation system include an assessment of the appropriateness of the remediation goals relative to current site conditions and current and future land and ground water use.

   To assist with the completion of this assessment, it is further recommended that the long-term monitoring program be carefully examined to ensure that the necessary data required to complete the assessment is being collected. If further data collection activities are determined to be necessary, then they should be incorporated into the Field Operations Plan.

6. **Include the MCL for PCP as a remediation goal in site ground water.** The ROD does not specifically state a remediation goal for PCP in ground water. However, the ROD does list the MCLs as ARARs for the Site. PCP is detected in many site wells at concentrations above the MCL. If restoration of site ground water to its beneficial use as a drinking water supply remains a remedial objective for the Site, then the MCL for PCP should be included as a remediation goal.

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7. **Abandon the piezometer identified as the 'White Tube'.** The piezometer identified as the 'White Tube' is not constructed according to LDEQ and LaDOT requirements. The first five-year review recommended that the piezometer be sampled, abandoned, and replaced if necessary. This recommendation is also made by this second five-year review.

Protectiveness Statement(s): The remedy implemented for the ACW Site is considered protective of human health and the environment. Waste and contaminated soils exposed at the surface of the Site were addressed through incineration and containment/capping. Contaminated ground water and NAPL is contained and extracted by the site fluids recovery system and treated in the PLTS. The PLTS effluent is then either discharged to Creosote Branch creek or injected back into the shallow ground water through the in-situ bioremediation system. The in-situ bioremediation system is operated to remediate contaminated subsurface soils. Continued O&M will ensure that the selected remedy continues to be protective.

Because the completed remedial action and O&M program for the American Creosote Works Site are considered protective for the short-term, the overall remedy for the Site is considered protective of human health and the environment for the short-term. The selected remedy will continue to be protective if the recommendations and follow-up items identified in this five-year review are addressed.

Other Comments: The Site is generally well maintained and operated. Improvements to site O&M made as a result of the implementation of recommendations of the first five-year review have resulted in increased production of ground water and NAPL and reduced O&M costs.

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Second Five-Year Review Report
American Creosote Works Superfund Site

The United States Environmental Protection Agency (EPA) Region 6 has conducted a second five-year review of the remedial actions implemented at the American Creosote Works (ACW) Superfund Site ('site' or 'ACW Site'), for the period between August 2000 (when the first five-year review was completed) to June 2005. The ACW Site is located in the City of Winnfield, Winn Parish, Louisiana. 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 in a Five-Year Review Report. Five-Year Review Reports identify issues found during the review, if any, and recommendations to address them. This Second Five-Year Review Report documents the results of the review for the ACW Superfund Site, conducted in accordance with EPA guidance on five-year reviews. EPA RAC6 contractor CH2M HILL, Inc. provided support for conducting this review and the preparation of this report.

EPA guidance on conducting five-year reviews is provided by Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (**EPA, 2001**) (replaces and supersedes all previous guidance on conducting five-year reviews). EPA and contractor personnel followed the guidance provided in this OSWER directive in conducting the five-year review performed for the ACW Site.

1.0 Introduction

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) §9601 *et seq*. and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300 *et seq*., call for five-year reviews of certain CERCLA remedial actions. EPA policy also calls for a five-year review of remedial actions in some other cases. The statutory requirement to conduct a five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA), P.L. 99-499. The EPA classifies each five-year review as either 'statutory' or 'policy' depending on whether it is being required by statute or is being conducted as a matter of policy. The second five-year review for the ACW Site is a statutory review.
As specified by CERCLA and the NCP, statutory reviews are required for sites where, after remedial actions are complete, hazardous substances, pollutants, or contaminants will remain onsite at levels that will not allow for unrestricted use or unrestricted exposure. Statutory reviews are required at such sites if the Record

of Decision (ROD) was signed on or after the effective date of SARA. CERCLA §121(c), as amended, 42 USC § 9621(c), states:

> 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.

The implementing provisions of the NCP, as set forth in the CFR, state at 40 CFR 300.430(f) (4) (ii):

> 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.

The five-year review for the ACW Site is required by statute because the ROD for the Site was signed on April 28, 1993, after the effective date of SARA, and because materials remain onsite above levels that allow for unlimited use and unrestricted exposure. This is the second five-year review for the ACW Site; the first review was completed in July 2000. The triggering action for the five-year review at the ACW Site is the date of the start of the Remedial Action (RA) for the Site (December 1994).

2.0 Site Chronology

A chronology of significant site events and dates is included in **Table 1**, provided at the end of the report text. Sources of this information are listed in **Attachment 1, Documents Reviewed**.

3.0 Background

This section describes the physical setting of the Site, including a description of the land use, resource use, and environmental setting. This section also describes the history of contamination associated with the Site, the initial response actions taken at the Site, and the basis for each of the initial response actions. Remedial actions performed subsequent to the initial response actions at the Site are described in **Section 4**.

3.1 Physical Characteristics

The ACW Superfund Site is located in the City of Winnfield, Winn Parish, Louisiana, in the north-central portion of the state (see **Figure 1** for a site map). The City of Winnfield has a population of approximately 7,000 residents. The ACW Site is about 34 acres in size, and it is bordered by Front Street on the west and Watts and Grove Streets on the south. The Site is bounded on the north and east by Creosote Branch creek, a perennial creek. The contamination at the Site resulted from past activities associated with wood treatment operations (**EPA, 2000**, and **EPA, 1993a**).

The Site is currently comprised of two land parcels. The south parcel, which is owned and controlled by Winn Parish, is inactive. Three monitor wells and ancillary structures remaining from the former soils remediation incinerator are located on this parcel. The north parcel is also owned by Winn Parish, but the property is under the control of the EPA through an access agreement. The north parcel is separated from the south parcel and completely enclosed by a security fence. A fluids recovery system (comprised of numerous extraction wells and trenches), numerous monitor wells, a fluids injection system (comprised of numerous injection wells and trenches used as part of the in-situ bioremediation system), and the Process Liquids Treatment Facility (PLTS) are located on the north parcel. Two waste burial areas (the Tar Mat and Waste Cell) are also located on the north parcel. The Tar Mat area was used to dispose of the ash generated by the soils remediation incinerator, while the Waste Cell was used for the disposal of contaminated materials from prior EPA removal actions and the RA at the Site (**EPA, 2000**).

The site topography slopes from south to north descending in elevation from approximately 120 feet to 105 feet above mean sea level (MSL). Surface water at the Site drains into Creosote Branch creek. Creosote Branch creek flows within a 10 to 12 feet deep drainage at an approximate elevation of 90 feet above MSL. Creosote Branch creek flows two miles east-southeast of the Site, where it joins Port de Luce Creek, which flows another three miles to the southeast and joins Cedar Creek. Cedar Creek eventually drains into the Dugdemona River, which is one of the larger waterways in the Winnfield area (**EPA, 2000**).

Surface drainage at the Site is varied. The northwestern portion of the Site is drained primarily through overland flow into Creosote Branch creek. Low relief in this area results in the ponding of water during heavy rains. The north-central portion of the Site is currently drained by two north-south trending drainage ditches, which empty into Creosote Branch creek. Surface water in the northeastern portion of the Site, in the vicinity of the former Tar Mat area, drains overland to a natural drainage that enters Creosote Branch creek. The southern portion of the Site, which is topographically higher, is characterized by rapid runoff of surface water. The runoff is captured by an east-west trending drainage ditch constructed by the EPA. This ditch drains to the west into Creosote Branch creek. A shallow pond, most likely constructed by a previous owner to provide firewater storage, is located in the southeastern corner of the Site. This pond is up-gradient with respect to ground water flow, and it most likely interacts with ground water in the deeper aquifer at the Site (**EPA, 2000**).

The northern portion of the Site is underlain by the Prairie Terrace deposits. These deposits are unconsolidated and poorly bedded and consist of a mixture of gravel, sand, and silt. The Prairie Terrace deposits are up to 25 feet thick at the Site, and the deposits exhibit a fining upward grading. Gravels are common at the base, and sandy to clayey silt is common in the upper 10 feet. The Prairie Terrace deposits lie unconformably on the Cockfield Formation in the northern areas of the Site, forming a wedge that thins to the south. The Cockfield Formation consists of lignitic shales interbedded with silty sands. The Cockfield Formation outcrops in the southern portion of the Site, and it is approximately 150 feet thick in the Winnfield area (**EPA, 2000**).

A shallow aquifer is present at the Site within the Prairie Terrace deposits. Ground water occurs under confined conditions within the shallow aquifer, and ground water flows to the north and discharges to Creosote Branch creek. A deeper aquifer occurs at the Site within the Cockfield Formation at depths of 55 to 65 feet below ground surface (bgs). Ground water in the deeper aquifer flows towards the northwest, and an upward vertical gradient exists between the deep and shallow aquifers (**EPA, 2000**). Potable water in Winn Parish is obtained from the Sparta Aquifer, which occurs below the Cockfield Formation at depths ranging from 180 to 300 feet bgs. Ground water contamination at the Site is contained within the shallow aquifer in the Prairie Terrace deposits, and is present primarily in the former process and impoundment areas and areas hydraulically downgradient of these locations. Samples collected during the Remedial Investigation (RI) determined that no contamination was present in the deep aquifer (**EPA, 1993a**).

3.2 Land and Resource Use

Land use in the ACW Site area includes agricultural, residential, and recreational uses. Agricultural uses are localized and occur in areas between forested land and residential development. Primary crops include soybeans, wheat, cotton, and corn. Forests in the area are used primarily for timber production. A large inactive lumber mill is located immediately north of the Site across Creosote Branch creek and adjacent to the Kansas City Southern Railroad. Forest lands also support recreational uses including hunting, fishing, camping, and hiking. The Site is surrounded by residential neighborhoods, with the closest residence being located 200 feet from the Site. Most of the residents use the Winnfield Water System as their source of potable water (**EPA, 2000, and EPA, 1993a**).

Portions of the ACW Site originally contained regulatory wetlands (the areas meet the three criteria necessary to be defined as a wetland). Approximately 28.3 acres of wetlands and 1.6 acres of open water were identified at the Site and on adjacent land, on the northern, eastern, and western peripheries (in the vicinity of Creosote Branch Creek) (**EPA, 2000**). These wetlands have been degraded to some extent and may no longer be present to the extent originally observed.

3.3 History of Contamination

Wood treatment operations at the ACW Site began in 1901, when the Site was operated by the Bodcaw Lumber Company. In 1910, the Bodcaw Lumber Company sold 22 acres of land, including most of the ACW Site, to the Louisiana Creosoting Company. The ROD indicates that operational records for the periods of ownership of both companies were not available. In 1938, the ACW Site was purchased by American Creosote Works of Louisiana, Inc. (later to become American Creosote Works, Inc.), which operated the facility until 1977. At some point during this period, American Creosote Works acquired an additional 12 acres of adjoining property (**EPA, 1993a**).

Wood treatment operations at the Site utilized both creosote and pentachlorophenol (PCP). Petroleum products were also used as a carrier fluid for the creosote and PCP. There is no available evidence from site historical records or sampling data to indicate that inorganic compounds (such as chromated copper arsenate or ammoniacal copper arsenate) were used in the treatment processes at the ACW Site (**EPA, 1993a**).

Aerial photography shows that the ACW Site facilities were well established by 1940. Wood treating operations were concentrated in the north-central portion of the Site (referred to as the central process area, located in the vicinity of the current Waste Cell). This area consisted of a boiler building surrounded by pressure chambers, or retorts. A tank farm was located east of the boiler building. The tank farm lacked secondary containment. The southern half of the Site was used to stage and prepare timbers (debarking and cutting) prior to treatment, while treated lumber was stored in the central and north-central (north of Creosote Branch creek) portions of the Site. Several railroad tracks ran across the Site from southwest to northeast, passing through the central process area. These tracks were apparently used to transport treated and untreated lumber around the Site. In the 1940 aerial photograph, an unnamed drainage pathway flowed from the central process area north and east, through the area later referred to as the Tar Mat, to a confluence with Creosote Branch creek (**EPA, 1993a**).

Between late 1950 and mid 1952, two surface impoundments (impoundments 1 and 2) were constructed east to the central process area. These two impoundments probably received liquid wastes from the wood treatment processes. The liquid wastes could have included water, tree sap, petroleum distillates, and PCP. A third surface impoundment (impoundment 3) was constructed in the mid 1960s. Based on aerial photographs and records found at the Site, the mid- to late-1960s appear to have been the period of peak operations at the ACW Site. According to site records, for a seven-month period ending July 31, 1966, more than 750,000 gallons of petroleum distillate, 40,000 gallons of creosote, and 54,000 pounds of PCP were used to treat approximately 7.5 million board-feet of lumber (**EPA, 1993a**).

Impoundment 1 was backfilled with soil and wood chips between 1967 and 1970. An aerial photograph from 1973 reveals the development of the Tar Mat area located approximately 500 feet east of the central process area. The Tar Mat was a large, flat, asphalt-like layer that extended over a marshy portion of the Site. The 1973 aerial photograph showed that a number of mature pine trees located within the Tar Mat had died shortly before the photograph was taken. The cause of the Tar Mat is unknown. The ROD indicates that it possibly formed as a result of a single spill event. The Tar Mat may also have resulted from the removal and disposal of impoundment sludge (**CH2M HILL, 2002**). Between 1973 and 1976, a fourth surface impoundment (impoundment 4) was constructed north of impoundment 2. Impoundment 4 may have been used to contain drainage from impoundment 2. A pond was also constructed during this time period just south of impoundment 2. This pond was used to collect and store water for emergency fire fighting purposes (**EPA, 1993a**).

By 1979, it appears in aerial photographs that wood treating operations at the ACW Site had ceased. Very little treated and untreated wood were present at the Site, and all the site railroad tracks had been removed. The site owner, Dickerson Lumber Company, declared bankruptcy during this time period, and the City of Winnfield seized the property for failure to pay taxes (**EPA, 1993a**).

The Site was eventually purchased by Stallworth Timber Company, and by 1981, wood treating operations resumed at the Site on a smaller scale. A large drainage ditch was excavated from the south-central portion of the Site to the north and east, running between the central process area and impoundment 2. By 1983, impoundments 2 and 4 had been backfilled with soil and wood chips, and the retaining walls around the impoundments had been demolished. The Louisiana Department of Environmental Quality (LDEQ) discovered the Site abandoned in June 1985 (**EPA, 1993a**).

Wood treatment operations occurred at the ACW Site for a period of over 80 years. During this time, areas of the Site were contaminated through spills, runoff, and possibly discharges. Investigations at the Site focused primarily on creosote, PCP, and the contaminated petroleum carrier fluids used in site operations. Creosote is composed of over 300 polynuclear aromatic hydrocarbon (PAHs) compounds. The most toxic PAH compound is Benzo (a) Pyrene (B(a)P). Therefore, the carcinogenic PAH compounds were converted to B(a)P equivalents during the RI and risk assessments for reporting purposes. In addition, in the most contaminated portions of the Site, dioxin contamination was also found to be present. Dioxins are a group of similar chemicals of which tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic. Dioxin concentrations were similarly reported as TCDD equivalents during the site RI and risk assessment, although no TCDD has ever been detected at the ACW Site (**EPA, 1993a**).

3.4 Initial Response

The State of Louisiana Stream Control Commission investigated the ACW Site in 1966. High levels of phenols and biological oxygen demand (BOD) were noted in site wastewater discharges. It is believed that the construction of simple impoundments designed to improve waste handling and treatment at the Site resulted from the investigation (**EPA, 2000**).

The LDEQ conducted several inspections at the Site between 1982 and 1986. These inspections noted spillage of creosote, abandoned pits and containers, and obvious offsite contamination. As a result, the LDEQ issued a letter of warning to Stallworth Timber Company in January 1983 in response to observed releases to the environment. In December 1984, LDEQ inspectors noted no improvements at the Site, and a Compliance Order was issued to Stallworth Timber Company on January 22, 1985. Stallworth Timber Company failed to comply with the terms of the Compliance Order, and in June 1985, LDEQ inspectors found the Site abandoned (**EPA, 2000, and EPA, 1993a**).

The LDEQ referred the ACW Site to EPA Region 6 in March 1987, requesting that the EPA take action at the Site. The EPA conducted several investigations at the Site in 1987 and 1988. In May 1988, the EPA issued a Unilateral Administrative Order (UAO) to Stallworth Timber Company that directed Stallworth Timber Company to construct a fence and post warning signs around the most contaminated portions of the Site. Stallworth Timber Company completed this task in July 1988. During this action, an EPA Emergency

Response Cleanup Services (ERCS) contractor noted two storage tanks at the Site that were in imminent danger of rupturing. EPA notified Stallworth Timber Company of this threat, but Stallworth Timber Company declined taking action. This resulted in the EPA mobilizing an ERCS team to the Site (**EPA, 2000**, and **EPA, 1993a**).

The EPA conducted the first emergency removal action at the ACW Site between May 31 and June 5, 1988. This removal action involved draining the tanks and constructing a berm around the process area to contain and stabilize heavily contaminated soils. At the completion of this work, heavy rains threatened to overflow and erode the berm. The EPA remobilized ERCS to the Site. The height of the berm was extended, and an overflow filtration system was installed (**EPA, 2000**, and **EPA, 1993a**).

In February 1989, the EPA issued a UAO to Stallworth Timber Company for a removal action to address the immediate threats posed by the ACW Site as determined during previous investigations. Stallworth Timber Company again declined to take action in response to the UAO. From March 17 to August 21, 1989, the EPA conducted another emergency removal action at the ACW Site to address the immediate, short-term risks posed by the Site. This emergency removal action involved several activities. All wood treating liquids at the Site were consolidated into a single tank. Liquid and surface sludges at the Site were solidified with rice hulls and fly ash, and the stabilized material was consolidated into an existing impoundment (now identified as the Waste Cell). Existing buildings and process equipment were dismantled, decontaminated, and placed in a scrap pile northwest of the process area. An east-west drainage ditch was constructed to redirect surface water runoff from the southern portion of the Site away from the heavily contaminated northern portion. A large north-south drainage ditch running through the most contaminated areas was backfilled. Finally, contaminated water from holding ponds, lagoons, containment basins, and storage tanks was treated and discharged to Creosote Branch creek (**EPA, 2000**, and **EPA, 1993a**).

In December 1991, the EPA, US Justice Department, and Stallworth Timber Company met to discuss reimbursement of past and future response costs for the ACW Site incurred by the US Government. Stallworth Timber Company was also offered the opportunity to conduct the RI, Feasibility Study (FS), Remedial Design (RD), and RA for the Site. At this meeting, Stallworth Timber Company notified the EPA that the property had been sold to Reinhardt Investments (located in the Netherlands Antilles). Stallworth Timber Company notified the EPA by letter dated December 12, 1992 that it would not conduct the work due to financial inability. The EPA received no response to its inquiries to Reinhardt Investments (**EPA, 1993a**).

As a result, the EPA conducted an RI/FS for the ACW Site between February and July 1992. The RI revealed that:

- Approximately 275,000 cubic yards of contaminated soils were present at the Site in the Tar Mat area, Tar Mat drainage area, Waste Cell area, impoundment areas, and the central process area. This contamination extended down to depths of approximately 40 feet bgs in some areas.
- Approximately 200,000 gallons of light non-aqueous phase liquids (LNAPLs) and dense non-aqueous phase liquids (DNAPLs) were present at the Site beneath the central process area and impoundment areas.
- Approximately 24 million gallons of dissolved contamination was present in site ground water in the shallow aquifer beneath the central process area, impoundment areas, and areas hydraulically downgradient. Ground water contamination was determined to be migrating north towards and intercepted by Creosote Branch creek. Tarry seeps were observed on the creek bank adjacent to the Site.
- Sediment contamination extended up to 2 miles downstream from the Site in Creosote Branch creek and downstream tributaries (**EPA, 2000**).

Site soils were determined to be contaminated with PAHs, volatile organic compounds (VOCs), dioxins, and PCP. The shallow aquifer at the ACW Site was determined to be contaminated with PAHs, phenols, and benzene. The pattern of ground water contamination was discovered to closely follow the pattern of subsurface soil contamination. Based on the results of the RI, surface waters in Creosote Branch creek were determined to not pose a significant threat to human health or the environment. However, sediments near the Site, contaminated with PCP and PAHs, were determined to pose a threat to the environment (**EPA, 2000**).

3.5 Basis for Taking Action

The purpose of the response actions conducted at the ACW Site was to protect public health and welfare and the environment from releases or threatened releases of hazardous substances from the Site. Remedial actions taken at the Site were deemed necessary based on the results of the RI, Baseline Human Health Risk Assessment (BHHRA), and the Ecological Risk Assessment (ERA) conducted for the ACW Site. Due to the land use surrounding the Site at the time of the RI, the EPA concluded that a residential use scenario was most appropriate for estimated risks posed by the Site. Exposure to contaminated soils at the Site under a residential exposure scenario resulted in an excess cancer risk of 2×10^{-2} (well above the EPA's recommended range of between 1×10^{-4} and 1×10^{-6}) based on direct contact with the soil. In addition, ingestion of contaminated ground water resulted in an excess cancer risk of 8 x 10^{-2} and an estimated noncancer chronic hazard index of 43 (well above the EPA recommended index of 1). Sediment contamination in Creosote Branch creek was determined to not pose a threat to human health. Toxicity testing during the RI demonstrated that the sediments do pose a threat to the environment. However, the EPA determined that removal of the contaminated sediments in Creosote Branch creek by excavation could adversely affect nearby wetlands, and disturbance of the sediments would pose a greater environmental threat than leaving them in place. The primary threats that the ACW Site posed to public health were direct contact with contaminated site soils and ingestion of contaminated site ground water by potential future residents (**EPA 2000**, and **EPA 1993a**).

4.0 Remedial Actions

The second five-year review specifically addresses actions taken at the ACW Site since completion of the first Five-Year Review Report, completed in August 2000 (**EPA, 2000**). This section provides a description of the remedy objectives, selection, and implementation at the ACW Site. It also describes the ongoing operations and maintenance (O&M) activities performed and overall progress made at the Site in the period since completion of the first five-year review. The EPA is managing the site O&M activities through its RAC6 contractor CH2M HILL.

4.1 Remedy Objectives

The specific remedial objectives for the ACW Site RA were:

$ For shallow ground water, prevent the exposure of potential receptors to onsite contaminated ground water in amounts above human health-based standards and to restore ground water quality;
$ Remove the threat of potential exposure to future residents via direct contact with contaminated surface soils, Tar Mat materials, and non-aqueous phase liquids (NAPLs); and,
$ Reduce the potential for site contaminants to migrate into surface waters or ground water (**EPA, 1993a**).

In order to achieve the remedial objectives, the ROD established the following remediation goals for the ACW Site:

- For site ground water, reduce PAH concentrations to below the Maximum Contaminant Level (MCL) of 0.2 micrograms per liter (µg/L) based on B(a)P equivalents and to reduce benzene concentrations to below the MCL of 5 µg/L;
- The remediation goal for PAHs in treated and untreated soils (both surface [0-2 feet bgs] and subsurface [below 2 feet bgs]) was 3,000 micrograms per kilogram (µg/Kg);
- The remediation goal for PCP in treated and untreated surface and subsurface soils was 50,000 µg/Kg (however, the ROD states that this goal may be revisited, based on Resource Conservation and Recovery Act [RCRA] treatment requirements, if the ground water cleanup goals were met); and,
- For dioxins in soils, the remediation goal was set at 1 µg/Kg TCDD equivalents in treated soil. Untreated soil with TCDD equivalent concentrations between 1 µg/Kg and 10 µg/Kg were to be covered with a minimum of 12 inches of clean soil (**EPA 2000**, and **EPA 1993a**).

4.2 Remedy Selection

One ROD has been issued by EPA for the ACW Site. The Site was also addressed through two emergency response actions as described in **Section 3.4**. The ROD for the ACW Site was signed on April 28, 1993. The ROD addressed the principal threats posed by the Site to human health and the environment. These threats were determined to be direct contact with contaminated site soils and ingestion of contaminated site ground water by future residents. The ROD states that the selected remedy is the final remedy for the Site, and that the remedy addresses remediation of shallow ground water contamination, the sources of shallow ground water contamination, and contaminated soils at the Site (**EPA, 1993a**).

The remedy described in the 1993 ROD for the ACW Site consisted of the following elements:

- Liquid contaminants (ground water, LNAPLs, and DNAPLs) were to be pumped from the subsurface, separated, and treated. The separated NAPLs would be destroyed through onsite or offsite incineration. The contaminated ground water would be treated onsite and either discharged or used as part of the in-situ biological treatment system discussed below.
- 25,000 cubic yards of highly contaminated tars and sludges located in the Tar Mat area would be incinerated onsite. The resulting incinerator ash would be returned to the excavated areas and used to backfill the excavations. The backfilled excavations would be graded, capped with soil, and revegetated.
- 250,000 cubic yards of contaminated soils and sludges in the central process area and buried pits would be addressed through in-situ biological treatment. Nutrients, microbes, and oxygen would be injected into the subsurface via wells as necessary to enhance biological treatment in-situ and to attain the stated

remediation goals. The ground water extraction system used for ground water and NAPL recovery would also be used to hydraulically control offsite migration of contaminated ground water and to allow for the potential recirculation of bacteria for efficient treatment.

$ Capping of contaminated surface soils, decontamination and onsite landfilling of process equipment and scrap, and grading and capping to complement the above remedial actions.

$ The surface soils in the area between the Tar Mat and Creosote Branch creek would not be removed as part of the Site remedy due to potential detrimental impacts to wetlands in that area. Soils in this area, although containing B(a)P equivalent concentrations above the site remediation goals, were determined to pose a risk below the 1×10^{-4} goal for remediation. It was determined that surface soils in this area did not pose a significant threat to ground water or human health.

$ Contingency measures were established in the event that the ground water remedy was not able to achieve the site remediation goals at any or all monitoring points at the Site (the ROD goes on to define the area of attainment for the ground water remediation goals as being the site plume). These measures include continued low-level pumping to provide gradient control and plume containment, waiving chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for the cleanup of those portions of the plume where it is deemed technically impracticable (as determined by both the EPA and LDEQ) to achieve further contaminant reduction, and implementing institutional controls to restrict access to the aquifer in those areas where contamination remains above health-based goals (should the aquifer ever be proposed for use as a drinking water source).

$ The ROD called for ecological monitoring for an estimated period of 5 to 10 years after implementation of the RA. The extent of ecological studies was to be determined during the RD and was to include an evaluation of wetlands and streams as the EPA and the LDEQ considered appropriate.

$ The ROD also called for ground water monitoring to occur for 5 to 10 years after completion of the onsite remedial activities to monitor the effectiveness of the source destruction (**EPA, 1993a**).

4.3 Remedy Implementation

The RD for the ACW Site was conducted concurrent to the preparation of the ROD using an expedited RD process. The RD evolved through an iterative process between 1992 and 1996 in conjunction with the development of the EPA's guidance for presumptive remedies at wood treating sites. The EPA contracted with the United States Army Corps of Engineers (USACE) to perform the RD/RA for the ACW Site (**EPA, 2000**).

Prior to initiation of the incineration, an investigation was conducted of the Tar Mat and Waste Cell materials. The purpose of the investigation was to obtain data regarding the source materials as part of the RD. Based on this investigation, it was estimated that approximately 34,000 cubic yards of material from the Tar Mat and 4,000 cubic yards of material from the Waste Cell would require incineration. In addition, it was determined that a dewatering system would be necessary in the excavation at the Tar Mat area due to the anticipated depth of excavation (15 feet bgs) relative to the depth where ground water occurred in that area (approximately 5 feet bgs) (**EPA, 2000**).

The USACE contracted IT Corporation to perform the RA for the ACW Site. Site operations associated with the excavation of the Tar Mat area began on October 4, 1996. IT Corporation's subcontractor, GDC Enviro-Solutions, conducted the incinerator trial-burn at the ACW Site from December 2 – 6, 1996. The trial burn demonstrated that the incinerator met the regulatory and performance requirements. Material was excavated starting on the eastern end of the Tar Mat area. The excavated material was prepared and then incinerated, and the resultant ash was then stored pending analytical results demonstrating compliance with the treatment specifications. The ash was then returned to and placed in the Tar Mat area excavation near its point of origin. The bottom of the excavation was lined with a geotextile liner prior to placement of the ash, and a three-foot thick clay cover was placed on top of the ash at the end of incineration (**EPA, 2000**).

The incineration portion of the RA was completed in February 1998. Approximately 56,500 tons of contaminated materials were treated. In addition, approximately 7,000 cubic yards of material was excavated and consolidated into the Waste Cell due to low-levels of contamination (**EPA, 2000**).

The ground water and NAPL extraction, treatment, and in-situ bioremediation components of the selected remedy were constructed together and operate as a single system divided into three component systems. These three systems include:

- The fluids recovery system, which extracts contaminated ground water and NAPL;
- The PLTS, which separates the ground water from the NAPL and treats the contaminated ground water; and,
- The in-situ bioremediation system, which remediates contaminated site ground water and soils.

In addition, a network of monitor wells and piezometers were installed to monitor remedy performance and verify hydraulic containment. Construction of these components began in March 1996 and was substantially completed in September 1996. Full-time operation of the entire system began October 1, 1996 (**EPA, 2000**).

The fluids recovery system includes a network of extraction wells and two extraction trenches. The extraction wells and trenches are linked together via air supply piping that operates the well and trench sump pumps. Recovered fluids are conveyed to the PLTS through double walled piping. A total of 15 extraction wells were construction as part of the original system. Three additional wells (for a total of 18 extraction wells) were constructed in the Waste Cell area in March 1999. **Figure 2** shows the layout of the extraction system.

Each extraction trench (designated the north extraction trench and the east [Tar Mat] extraction trench) was constructed using 4-inch diameter High Density Polyethylene (HDPE) pipe with 1/8 to 1/4-inch diameter perforations. The HDPE pipe is place in the bottom of each trench, and the trenches are backfilled with graded sand and gravel. The perforations allow the NAPL and ground water to enter the HDPE pipe, where the fluid is then conveyed to several sumps installed along the length of the trenches. Each sump contains a pump used to extract the fluids from the subsurface. The First Five-Year Review Report noted that two gaps exist in the HDPE piping in the north extraction system. The first gap is 85 feet long and extends east of sump S3, and the second gap is 15 feet long and extends east of sump S4. The report indicated that, due to the higher hydraulic conductivity of the trench backfill materials relative to the aquifer, the trenches themselves should facilitate capture of mobile creosote and transfer the creosote towards the collection piping (**EPA, 2000**).

The PLTS was designed to separate NAPLs and dissolved contamination from ground water. Treatment levels were not specified, but it was established during the design of the system that the effluent treatment requirements would be the same as those established for the treatment system constructed at the Bayou Bonfouca Superfund Site in Slidell, Louisiana. Although some modifications have been made to the PLTS since construction, the system uses four major process stages to treat the extracted ground water and NAPL. The first stage involves removal of NAPL from water in an oil/water separator (OWS). The second stage involves flocculation and settling of small NAPL particles not separated in the OWS in a lamella clarifier. The third stage of treatment completes decomposition of biodegradable organic compounds through aerobic respiration in an activated sludge bioreactor. The final stage of treatment includes sand and activated carbon filtration. The effluent from the PLTS is either discharged to Creosote Branch creek or used for the in-situ bioremediation system (**EPA, 2000**).

The in-situ bioremediation system includes a nutrient additive system, an injection trench, and seven injection wells. Fluids are conveyed from the PLTS to the injection system through double walled piping. A float valve in each well and sump maintains the water level at an estimated elevation of 104 feet. **Figure 2** shows the layout of the injection system (**EPA, 2000**).

The system uses treated effluent supplied from the PLTS, and it is designed to enhance biodegradation of organic contaminants in the saturated zone. The primary contaminants of concern (PAHs and PCP) most readily biodegrade under aerobic conditions. The nutrient additive system amends a portion of the PLTS effluent with hydrogen peroxide and Restore 375 (a buffered nutrient mixture of ammonium chloride and phosphate compounds). The hydrogen peroxide is used to increase dissolved oxygen (DO) concentrations in the injected water, and the Restore 375 provides nitrogen, phosphorus, a sequestering agent, and pH buffering. Initially, the system was designed to use air sparging as a means of increasing DO concentrations, but this was discontinued in favor of hydrogen peroxide (**EPA, 2000**).

The monitoring network completed as part of the RA included 12 shallow monitor wells, 7 deep monitor wells, 11 shallow piezometers, and 5 deep piezometers (**EPA, 2000**). An additional 6 shallow monitor wells and 7 shallow piezometers were installed in 2003 and 2004 (**CH2M HILL, 2004**). The monitoring network is designed to track contaminant concentrations in both the shallow and deep aquifers and to determine hydraulic gradients for purposes of verifying capture and containment of the ground water contamination.

4.4 Operations and Maintenance and Long-Term Monitoring

As stated in the ROD, the EPA is responsible for conducting O&M activities at the Site. The EPA has contracted with CH2M HILL to perform O&M at the Site. A general Field Operations Plan has been developed by CH2M HILL that specifies the general O&M activities conducted at the Site (**CH2M HILL, 2001**). Specific O&M requirements for various components of the remedy are contained in various Operations and Maintenance Manuals developed by IT Corporation. Copies of these manuals are stored at the Site for use by the O&M staff.

O&M activities at the Site include continued operation and upkeep of the well field (including the extraction and injection trenches, extraction and injection wells, monitor wells, and piezometers), continued operation and upkeep of the PLTS, inspections and maintenance of the site fence, inspections and maintenance of the disposal areas (waste cell and tar mat), routine sampling of the PLTS, semiannual ground water sampling, weekly hydraulic containment and semiannual site-wide water level monitoring, mowing of the Site, and site security. O&M activities are conducted by onsite personnel, and routine maintenance and monitoring activities are conducted on a daily basis, five days a week. There is also a system within the PLTS building that has the capability to call a site operator if an alarm condition occurs when operations personnel are not present onsite. General site O&M activities are described in the Field Operations Plan (**CH2M HILL, 2001**) and are summarized in the following paragraphs.

The well field (extraction and injection wells and recovery and injection trenches) is operated continuously. The first five-year review recommended that a pumping strategy be developed for the Site to create a uniform ground water flow field between the injection and extraction trenches. The purpose of the pumping strategy was to increase NAPL recovery rates and provide for a more uniform distribution of nutrients and oxygen in the well field (**EPA, 2000**). A pumping strategy was developed and implemented in July 2001. The original pumping strategy called for operating a subset of the injection and recovery wells in two phases. After the first year of operation using the pumping strategy, it was determined that operating a particular subset of the injection and recovery wells full-time worked better towards achieving the original goals (increasing NAPL recovery and more uniform distribution of nutrients and oxygen). **Table 2** provides a list of the injection and recovery wells as well as trench sumps that are currently operated at the Site. The locations of each recovery well, injection well, recovery trench sump, and injection trench sump are shown on **Figure 2**.

O&M of the well field includes various tasks that occur on a daily, weekly, and yearly basis. All active recovery wells, injection wells, and trench sumps are inspected daily to make sure that each is operating properly and that no leaks are present. Water levels are recorded from selected monitor wells, piezometers, and recovery sumps on a weekly basis to verify hydraulic containment of the contaminated ground water. Finally, each well and sump is inspected on a yearly basis for damage to the well or well pad and to verify the presence of locks and identification markings. Total depth measurements are also collected yearly. A preventative maintenance program has been implemented for the well field components of the remedy. Additional pumps and spare parts are kept at the Site. When a pump fails or is about to fail, a new pump is installed in the well/sump, and the failed pump is repaired and stored for later reuse. Sand infiltration in certain recovery trench sumps (as noted in the first five-year review) still occurs. The sumps have to be cleaned out approximately every two years. Finally, procedures are in place to determine when redevelopment of wells is required due to sand infiltration and/or fouling.

Various O&M tasks for the PLTS occur on a daily, weekly, monthly, quarterly, and semiannual basis. The primary tasks included in the PLTS inspection and maintenance program are provided in **Table 3**. Activities and items not listed in **Table 3** are performed when determined necessary. The PLTS is automated such that an operator is not required for the system to function. The PLTS can be accessed remotely to determine the operational status of PLTS. Also, the system has the ability to page an operator if an alarm condition occurs. Sampling of the PLTS is performed at various stages in the treatment process to evaluate the system's performance. Also, the PLTS effluent is sampled on a daily and twice weekly basis to demonstrate compliance with the site discharge limits. These samples are analyzed onsite, which allows for a cost effective means of obtaining results quickly. The schedule analytical parameters for samples of the PLTS effluent that are analyzed onsite are provided in **Table 4**. In addition, samples of the PLTS are collected on a quarterly basis and submitted to an offsite laboratory to verify compliance with the site discharge requirements. A list of the analytical parameters and discharge limits is provided in **Table 5**.

O&M of the long-term monitoring network includes inspection of the monitor wells and piezometers, water levels measurements, and ground water sampling. Water level measurements are collected from each monitor well and piezometer semiannually to determine overall ground water flow in both the shallow and deep aquifers at the Site. In addition, ground water sampling is conducted semiannually at selected monitor wells, piezometers, recovery wells, and recovery sumps to monitor contaminant trends in ground water at the Site. The list of wells to be sampled is evaluated and updated on a yearly basis, and the ground water sampling and water level measurement schedule for the year 2004 is provided in
Table 6. The wells and sumps where water level measurements are collected weekly to demonstrate hydraulic containment of the ground water plume are also listed in **Table 6**. The location of the monitor wells and piezometers are shown on **Figures 3 and 4**. The site monitor wells and piezometers are inspected on a yearly basis for damage to the well or well pad and to verify the presence of locks and identification markings. Total depth measurements are also collected yearly.

Several additional O&M activities are conducted at the Site on a monthly basis. The site fences are inspected to confirm that there are no breeches or damage to the fence and that all warning signs are present. Also, the caps on the two disposal areas (Waste Cell and Tar Mat) are inspected monthly for the presence of holes, cracks, erosion, settlement, trees, and bushes. Finally, the surface drainage system is inspected to make sure it is free of rocks, debris, excessive sedimentation, and excessive vegetation. Mowing is also performed at the Site on an as needed basis.

4.5 Progress Since Initiation of Remedial Action

During the RA, approximately 56,500 tons of highly contaminated soils from the Tar Mat area were incinerated. In addition, approximately 7,000 cubic yards of low-level contaminated soils were consolidated in the Waste Cell and capped with a low-permeability clay cover (**EPA, 1999**). The southern portion of the Site has been released for reuse (**EPA, 2000**).

The fluids recovery system, PLTS, and in-situ bioremediation system have been operational since October 1996. From October 1996 through April 2005, approximately 46,600,000 gallons of ground water and 138,000 gallons of NAPL have been extracted and treated. Approximately 20,830,000 gallons of treated effluent has been discharged to Creosote Branch creek in that time, and approximately 23,560,000 gallons have been injected back into the aquifer through the in-situ bioremediation system. The remainder of the treated effluent is used by a bio-cell constructed on top of the Waste Cell as part of the biosolids management program. Approximately 500,000 gallons of ground water and 1,800 gallons of NAPL are extracted from the aquifer each month (**CH2M HILL, 2005**).

Quarterly and semiannual (beginning in 2003) ground water sampling has been conducted at the Site since completion of the first five-year review. The PLTS effluent is tested on a regular monitoring schedule that includes quarterly offsite sample analysis to confirm that the site's discharged effluent is in compliance with the discharge limits. The results of the ground water sampling activities and effluent sampling are further discussed in **Section 6.4**. Additional investigations were conducted in 2003 and 2004 to obtain data to better characterize the current conditions present at the Site. These investigations were conducted to provide address some of the recommendations presented in the First Five-Year Review Report (discussed in **Section 5.0**). These investigations are further discussed in **Section 6.4**.

Based on investigations conducted in 2003 and 2004, it was estimated that 462,000 gallons of NAPL were present in the subsurface at that time (**CH2M HILL, 2004**). O&M of the Site, as described in **Section 4.4**, will be on-going for the foreseeable future. Semiannual ground water monitoring results for the December 2003 through December 2004 period indicate the ROD cleanup level of 0.2 µg/L for PAHs expressed in B(a)P equivalents has been attained at 18 of the 32 locations currently being monitored while the 5 µg/L cleanup level for benzene has been attained at 17 of 32 locations. Continued emphasis on the optimization of fluid extraction and injection rates, in conjunction with recently completed and proposed system modifications, should further accelerate remedial action progress and promote a higher level of cleanup within the most heavily contaminated portions of the shallow aquifer.

5.0 Progress Since the First Five-Year Review

The first five-year review of the ACW Site was completed in August 2000. The findings of the first 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 Statements from First Five-Year Review

The First Five-Year Review report concluded that the remedial actions implemented at the ACW Site were protective of human health and the environment. The First Five-Year Review Report stated that the incineration of the Tar Mat wastes eliminated a concentrated source of contaminants responsible for uncontrolled releases to the environment. Also, the installation of a clay cover over the Tar Mat and Waste Cell provided a barrier against direct contact with any untreated material, and the site fence prevented access to the Site. Finally, the First Five-Year Review Report concluded that the fluids recovery system and PLTS provided for the removal and treatment of creosote and dissolved phase contamination from the shallow aquifer (**EPA, 2000b**).

5.2 First Five-Year Review Recommendations and Follow-up Actions

The first five-year review of the ACW Site, completed in August 2000, identified several deficiencies. These deficiencies were ranked as high, medium, or low priority. In addition, the First Five-Year Review Report contained recommendations and follow-up actions needed to address most of the deficiencies. The identified deficiencies and recommendations or follow-up actions are provided in **Table 7**.

The primary high and medium priority recommendations and follow-up actions in the First Five-Year Review Report included:

- Remove the sediment accumulated in extraction trench sumps S3, S4, and S5;
- Modify the Operations and Monitoring Plan to incorporate a sampling and analysis program that yields data that demonstrates the remedy’s protectiveness;
- Develop a preventative maintenance program for the PLTS;

- Install a pump in monitor well SMW-2 (located down-gradient of the extraction trench) to remove NAPL and dissolved-phase contaminants present in the well;
- Develop and institute a pumping strategy that creates a uniform flow field between the injection and extraction trenches, increases NAPL recovery rates, and provides a more uniform distribution of oxygen and nutrients;
- Perform ground water sampling at monitor well SMW-4 (located outside the extraction/injection system near the Tar Mat) to confirm whether or not contamination detected at this location in 1997 is still present;
- Develop an updated sample procedure for DO measurements that minimizes aeration of the sample;
- Develop a test method to evaluate the performance of the vapor phase granular activated carbon (GAC) system used to treat tank vapors inside the PLTS;
- Repair damage to the cover of the Waste Cell observed during the site inspection and incorporate an inspection schedule and repair procedure into the Operations and Maintenance Plan;
- Develop a bio-solids management program; and,
- Implement an institutional control that provides notice of site conditions and the need to preserve the integrity of the clay cover.

5.3 Status of Recommended Actions

This section describes the current status of implementation of the recommendations and follow-up actions included in the First Five-Year Review Report. The current status of implementation of the recommendations and follow-up actions is also provided in **Table 7**.

The first five-year review recommended that action be taken to correct inactive trench sumps S3, S4, and S5. These sumps were inactive due to sediment accumulation in the piping at the base of the sump. Each sump was redeveloped and returned to service. The sediment accumulation in these sumps is the result of the trench design. The site operators noted during the site inspection that sediment accumulation is still a problem at these locations, and that redevelopment is required approximately every two years to keep the sumps operational.

A Field Operations Plan (**CH2M HILL, 2001**) was developed for the Site to address the recommendation that a sampling and analysis plan be developed that yields data to demonstrate the remedy's protectiveness. The Field Operations Plan includes well field, PLTS, in-situ remediation system, and monitor well network O&M procedures and sampling requirements. The data collection efforts outlined in the Field Operations

Plan provides data that is sufficient to demonstrate the protectiveness of the remedy for the Site. Also, the Field Operations Plan contains inspection and maintenance schedules for the major components of the remedy, which addresses the recommendation that a preventative maintenance program be developed for the PLTS.

During the first five-year review, NAPL was observed in monitor well SMW-2, which is located down-gradient of the recovery trench and between the trench and Creosote Branch creek. The first five-year review noted that the contamination was not be captured by the fluids recovery system, and the potential existed for this contamination to migrate to Creosote Branch creek. The first five-year review recommended that a pump be installed in this monitor well to extract NAPL and dissolved phase contamination from the ground water near this well (**EPA, 2000**). A subsurface investigation (further discussed in **Section 6.4**) was conducted in 2003 and 2004. Testing was performed to assess the performance of SMW-2 as a recovery well. Also, an evaluation was performed to determine if the contamination present at SMW-2 was related to a NAPL source that existed prior to construction of the recovery trench or if the contamination had migrated through a gap that exists in the recovery trench. The results of the investigation and ground water sampling efforts led to the conclusion that the contamination present at SMW-2 resulted from both a nearby NAPL source and contaminant migration through the gap in the recovery trench (**CH2M HILL, 2004**). The EPA is currently working with CH2M HILL to perform optimization of the remedy at the Site. As part of this work, two new extraction wells will be installed down-gradient of the recovery trench in the area near SMW-2 to capture the contamination that exists in this area.

The First Five-Year Review Report recommended that a pumping strategy be developed and implemented at the Site. It was noted in the first five-year review that ground water flow within the well field was unorganized and that stagnation zones existed through a large portion of the shallow aquifer under the Waste Cell. **Figure 5** shows ground water flow in the shallow aquifer at the time of the first five-year review. The first five-year review stated that the pumping strategy should result in more uniform flow within the well field, result in higher recovered volumes of NAPL, and provide more uniform distribution of DO and nutrients within the shallow aquifer (**EPA, 2000**). A pumping strategy was developed and incorporated into the Field Operations Plan. The pumping strategy initially called for ground water pumping and injection at two different sets of recovery and injection wells (known as the Phase I and Phase II wells) on a rotating 6-month basis. The prior pumping strategy used all the recovery and injection sumps year-round (**CH2M HILL, 2001**). This revised strategy was implemented in July 2001. After the first year of operation, it was decided that only the Phase I well group would be utilized for pumping and injection. Slight modifications have also been made to the pumping strategy to improve hydraulic containment and increase NAPL recovery volumes. The wells that are currently operated are listed in **Table 2**. The results of the implementation of the pumping strategy are discussed in **Section 6.4**.

It was noted as part of the first five-year review that dissolved naphthalene contamination was present in ground water at monitor well SMW-4 at concentrations above a non-cancer hazard index of 1.0 in 1997. A non-cancer hazard index above 1.0 indicates a potential for non-cancer related health effects from extended exposure to a particular contaminant. SMW-4 is located outside of the capture zone of the fluids recovery system. The First Five-Year Review Report recommended sampling SMW-4 to verify the naphthalene concentration in ground water at this location. SMW-4 was sampled four times between July 2001 and March 2003, and no VOCs or semi-volatile organic compounds (SVOCs) were detected in the monitor well (see **Tables 9** and **12**).

The First Five-Year Review report recommended that a sampling and analysis procedure be developed for DO that minimized aeration of the sample. DO measurements are used to evaluate DO distribution in site ground water to determine the amount of hydrogen peroxide dosing required for injection as part of the in-situ bioremediation system. An updated DO sampling and analysis procedure was incorporated into the Field Operations Plan that utilizes an in-well sensor to measure the DO concentration. The procedure calls for the sensor to be placed into the monitor well at a depth below the top-of-casing and below the water level that is sufficient to minimize atmospheric influences (**CH2M HILL, 2001**).

The First Five-Year Review Report recommended that a test method be developed to evaluate the performance of the vapor phase GAC system used to treat tank vapors in the PLTS building. Evaluation of the vapor phase GAC system's performance is an issue from a health and safety standpoint. If the vapor phase GAC system does not perform adequately, vapors could accumulate inside the PLTS potentially posing a hazard to workers inside the building. Instead of developing a test method for the vapor phase GAC system, the system was moved outside of the PLTS building. Moving the vapor phase GAC system outside the PLTS building removes the hazard to workers inside the building if the system was not working properly.

During the first five-year review site inspection, several erosion cuts were noted near the Waste Cell soil cover. Also, it was noted that minor re-seeding of the site vegetation should be performed. The first five-year review recommended that the erosion cuts be repaired, and that regular inspections and repair procedures for the clay covers be implemented as part of the site O&M. The erosion cuts were repaired, and no damage was noted to the clay covers as part of the site inspection conducted as part of this second five-year review (see **Attachment 3**). The Field Operations Plan contains procedures for inspecting, maintaining, and repairing the clay covers at the Site.

The first five-year review noted that the method used for managing bio-solids (biological treatment sludge) from the bioreactor system (a part of the PLTS) resulted in operational problems, fluctuating performance, higher system maintenance and cost, and could result in a longer remediation timeframe (**EPA, 2000**). It was recommended that a bio-solids management program be developed to address operational issues related to the bioreactor system. An evaluation of the bioreactor and bio-solids management options was conducted in 2000. Due to external factors that affect microorganism growth in the bioreactor, a regular wasting program could not be developed. Wasting of excess bio-mass from the bioreactor is performed on an as-needed basis based on operator experience and knowledge of the system. A bio-cell was constructed on top of the Waste Cell for the purpose of removing, accumulating, and dewatering excess bio-solids from the bioreactor.

The First Five-Year Review Report recommended that an institutional control be put in place that at a minimum provides notice of site conditions, including the need to maintain the integrity of the clay cover at the Site and the need to restrict the use of site ground water until the remediation goals are achieved. Based on the document review and information available at the time of this second five-year review, this recommendation has not yet been implemented.

The First Five-Year Review Report contained a number of low priority recommendations that are listed in **Table 7**. The majority of these recommendations were addressed through development of the Field Operations Plan, updating the site Health and Safety Plan, updating the site Pollution Control and Mitigation Plan, and implementing and documenting the new procedures. In addition, recommendations related minor maintenance items (such as replacing well locks, redevelopment of wells, etc.) were addressed as time permitted by the site O&M staff. The only low priority recommendation that has not been addressed is the need to abandon and possibly replace the piezometer identified as "White Tube".

Two issues were identified by the first five-year review for which recommendations were not provided in the First Five-Year Review Report. These issues were:

- No information or data had been obtained to evaluate the effectiveness of the bioremediation system; and,
- The in-situ bioremediation system did not treat contamination present in subsurface soils in the vadose zone (above the water table).

The First Five-Year Review Report stated that these issues would be discussed with EPA and recommendations developed after completion of the first five-year review (**EPA, 2000**). As part of the site investigations conducted during 2003 and 2004, additional data were collected to address recommendations related to these two issues. The data collection efforts and actions taken to address these two issues are further discussed in **Section 6.4**.

6.0 Five-Year Review Process

This second five-year review for the ACW Site has been conducted in accordance with the EPA's Comprehensive Five-Year Review guidance dated June 2001 (**EPA, 2001**). Interviews were conducted with relevant parties; a site inspection was conducted; and applicable data and documentation covering the period of the review were evaluated. The activities conducted as part of this review and specific findings are described in the following paragraphs.

6.1 Administrative Components

The five-year review for this site was initiated by the EPA when EPA contractor CH2M HILL, Inc., was tasked to perform the technical components of the review. A public notice announcing initiation of the five-year review was published in the ***Winn Parish Enterprise***. The review team was led by the EPA Remedial Project Manager (RPM) for this site, Mr. Michael Hebert/ EPA Region 6. The components of the review included community involvement, document review, data review, a site inspection, interviews, and development of this Five-Year Review Report, as described in the following paragraphs.

6.2 Community Involvement

A public notice announcing initiation of the five-year review was published in the ***Winn Parish Enterprise*** on April 27, 2005. Upon signature, the Second Five-Year Review Report will be placed in the information repositories for the Site, including the Winn Parish Public Library, the LDEQ office in Baton Rouge, Louisiana, and the EPA Region 6 office in Dallas, Texas. A notice will then be published in the ***Winn Parish Enterprise*** to summarize the findings of the review and announce the availability of the report at the information repositories. Copies of the two public notices are provided as **Attachment 5** to this report.

6.3 Document Review

This second five-year review for the Site included a review of relevant site documents, including decision documents, the preliminary closeout report, the First Five-Year Review Report, O&M plans, sampling and investigation reports, and related monitoring data. Documents reviewed are listed in **Attachment 1a**.

6.4 Data Review

Data collected as part of site investigations conducted in 2003 and 2004 were reviewed as part of this second five-year review. In addition, data collected as part of the long-term monitoring program, including water level and ground water sampling data, were reviewed. Operational data, such as volumes of ground water and NAPL extracted, treated, and injected, and effluent monitoring data were also reviewed as part of this second five-year review. Finally, storm water and surface water (creek) sampling data were reviewed. The results of this data review are discussed in the following paragraphs.

The EPA and CH2M HILL took several steps in order to address some of the recommendations included in the first five-year review. CH2M HILL performed a site characterization and remedial system evaluation in 2002. Based on reasonable assumptions used in this evaluation, it was estimated that there were originally 715,000 pounds of contaminant mass present in 264,000 cubic yards of soil at the Site after completion of the incineration portion of the RA. It was also estimated that there was originally 200,000 pounds of dissolved contaminant mass present in 24 million gallons of contaminated ground water and 10.2 million pounds of contaminant mass present in 1.1 million gallons of NAPL at the Site. At the time of the evaluation, 30.7 million gallons of contaminated ground water and 82,000 gallons of NAPL had been recovered at the Site, resulting in the removal of approximately 992,000 pounds of contaminant mass present in site ground water. The report documenting this evaluation estimated that only 30 to 50 percent of the NAPL present at the ACW Site could be recovered through pumping, and that the remaining volume would continue to dissolve into ground water over time. The evaluation conservatively estimated that 100 cubic yards of contaminated soil had been treated through in-situ bioremediation. It was recognized that even if the treated volume of contaminated soil were underestimated by a factor of 100, then the treated volume of contaminated soil would only increase to 10,000 cubic yards (or 3.7 percent of the volume requiring treatment) (**CH2M HILL, 2002**).

The remedial system evaluation also evaluated the effectiveness of the pumping strategy that was employed as recommended by the first five-year review. A comparison of the ground water pumping and NAPL recovery volumes for the three different pumping strategies used at the Site (all wells, Phase I wells, and Phase II wells) was performed. Data for the volume of ground water and NAPL extracted from the aquifer since operation of the fluids recovery system began are provided in **Table 8**. During the first six months of operation of the Phase I well group, the average ground water extraction rate per month increased from 275,800 gallons to 485,800 gallons, and the average NAPL recovery rate per month increased from 1,100 gallons to 1,800 gallons. During the first six month operating cycle of the Phase II well group, the average ground water extraction rate increased to 506,800 gallons per month, but the NAPL recovery rate decreased to 1,600 gallons per month. After the first year of operation utilizing the new pumping strategy, it was decided that only the Phase I well group would be utilized for pumping and injection. Slight modifications were made to the pumping strategy to improve hydraulic containment and increase NAPL recovery volumes (**CH2M HILL, 2002**). The wells that are currently operated are listed in **Table 2**.

Based on the results of the site characterization and remedial system evaluation, it was concluded that, given the difficult nature of remediation observed at many creosote sites and the volume of NAPL remaining at the ACW Site, it may be difficult to restore the ground water quality at the Site to the remediation goals within a reasonable timeframe (given as 30 years). The report also concluded that additional data was necessary to establish whether or not the remediation goals in the ROD could be achieved. The report included the following recommendations:

- Update the nature and extent of contamination at the Site to show current site conditions. This recommendation would re-baseline the contaminant distribution at the Site to allow for a better targeting of RA operations at those areas with the most contaminants remaining;
- Upgrade the Site monitoring network through the installation of additional monitor wells and piezometers. The network in place at that time provided unreliable data due to the dynamic operation of the remedial systems.
- Abandon two monitor wells (MWOB11 and MWEX13) that were constructed across both the shallow and deep aquifers, and due to their construction, could allow contaminant migration from the shallow to the deep aquifer. Also, it was recommended that two additional monitor wells (MWEXT10 and MWOB12) be abandoned because the wells were screened too shallow and did not provide water level or water quality data that were comparable to other wells.

- Perform a comprehensive, site-wide ground water sampling effort to re-baseline the site-wide ground water quality conditions. Prior to 2002, a site-wide sampling event had not been conducted since 1993.
- Perform soil column tests to provide empirical data regarding achievable cleanup levels and the timeframe required to achieve them. This treatability study would provide data to establish the effectiveness of the in-situ bioremediation system and provide for improved RA planning and remedy modifications that accelerate site cleanup (**CH2M HILL, 2002**).

Additional site investigation work was conducted in 2003 and 2004. The investigation work activities included:

- Source material characterization;
- Monitor well and piezometer drilling and installation;
- Ground water sampling in the shallow and deep aquifers;
- Time-series sampling at SMW-2;
- DO and nutrient measurements;
- Oxygen uptake rate measurements; and,
- Soil column flushing benchscale testing (**CH2M HILL, 2004**).

The source material characterization work involved the drilling and sampling of boreholes in order to estimate the amount of contamination still present at the Site. Visual observations were made to determine the absence/presence of NAPL during drilling of boreholes, and soil samples were collected for analysis of contaminants. The report documenting the work performed estimated that 252,650 cubic yards of contaminated soil remained at the Site. It was estimated that approximately 462,000 gallons of NAPL remained in the subsurface at the Site. This estimate was much lower than the 1.1 million gallon estimate in the RI/FS and the 900,000 gallon estimate in the first five-year review. The report indicated that this estimated volume may underestimate what is actually present because several site monitor wells do not extend to the base of the shallow aquifer, and thus may show lower NAPL thicknesses in the well than is actually present at the well's location (**CH2M HILL, 2004**).

Time-series testing was performed at SMW-2 during 2003. The purpose of the test was to determine if a source of contamination was present in the shallow aquifer down-gradient of the recovery trench, or if contamination had migrated through the gap in the recovery trench identified during the first five-year review. This testing involved pumping the well at a constant rate for three days, and collecting a ground water sample at the end of each day. In addition, a sample was collected four days after pumping had ceased. During the first day of pumping, NAPL droplets were observed in the well's discharge. The analytical results were presented in Figure 3-7 of the *Subsurface Investigation Data Evaluation Report* (**CH2M HILL, 2004**). The data showed that the concentrations of benzene, naphthalene, and PCP did not show a decreasing concentration trend over the period of the test. Benzo (b) fluoranthene and B(a)P concentrations decreased slightly over the period of the test. The lack of clear decreasing concentration trends, along with the presence of NAPL in the well's discharge during the first day of pumping, led to the conclusion that a source of contamination existed on the down-gradient side of the recovery trench in the area near SMW-2 (**CH2M HILL, 2004**).

During 2003, additional data were also collected to evaluate the performance of the in-situ bioremediation system. DO and nutrient (ammonia, nitrate, and phosphorus) samples were collected and analyzed to evaluate the delivery of injection water in the subsurface. Oxygen uptake rate measurements were collected to estimate biological PAH transformation rates. Soil column-flushing tests were conducted using soil obtained from the Site to estimate the effectiveness of in-situ bioremediation and to evaluate potential enhancements that might be obtained through the use of heated water. The DO data indicated that oxygen was being delivered to most areas of the aquifer. The nutrient data were inconclusive. Based on the oxygen uptake rate measurements, it was estimated that the PAH transformation rate at the Site was 46.5 kilograms per year. The soil column-flushing tests indicated that PAH concentrations were reduced by the in-situ bioremediation system, and the overall level and time period required for restoration could be improved if the amended PLTS effluent used for injection was heated to 150 ° Fahrenheit (F) (**CH2M HILL, 2004**).

Additional lithologic data at the Site were collected during drilling activities completed during 2003. New geologic cross-sections were constructed for the Site, and the depths of construction of both the recovery and injection trenches were compared to the depth of the contact between the Prairie Terrace Deposits and the Cockfield Formation. Based on this comparison, it was discovered that both trenches were constructed within the deep aquifer at the Site (**CH2M HILL, 2004**).

The *Subsurface Investigation Data Evaluation Report* provided several conclusions based on the results of the investigation work conducted during 2003 and 2004. These conclusions included the following:

- The placement of the injection trench in the deep aquifer might limit the in-situ bioremediation system's ability to promote flushing and delivery of oxygen and nutrients to the shallow aquifer in the south portions of the Site;
- The injection trench and wells were not expected to provide any benefit to contaminated vadose zone soils;
- Large volumes of contaminated soil and NAPL remained at the Site;
- The presence of contamination down-gradient of the recovery trench near monitor well SMW-2, piezometer SP-9, and monitor well MW-2A was the result of conditions that existed at the Site prior to construction of the recovery trench;
- The rate of in-situ bioremediation at the Site was slow due to the high oxygen demand required for PAH degradation and limitations on the amount of oxygen that could be injected; and,
- The use of heated water to flush contaminants from soil samples collected at the Site resultant in improved contaminant removal.

The Subsurface Investigation Data Evaluation Report recommended that a tracer study be conducted to verify the injection trench construction and performance, and that expanded use of injection technology be evaluated for the delivery of oxygen and nutrient amended PLTS effluent to vadose zone soils (**CH2M HILL, 2004**).

Ground water monitoring data collected at the Site since March 2000 was reviewed as part of this five-year review. The analytical results for SVOCs detected in monitor wells and recovery wells in the shallow aquifer are provided in **Tables 9** and **10** respectively. The analytical results for carcinogenic PAHs and B(a)P equivalents in both monitor and recovery wells completed in the shallow aquifer are provided separately in **Table 11**. The analytical results for VOCs detected in monitor wells and recovery wells in the shallow aquifer are provided in **Tables 12** and **13** respectively. In general, contaminant concentrations exceeding the site remediation goals in the shallow ground water are confined to the area of the Site between the injection and recovery trenches. However, as noted above, contamination is present down-gradient (north) of the recovery trench in the area near monitor well SMW-2. Also, lower levels of contamination are present down-gradient of the recovery trench in monitor well MW-2A. The data do not demonstrate consistent concentration trends (increasing or decreasing). This is to be expected since there is still a large volume of source material (NAPL) present at the Site. Also, the lack of consistent monitoring data prior to implementation of the current long-term monitoring program and upgrading of the monitoring network make it difficult to evaluate long-term contaminant concentration trends.

Currently, benzene and carcinogenic PAHs exceed the remediation goals in shallow ground water in the area between the injection and recovery trenches, north of the recovery trench in the area around SMW-2 and piezometer SP-9, and northwest of the recovery trench at monitor well MW-2A. The ROD did not set a remediation goal for PCP. However, the maximum contaminant level (MCL) for PCP established under the requirements of the Safe Drinking Water Act (SDWA) is 1 µg/L. The MCL for PCP is exceeded in the area between the injection and recovery trenches and at monitor well MW-2A. The MCLs for ethylbenzene and toluene (compounds that are associated with benzene and the petroleum carrier fluid used for PCP at the Site) have been infrequently exceeded at a few monitor wells since 2000. Bis-2ethylhexyl-phthalate, which has also infrequently exceeded the MCL, is a common plasticizer associated with monitor well casings. Due to its infrequent detection and its use in monitor well casings, bis-2ethylhexy-phthalate is not considered a contaminant associated with the Site.

Several ground water sampling events have been conducted for the deep aquifer since 2000. The analytical results for SVOCs and VOCs detected in monitor wells in the deep aquifer are provided in **Tables 14**. The analytical results for carcinogenic PAHs and B(a)P equivalents in the deep aquifer monitor wells are provided separately in **Table 15**. Ground water in the deep aquifer was last sampled in March 2003. This sampling event also represents the only comprehensive sampling event conducted for the deep aquifer since completion of the first five-year review. As shown in **Table 15**, total carcinogenic PAH B(a)P equivalents exceeded the remediation goal of 0.20 µg/L at monitor wells MW-02 in May 2002 and SMW-2 in March 2003. Monitor well MW-2 is a deep monitor well paired with shallow monitor well MW-2A, and DMW-2 is a deep monitor well paired with shallow monitor well SMW-2.

Water level data are collected at the Site from a subset of wells and piezometers (see **Table 6**) on a weekly basis to monitor and ensure that an inward ground water flow gradient exists at the recovery trench. These data are used to demonstrate that the recovery trench is capturing the ground water contamination. Water level data are also collected from all site monitor wells, piezometers, recovery wells and sumps, and injection wells and sumps on a semiannual basis to evaluate the ground water flow in both the shallow and deep aquifers at the Site. The weekly water level data are compiled and documented in monthly operating reports, and inward ground water flow gradients at the recovery trench are consistently observed at the Site. The first five-year review recommended that a pumping strategy be implemented to achieve a more uniform ground water flow field in the shallow aquifer at the Site. The pumping strategy was implemented in July 2001 and revised in July 2002 (see **Table 2**). Ground water flow in the shallow aquifer at the time of the first five-year review is presented on **Figure 5**. Ground water flow in the shallow aquifer for December 2004 is shown on **Figure 6**. As **Figures 5** and **6** demonstrate, ground water flow within the shallow aquifer has become more uniform since implementation of the pumping strategy.

The PLTS effluent is tested according to the schedules shown in **Tables 4** and **5**. The analytical results for constituents detected in the PLTS effluent samples that were sent to an offsite laboratory on a quarterly basis from September 2001 through December 2004 are provided in **Table 16**. As shown in **Table 16**, the PLTS effluent has met the discharge limits for all constituents except for PCP in January 2003, March 2004, and December 2004. The exceedences of the PCP discharge limits are potentially associated with reduced treatment efficiency in the bioreactor and premature exhaustion of the granular activated carbon filters. After each exceedence, the carbon in the carbon filters was replaced. High PCP concentrations in the PLTS effluent are most likely related to the rate at which recovery well R-14 is pumped. The PCP concentrations are highest in this well, and as a result, the more this well is used, the faster the carbon in the carbon filters is spent necessitating more frequent replacement and proportionately higher O&M costs.

One storm water sampling event was conducted at the Site in December 2001. Benzo (b) fluoranthene, B(a)P, benzo (g,h,i) perylene, and indeno (1,2,3-cd) pyrene were detected in the storm water sample. The detected concentrations were well below the effluent discharge limits for the PLTS, and storm water sampling was therefore discontinued.

Monthly ground water and NAPL extraction volumes and contaminant mass removal amounts were examined as part of this five-year review. Monthly ground water and NAPL extraction volumes are provided in **Table 8** and presented graphically on **Figure 7**. As shown on **Figure 7**, both the monthly ground water and NAPL extraction volumes increased after implementation of the pumping strategy. Also, prior to implementation of the pumping strategy, the monthly ground water and NAPL extraction volume trends were highly variable. Although the month-to-month volumes of extracted ground water and NAPL have varied somewhat since implementation of the pumping strategy, there has been much less variation in the volumes extracted. Also, the overall trend in extracted volumes of ground water and NAPL has increased since implementation of the pumping strategy. The mass of dissolved contaminants and NAPL, expressed in pounds, is also provided in **Table 8** and shown graphically on **Figure 8**. The same trends before and after implementation of the pumping strategy are true for the monthly amount of contaminant mass removed. Removal of NAPL accounts for approximately 90 percent of the total contaminant mass removed at the Site monthly.

6.5 Interviews

During the course of the five-year review, interviews were conducted with several parties involved with the Site: (1) Mr. Mark Purcell, former EPA Remedial Project Manager; (2) Mr. Rich Johnson of the LDEQ; (3) Mayor Deano Thornton, City of Winnfield; (4) District Attorney Terry Reeves, Winn Parish; (5) Juror Robert Hutto, Winn Parish Police Jury; and (6) Mr. John Nugent and Mr. Joe Hambrick, site operators for CH2M HILL. Interview Record Forms which document the issues discussed during these interviews are provided in **Attachment 2**.

In general, the interviews noted that work at the Site was going well and without problems. It was noted that the community has not expressed any concerns regarding the Site or its ongoing operations. However, District Attorney Reeves did state that he was still somewhat concerned about creosote that may have been left in the creek. He indicated that he thought someone had made a statement about seeing creosote in the creek at the Highway 167 bridge (located approximately 1 mile downstream of the Site) as a result of highway construction work. Mayor Thornton, District Attorney Reeves, and Juror Hutto all expressed desire to see the south portion of the Site put back into use. Both Mayor Thornton and Juror Hutto expressed that they would like to see some sort of annual communication concerning operations at the Site and its progress. Mr. Johnson of the LDEQ also stated that he would like at least an annual site status summary.

The site operators, Mr. Hambrick and Mr. Nugent, both stated that operation of the Site has improved over the past five years. Both operators, along with Mr. Purcell of EPA, noted that the major recommendations of the first five-year review had been implemented or were in the process of being implemented. It was noted in their interviews that these changes had improved the overall performance of the remedial systems and reduced the cost of operation at the same time. Both Mr. Hambrick and Mr. Nugent noted that the volume of creosote and ground water extracted and treated at the Site had increased considerably. The only concerns that they raised were that the increased production had increased the frequency of maintenance required at the Site. Mr. Purcell stated that limited surface water and sediment sampling in Creosote Branch creek should be considered at the Site.

6.6 Site Inspection

An inspection was conducted at the Site on May 16 and 17, 2005. The completed site inspection checklist is provided in **Attachment 3**. Photographs taken during the ACW Site inspection are provided in **Attachment 4**.

A security fence surrounds the Site, and the entrance to the Site is controlled through a gate located on Front Street on the south portion of the Site (**Photograph 35**). The north and south portions of the Site are separated by another fence and gate (**Photographs 2**). Signs are posted on the perimeter fence at appropriate intervals along the perimeter fences. The site fences and gates appeared in good condition and to be well maintained. No obvious signs of trespassing were apparent during the site inspection. Three monitor wells are present within two fenced enclosures on the south property (**Photographs 1**, **2**, and **27**). At the time inspection, locks were not present on the monitor wells and fenced enclosures, but locks were installed before the site inspection was completed.

The PLTS building was also inspected. Ground water and NAPL enter the PLTS building from the well field at the Equalization Tank (**Photograph 5**). NAPL and dissolved contamination is then separated from the ground water in stages. The first stage is an OWS located inside the PLTS building (**Photograph 6**). The separated NAPL settles to the bottom of the OWS, where it is transferred to the NAPL storage tank (**Photograph 5**). Water is then transferred to the lamella clarifier, located outside on the south side of the PLTS building (**Photograph 9**); where through neutralization, oxidation, flocculation, and settling, small droplets of free and emulsified NAPL and suspended solids are removed. Water exits the lamella clarifier and enters the biological treatment unit (bioreactor), which is located outside on the south side of the PLTS building (**Photographs 9** through **12** and **22**), where dissolved organic contaminants are removed. The final stage of the treatment system are the sand and carbon filters (**Photograph 7**), which are used as a final polishing step to removed dissolved contaminants. The treated effluent is then either used for the in-situ bioremediation system or discharged to Creosote Branch creek (**Photographs 24** through **26**). **Photograph 4** shows visually the quality of the water as it passes through various components of the PLTS. Each component of the PLTS appeared to be in good condition and properly labeled. No leaking was noted around any of the tanks, and there appeared to be proper secondary containment.

The well field was also inspected during the site inspection (**Photographs 13** through **20**). Due to the size of the Site and various components of the remedy, not every well could be inspected visually. However, the condition of each inspected well was very good. The injection trench is located along the south and southwest boundaries of the well field (**Photographs 13** and **14**). All piping is located underground. The recovery wells and sumps are surrounded by rocks to help contain creosote spills that can occur when working on a well (**Photographs 18** and **20**). Also, the recovery wells and sumps are usually left open to allow easy access and to prevent wasps from building nests under the well lids (**Photograph 18**). The two monitor wells on the north side of Creosote Branch creek, located outside of the site perimeter fence, were also inspected. Both wells were secured with locks, had good access, and were maintained in good condition (**Photographs 33** and **34**).

The Waste Cell and Tar Mat burial areas were inspected during the site inspection. The vegetation appeared mowed and well established (**Photographs 15** through **18**). No signs of erosion, settlement, or cracking were noted. The clay covers over both areas appeared to be in good condition and well maintained. The bio-cell, used for management of biosolids from the bioreactor, is located on top of the Waste Cell (**Photographs 15**).

Accessible portions of Creosote Branch creek were observed as part of the site inspection (**Photographs 28** through **32**). Points along the creek outside the site fence were examined in response to stained creosote soils noted as part of the first five-year review. Also, the creek was examined at the Highway 167 bridge in response to comments made by District Attorney Terry Reeves. Stained soils, sediments, and oil discharges in the creek surface water were not observed during the site inspection.

7.0 Technical Assessment

The five-year review must determine whether the remedy at a Site is protective of human health and the environment. The EPA guidance describes three questions 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 paragraphs. At the end of the section is a summary of the technical assessment.

7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The document that details the remedial decisions for the Site is the April 1993 ROD. The incineration portion of the RA is complete. The Site is now undergoing O&M. Based on the data review, site inspection, and interviews, it appears that the ACW Site remedy is functioning as intended by the ROD. However, as stated in **Section 6.4**, data indicates that a source or sources of ground water contamination exists down-gradient of the recovery trench. In addition, the in-situ bioremediation system, as currently constructed, does not affect soil contamination present in the vadose zone. Opportunities for optimization, early indicators of potential remedy problems, and institutional controls are described below.

<u>Opportunities for Optimization.</u> CH2M HILL has operated the Site since October 1999. Since that time, site operations have gradually undergone various improvements to optimize operations. The implementation of the bio-solids wasting procedure now in use at the Site has resulted in fewer operational problems related to the bioreactor. Implementation of the pumping strategy increased ground water and NAPL recovery volumes while reducing the number of wells and sumps in full-time service at the Site. Many of the chemical addition steps have been removed from the treatment process. The long-term monitoring program is examined on a yearly basis to determine if wells and/or analyses can be eliminated from the sampling program. The implementation of a preventative maintenance program prior to the development of mechanical problems with the various remedy components has most likely reduced system downtime and repair costs. Each of these steps combined to optimize the performance of the system by reducing system downtime, increasing ground water and NAPL recovery rates, and reducing O&M costs. The ROD estimated the yearly O&M costs at $750,000 per year, or $62,500 per month. Actual O&M costs are estimated at around $30,000 per month, or less than half the costs estimated in the ROD.

The EPA has tasked CH2M HILL to perform infiltration testing to evaluate potential design and construction changes to the in-situ bioremediation system to address soil contamination in the vadose zone. The construction of additional injection components to address vadose zone soil contamination will most likely result in zero or limited monthly discharge to Creosote Branch creek. The capacity of the injection system is highly dependent on rainfall amounts at the Site. Increased rainfall reduces the volume of water that can be injected. Using the excess PLTS effluent to address vadose zone soil contamination will speed the pace of the remediation.

A tracer study was recommended by the 2004 *Subsurface Investigation Data Evaluation Report* to verify the construction and performance of the injection trench. This study has been put on hold because of the planned construction of additional injection components to address vadose zone soil contamination. Additional near surface injection components will alter the ground water flow field within the shallow aquifer, and so the tracer study was deemed to not be useful at this time. After completion of the additional construction activities, a tracer study may yield useful data regarding ground water flow and the performance of the in-situ bioremediation system.

Early Indicators of Potential Remedy Problems. As noted in **Section 6.4**, ground water monitoring and subsurface investigation data indicate that a source or sources of contamination exist on the down-gradient side of the recovery trench in the area of monitor well SMW-2 and piezometer SP-9, and in the area near monitor well MW-2A. These conditions were present prior to construction of the recovery trench, and the presence of contamination in these areas does not indicate that the recovery trench is allowing contamination to migrate past it. However, the potential for this contamination to migrate to Creosote Branch creek exists. No additional monitor wells exist between these locations and the creek. Construction of additional extraction wells is currently being planned to address contamination down-gradient of the recovery trench gap near SMW-2. However, no additional wells are planned in the area near MW-2A, and the extent of contamination between this well and the creek is unknown.

Sampling data from March 2003 indicates that low-levels of carcinogenic PAHs were present in deep monitor well DMW-2 (discussed in **Section 6.4**). However, the reported carcinogenic PAH concentrations at this well represented a B(a)P equivalent concentration of 0.87 µg/L, which was above the remediation goal of 0.20 µg/L. However, it should be noted that the concentrations of each detected carcinogenic PAH compound was estimated at below the reporting limit for each compound. Because the concentrations were estimated at below the reporting limits, and because sampling was last performed at this location in March 2003, it cannot be definitively stated that site contamination is migrating to the deep aquifer. However, the presence of these contaminants at concentrations that are potentially above the site remediation goal warrants confirmation sampling.

Institutional Controls. Institutional controls are not currently used at the ACW Site. The ROD did specify institutional controls as a 'to be considered' (TBC) requirement. The ROD specifically states that the EPA and the State would determine the need to file a deed notice advising of site hazards. The First Five-Year Review Report recommended that an institutional control be put in place to provide notice of site conditions, exclude digging in the Waste Cell and Tar Mat areas, and prevent ground water use until the remediation goals are achieved. The Site is currently owned by the Winn Parish Police Jury, and control of the Site is maintained by EPA. Access to the Site is currently restricted by a fence. An institutional control has not yet been put in place as recommended by the first five-year review, however, current site conditions meet the goal that an institutional control would achieve. If site conditions are changed, then implementation of an institutional control should be considered.

7.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives Used at the Time of the Remedy Selection Still Valid?

The purpose of this question is to evaluate the effects of any significant changes in standards or assumptions used at the time of remedy selection. Changes in promulgated standards or "to be considereds" (TBCs) and assumptions used in the original definition of the remedial action may indicate an adjustment in the remedy is necessary to ensure the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics. There have been no changes in exposure pathways for the ACW Site since completion of the first five-year review. In addition, no new contaminants or routes of exposure have been identified for the Site as part of this five-year review. The first five-year review identified changes in several exposure assumptions and toxicity factors used in the 1993 BHHRA. However, the first five-year review noted that these changes would have only impacted conditions as they existed at the Site prior to remediation. Post-remediation site conditions eliminated or reduced the exposure pathways, effectively negating the impact of the change in exposure assumptions. Also, the first five-year review noted that these changes would have resulted in changes to the estimated potential risks at the Site and would not have affected the cleanup levels (**EPA, 2000**).

The Toxicity Equivalency Factors (TEFs) used to calculate B(a)P equivalent concentrations for carcinogenic PAHs were modified in July 1993 (**EPA, 1993b**). The revised TEF values were not noted in the first five-year review. The revised TEF values are provided in **Table 17**. Since the remediation goal for ground water is a combined carcinogenic PAH concentration of 0.20 µg/L expressed as B(a)P equivalents, the revised TEF values should be used when calculating carcinogenic PAH B(a)P equivalent concentrations. The Site has been placed under three feet of clean soil, and as such, the exposure to carcinogenic PAHs in surface soils has been removed. For subsurface soils, the remediation goals were the same as those for surface soils. However, the ROD also added that the purpose of the remediation goal was to achieve a ground water concentration of 0.20 µg/L B(a)P equivalents. The changes to the TEFs do not affect subsurface soils in that the overall objective of ground water protection must still be achieved.

Changes in ARARs. ARARs for this Site were identified in the ROD. The five-year review for this Site included identification of and evaluation of changes in the ROD-specified ARARs and TBCs to determine whether such changes may affect the protectiveness of the selected remedy. The ARARs and TBCs identified by the ROD for the ACW Site include contaminant, action and location specific requirements. These ARARs and TBCs are described below.

Contaminant-Specific Requirements:

1. SDWA MCLs (and specifically the MCL for benzene – 5 µg/L), 40 CFR 141.
2. Clean Water Act (CWA) Water Quality Criteria, 40 CFR Part 414.

Action-Specific Requirements:

1. RCRA Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities, 40 CFR 264, Subparts B, C, D, G, I, J, K, L, O, AA, and BB.
2. Requirements of the National Pollutant Discharge Elimination System (NPDES) under the CWA, 40 CFR 122 and 40 CFR 414.

Location-Specific Requirements:

1. Wetland protection requirements of the CWA, Section 404.

TBCs:

1. The need to file a deed notice advising of site hazards, as determined necessary by the EPA and State.
2. Executive Order No. 11990, regarding the protection of wetlands.
3. Clean Air Act (CAA) National Emission Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR 61.
4. CAA National Ambient Air Quality Standards (NAAQS), 40 CFR 50.
5. RCRA Land Disposal Restrictions (LDRs), 40 CFR 268 (specifically for U-051 wastes [creosote]).

The First Five-Year Review Report identified the additional following ARARs for the site remedy:

Contaminant-Specific Requirements:

1. Storm water discharge requirements, Louisiana Administrative Code (LAC) 33:IX.23 Section 2341.
2. CWA Section 303(d) list for the State of Louisiana.

Action-Specific Requirements:

1. LDEQ and Louisiana Department of Transportation (LaDOT) guidelines in *Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook*, May 1993.
2. Used oil requirements of LAC 33:V.1 Ch. 40.

ARARs Involving Activities that are No Longer Occurring. The requirements listed below, which were previously identified as ARARs, apply to activities that are not currently taking place at the Site or conditions that do not currently exist. Therefore, as a practical matter, they are no longer applicable to site remediation. However, should additional construction activities occur, these ARARs may be applicable.

The following ARARs are only applicable to the construction, and this construction is no longer occurring at the Site.

1. Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities, 40 CFR 264, Subparts B, C, D, G, I, J, K, L, O, AA, and BB.
2. Executive Order on Protection of Wetlands, Executive Order No. 11990, and wetland protection requirements of the CWA, Section 404.
3. CAA NAAQS requirements, 40 CFR 50.

Interpretation, Changes, and Revisions to Guidance and Regulations. The LDEQ and the Federal regulations have not been revised to the extent that the effectiveness of the remedy at the Site would be called into question. No new regulations have been issued by the State of Louisiana or the Federal government that would call into question the effectiveness of the remedy.

The ROD for the Site set the remediation goals in ground water for benzene and PAHs (expressed as B(a)P equivalents) as the MCLs. Remediation goals were not set in the ROD for other contaminants detected in site ground water. However, the ROD stated that the remedial objective for ground water was to prevent exposure to potential receptors to onsite contamination in amounts above human-health based standards and to restore ground water quality. The ROD also listed the primary drinking water standards promulgated under the SDWA, expressed as MCLs, as an ARAR for the Site. Remediation goals were not set in the ROD for PCP, toluene, or ethylbenzene in ground water. However, MCLs were established for these contaminants in 1992. Ethylbenzene and toluene concentrations in ground water have occasionally exceeded their respective MCLs at a few well locations in the past. PCP concentrations in ground water currently exceed the

MCL at many well locations. If the remedial objective remains to restore ground water quality, then the MCLs for these three contaminants should also be considered ARARs for the Site RA. The MCL for ethylbenzene is 700 µg/L; the MCL for toluene is 1,000 µg/L; and the MCL for PCP is 1 µg/L.

The First Five-Year Review Report included the State of Louisiana's CWA Section 303(d) list as a potential ARAR because the Ouachita River Basin was determined to be in need of a Total Maximum Daily Load (TMDL) study at the time of the report. The TMDL study was completed in 2001. The Dugdemona River (the nearest downstream segment from Creosote Branch creek) was included as part of the TMDL study. The designated uses of the Dugdemona River are primary and secondary contact recreation and fish and wildlife propagation. The Dugdemona River was determined to meet all its designated uses, and TMDLs were therefore not established.

The LDEQ and LaDOT updated their well installation and abandonment guidelines contained in the *Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook* in December 2000. The updated requirements are applicable to future installations and abandonment of wells at the Site.

Three additional action-specific requirements, not identified in the ROD or First Five-Year Review Report, should be considered applicable to the RA at the ACW Site. These requirements are:

1. RCRA requirements for the identification and listing of Hazardous Waste, 40 CFR 261.
2. RCRA Standards Applicable to Generators of Hazardous Waste (specifically manifesting), 40 CFR 262.
3. Occupational Safety and Health Act (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations, 29 CFR 1910.120.

The RCRA requirements contained in 40 CFR 261 require that hazardous waste generators identify and characterize potentially hazardous wastes that they generate. These requirements are already followed at the ACW Site, but the requirements are still applicable. The RCRA requirements contained in 40 CFR 262 contain the manifesting requirements for shipments of hazardous wastes. These requirements are also already followed at the ACW Site, but the requirements are still applicable. Finally, the OSHA HAZWOPER standard provides occupational health and safety requirements that must be followed for HAZWOPER regulated activities. The HAZWOPER standard is followed at the ACW Site, but the requirement is still applicable.

7.3 Question C: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

Examples of other information that might call into question the protectiveness of the remedy include potential future land use changes in the vicinity of the Site or other expected changes in site conditions or exposure pathways; no such information has come to light as part of this second five-year review for the Site.

7.4 Summary of the Technical Assessment

The technical assessment, based on the data review, site inspection, technical evaluation, and interviews indicates that the remedial actions selected for the ACW Site generally appear to have been implemented as intended by the decision documents. The EPA has tasked CH2M HILL to take actions to address contamination that is present down-gradient of the recovery trench near the trench gap. Two additional extraction wells are planned on the down-gradient side of the trench gap, near monitor well SMW-2, to capture and extract the contaminated ground water. Based on site data collected in 2003, it has been determined that the recovery and injection trenches were both constructed in the upper portion of the deep aquifer. Water level data demonstrates that the recovery trench does maintain inward hydraulic gradients in the shallow aquifer. However, there is currently insufficient data to evaluate how well the injection system distributes DO and nutrients in the shallow aquifer. Also, the injection system does not address soil contamination present in the vadose zone. The EPA has tasked CH2M HILL to perform testing activities that will assist in making design and construction changes to the in-situ bioremediation system. Additional injection capacity will be added to the system to address soil contamination in the vadose zone at the Site. It is possible that the added injection capacity will result in the PLTS effluent no longer being discharged to Creosote Branch creek. Instead, all the treated effluent will be used by the bio-cell and in-situ bioremediation system.

Updates to site O&M activities have improved the overall performance of the remedy since completion of the first five-year review. Specifically, implementing the Field Operations Plan, improved bio-solids wasting procedures, and implementing a preventative maintenance program have improved the efficiency of how the site operates. Also, consistent data collection activities, schedules, and procedures have provided a better understanding of site conditions and remedy performance. As a result of these changes, the average monthly volume of ground water and NAPL extracted, treated, and then either discharged or re-injected has increased since the first five-year review. In addition, O&M costs have decreased to approximately $30,000 per month, which is approximately one-half of the ROD estimated monthly O&M costs.

Since implementing the ground water portion of the RA at the Site, approximately 46,600,000 gallons of ground water and 138,000 gallons of NAPL have been extracted and treated at the Site. This has resulted in the removal of approximately 1.44 million pounds of contaminants from the site ground water (see **Table 8**). Based on investigation work conducted during 2003, it was estimated that approximately 252,650 cubic yards of contaminated soil and 462,000 gallons of NAPL remained at the Site (**CH2M HILL, 2004**).

Based on ground water sampling data collected in March 2003, low-level carcinogenic PAH contamination was present in the deep aquifer at monitor well DMW-2. Except in the areas near sumps S-1 and S-5, the remediation systems at the Site do not address contamination in the deep aquifer. During the March 2003 sampling event, the analytical method reporting limits for the detected carcinogenic PAHs were above the remediation goal of 0.20 µg/L. The analytical results were therefore reported as estimated at concentrations below the reporting limit. Since the reported concentrations were estimated, and the concentration values were low, it can only be stated with certainty that the contaminants were detected at low concentrations. No additional sampling has been performed in the deep aquifer since March 2003 to confirm the results. The detection of contamination at DMW-2 should be addressed as discussed in **Section 9.0**.

Based on sampling data, contamination above the remediation goals exists in site ground water down-gradient of the recovery trench in the area of monitor well SMW-2, monitor well MW-2A, and piezometer SP-9. Water level data suggests that ground water flow in these areas is towards the recovery trench. Also, as stated above, two additional extraction wells are planned in the area of SMW-2, SP-9, and the recovery trench gap to capture the contamination present in this area. However, no monitoring locations exist between these wells and Creosote Branch creek. Also, two monitor wells installed on the north side of Creosote Branch creek, opposite SMW-2, contain low levels of site-related contaminants. Creosote seeps and staining of soils in Creosote Branch creek have been observed at the Site in the past. However, seeps and staining were not noted in the creek during the site inspection for this five-year review. There is currently no data to determine if contaminated site ground water is discharging to the creek, and this issue should be addressed as discussed in **Section 9.0**.

8.0 Issues

The RA O&M activities are ongoing at the Site. Based on the data review, site inspection, interviews and technology assessment, it appears the remedy is functioning as intended by the decision document. To ensure continued protectiveness, seven issues are identified in the Second Five-Year Review Report for this Site, as described in the following paragraphs. These issues do not currently affect the protectiveness of the remedy, although they need to be addressed to ensure continued protectiveness.

1. **The in-situ bioremediation system currently does not remediate soil contamination in the vadose zone.** This was an issue identified in the First Five-Year Review Report. The EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review. The third five-year review for the Site should evaluate follow-up actions taken to address this recommendation.

2. **Contamination exists in shallow ground water above the site remediation goals on the down-gradient side of the recovery trench.** The presence of oil in monitor well SMW-2 was noted during the first five-year review. Investigation activities conducted at the Site in 2003 determined that the contamination was the result of a source or sources that existed on the down-gradient side of the recovery trench in the area of SMW-2 and piezometer SP-9 prior to construction of the trench. The EPA is currently taking action to address this issue. However, since this issue remains to be addressed, it remains as an issue for the second five-year review. The third five-year review for the Site should evaluate follow-up actions taken to address this recommendation. Also, contamination is present in shallow ground water above the site remediation goals at monitor well MW-2A. The presence of this contamination should be addressed as indicated in **Section 9.0**.

3. **Data has not been collected to assess current conditions in Creosote Branch creek.** Contamination present in Creosote Branch creek and wetlands near the Site were not addressed as part of the RA. The ROD determined that remediation in these areas would cause more harm to the ecosystem than it would do good. However, the ROD states that the selected remedy would include ecological monitoring after implementation of the remedy. The extent of this monitoring was to include an evaluation of wetlands and streams as considered appropriate by the EPA and LDEQ. To-date, no consistent monitoring of Creosote Branch creek has been performed. Since completion of the first five-year review, it has been verified that site ground water is contaminated on the down-gradient side of the recovery trench in two areas (as indicated in Item No. 2 above). No ground water monitoring locations currently exist between

these two areas and Creosote Branch creek. Also, low levels of contaminants are present in ground water on the north side of Creosote Branch creek opposite monitor well SMW-2. Finally, one interviewee indicated that creosote was observed in the creek at the Highway 167 bridge/creek crossing, where a new bridge is being constructed.

Operational data indicates that the recovery trench does maintain an inward ground water hydraulic gradient. Also, past creosote seeps and staining observed in the banks of Creosote Branch creek are no longer present. However, there is not enough data to determine if contaminated site ground water is discharging to the creek. Also, no ecological monitoring has been performed to determine if conditions in the creek have improved since the incineration portion of the RA was completed and the ground water remedy was implemented.

4. **Carcinogenic PAHs have been detected in deep ground water.** During ground water sampling activities conducted in March 2003, several carcinogenic PAHs were detected in deep ground water at monitor well DMW-2. The reported concentrations were estimated at below the reporting limits. However, the reported concentrations for the carcinogenic PAHs resulted in a total B(a)P equivalent concentration of 0.87 µg/L, which was above the remediation goal of 0.20 µg/L. Deep ground water at the Site has not been sampled since March 2003, and except in the areas near sumps S-1 and S-5, the deep ground water is not addressed by the remediation systems at the Site.

5. **Evaluate the site remediation systems to determine if the site remediation goals are achievable.** The ROD recognized that the pace of ground water and in-situ bioremediation would be slow. Also, the ROD included a provision to evaluate the system performance after 5 to 10 years of operation to determine if the remediation goals could be achieved. In 2003, it was estimated that approximately 462,000 gallons of NAPL were present at the Site and that approximately 30 to 50 percent of the NAPL could be recovered through the current remediation system (**CH2M HILL, 2004**). The un-recovered NAPL would remain in the subsurface and continue to be a source of dissolved phase ground water contamination for the foreseeable future.

   The remediation system has been operating for almost nine years. However, due to operational problems encountered during the first 4 years of operation, lack of appropriate data collection activities in the first 4 years of operation, enhancements and improvements made to site O&M procedures since the first five-year review, and implementation of a more comprehensive site monitoring program, this evaluation has not been performed. An evaluation of the system's ability to achieve the site remediation goals should be performed, and this remains as an issue to be addressed by the third five-year review as indicated in **Section 9.0**.

6. **Site remediation goals do not include the MCL for PCP.** PCP is present in shallow site monitor wells at concentrations that are above its MCL of 1 µg/L. The ROD did not set a remediation goal for PCP, but the ROD did state that the MCLs were ARARs for the Site.

7. **There remains a piezometer in the well field area that is not constructed according to LDEQ/LaDOT requirements.** This was an issue identified during the first five-year review. The recommendation that the piezometer (referred to as the 'White Tube') be sampled, abandoned, and replaced if necessary has not been implemented, and this remains an issue for the second five-year review.

9.0 Recommendations and Follow-up Actions

As described in the previous section, seven issues were identified during the second five-year review for this Site. To address these issues, the following recommendations and follow-up actions have been defined.

1. **Complete the design and construction changes planned for the in-situ bioremediation system.** The EPA has tasked CH2M HILL to perform infiltration testing to obtain data to support design and construction changes for the in-situ bioremediation system. Additional injection capacity is planned to remediate soil contamination present in the vadose zone. If left untreated, the soil contamination would continue to act as a long-term source of ground water contamination and increase the time required to achieve the ground water remediation goals for the Site. The design and construction changes planned for the in-situ bioremediation system should be completed.

2. **Address the ground water contamination that is present down-gradient of the recovery trench.** The EPA has tasked CH2M HILL to install two additional recovery wells in the trench gap (near SMW-2 and piezometer SP-9). Construction of the two new wells is planned to occur in July 2005. These two new wells should address the ground water contamination in this area. Ground water contaminated above the site remediation goals also exists down-gradient of the recovery trench at monitor well MW-2A. Although water level monitoring indicates that the recovery trench maintains an inward hydraulic gradient in the area of this monitor well, no monitor wells exist between MW-2A and Creosote Branch creek. Therefore, the down-gradient extent of the contamination is unknown. It is recommended that the

installation of an additional monitor well be considered to verify that contaminated ground water is not migrating towards Creosote Branch creek in this area.

3. **After the ground water issue described in item 2 above is addressed, and before the next five-year review, perform surface water and sediment sampling of Creosote Branch creek to confirm conditions in the creek.** The ROD states that ecological monitoring of streams and wetlands would be performed following completion of the RA. As noted in item 2 above, ground water contamination above Site remediation goals is now known to be present on the down-gradient side of the recovery trench. Also, one interviewee expressed concerns regarding the presence of contamination in Creosote Branch creek. Creosote seeps and staining were not observed during the Site inspection, however, which indicates that conditions in the creek have improved since implementation of the RA. Therefore, it is recommended that the ground water issues identified in item 2 be addressed first, then follow-up be performed to confirm the status of contamination in the creek. The data could be used to determine how conditions have changed in the creek since completion of the incineration portion of the RA and to verify that Site ground water is not adversely affecting surface water quality in the creek.

4. **Sample monitor well DMW-2 and analyze the samples using lower reporting limits to verify the presence or absence of carcinogenic PAH contamination in the deep aquifer.** It is recommended that monitor well DMW-2 be sampled, and the samples should be analyzed using reporting limits that are low enough to verify whether or not carcinogenic PAH concentrations exceed a B(a)P equivalent concentration of 0.20 µg/L. Several sampling events should be conducted to verify the absence of contamination. If the presence of contamination above the site remediation goal is confirmed at this location, monitoring of the deep aquifer should be expanded, and additional actions should be evaluated to address the contamination.

5. **Evaluate the site remediation systems' ability to achieve the remediation goals for ground water prior to or during the next five-year review.** The ROD provided for conducting an evaluation of the selected remedy after five to ten years of operation to determine if the site remediation goals are achievable within a reasonable timeframe. The remediation system at the Site has been in operation for almost nine years. It is recommended that the evaluation of the site remediation systems' ability to achieve the remediation goals for ground water be conducted prior to or at the time of the third five-year review.

   The ROD left open the ability to implement contingency measures if it is determined that it is technically impracticable to achieve and maintain the remediation goals in site ground water. These measures could include continued pumping at rates sufficient to contain the site plume, waiving the chemical-specific ARARs for the cleanup of ground water in those portions of the aquifer where it is deemed technically impracticable to achieve further concentration reductions, and the implementation of institutional controls to restrict access to those areas of the aquifer where contaminant concentrations remain above the remediation goals. The first five-year review states that the residential land-use scenario, used to determine the remediation goals, may no longer be appropriate for the Site. It is also recommended that the evaluation of the remediation system include an assessment of the appropriateness of the remediation goals relative to current site conditions and current and future land and ground water use.

To assist with the completion of this assessment, it is further recommended that the long-term monitoring program be carefully examined to ensure that the necessary data required to complete the assessment is being collected. If further data collection activities are determined to be necessary, then they should be incorporated into the Field Operations Plan.

6. **Include the MCL for PCP as a remediation goal in site ground water.** The ROD does not specifically state a remediation goal for PCP in ground water. However, the ROD does list the MCLs as ARARs for the Site. PCP is detected in many site wells at concentrations above the MCL. If restoration of site ground water to its beneficial use as a drinking water supply remains a remedial objective for the Site, then the MCL for PCP should be included as a remediation goal.

7. **Abandon the piezometer identified as the ‘White Tube’.** The piezometer identified as the ‘White Tube’ is not constructed according to LDEQ and LaDOT requirements. The first five-year review recommended that the piezometer be sampled, abandoned, and replaced if necessary. This recommendation is also made by this second five-year review.

10.0 Protectiveness Statement

The remedy implemented for the ACW Site is considered protective of human health and the environment. Waste and contaminated soils exposed at the surface of the Site were addressed through incineration and containment/capping. Contaminated ground water and NAPL is contained and extracted by the site fluids recovery system and treated in the PLTS. The PLTS effluent is then either discharged to Creosote Branch creek or injected back into the shallow ground water through the in-situ bioremediation system. The in-situ bioremediation system is operated to remediate contaminated subsurface soils. Continued O&M as part of the RA will ensure that the selected remedy continues to be protective.

Because the completed remedial action and O&M program for the American Creosote Works Site are considered protective for the short-term, the overall remedy for the Site is considered protective of human health and the environment for the short-term. The selected remedy will continue to be protective if the recommendations and follow-up items identified in this five-year review are addressed.

11.0 Next Review

The next five-year review, the third for the Site, should be completed during or before June 2010.

Table 1
Chronology of Site Events
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Date	Event
1901	Wood treatment operations begin at the American Creosote Works (ACW) Site under the direction of Bodclaw Lumber Company.
1910	Louisiana Creosoting Company acquires 22 acres of the site.
1938	American Creosote Works of Louisiana acquires and operates the site.
1950	American Creosote Works acquires 12 additional acres.
mid-to-late 1960s	Apparent period of maximum wood treating operations at the site based on analysis of aerial photography.
1966	The State of Louisiana Stream Control Commission investigates the American Creosote Works site due to high levels of phenols and biological oxygen demand in wastewater discharges.
1977	Dickson Lumber Company acquires and operates the site.
1980	Stallworth Timber Company acquires and operates the site.
1982	The Louisiana Department of Environmental Quality (LDEQ) begins a series of inspections of the ACW site.
January 6, 1983	The LDEQ issues a letter of warning to Stallworth Timber Company in response to releases of contaminants to the environment.
January 22, 1985	The LDEQ issues a Compliance Order to Stallworth Timber Company when inspections noted no environmental improvements at the site.
June 1985	LDEQ inspectors found the ACW Site abandoned.
March 17, 1987	The LDEQ refers the ACW Site to the Environmental Protection Agency (EPA) Region 6 for further evaluation.
1987 - 1988	The EPA conducts several investigations, including the preliminary assessment and site inspection of the ACW Site. These investigations result emergency removal actions to drain two tanks, construct berms around the process area to contain and stabilize heavily contaminated soil, and install an overflow filtration system.
May 1988	The EPA issues an Administrative Order to Stallworth Timber Company to fence and post warning signs around the most contaminated portions of the site.
July 1988	Stallworth Timber Company complies with the Administrative Order to fence and post warning signs at the site.
February 1989	The EPA issues a Unilateral Administrative Order to Stallworth Timber Company to conduct a removal action to address immediate threats posed by the ACW Site found during previous investigations. Stallworth Timber Company declined to take action.
March 17 - August 31, 1989	The EPA conducts an emergency removal action to address actual or threatened releases of hazardous substances from the ACW Site. The removal action includes source control and contaminant migration control actions.
1990	Stallworth Timber Company sells the ACW Site property to Reinhardt Investments of the Netherlands Antilles.
December 1991	The EPA, US Department of Justice (DOJ), and Stallworth Timber Company meet to discuss reimbursement for past response costs and to provide Stallworth Timber Company the opportunity to conduct the Remedial Investigation/Feasibility Study (RI/FS), Remedial Design (RD), and Remedial Action (RA) for the site. Stallworth Timber Company indicated during the meeting and by letter dated December 12, 1992 its reluctance to conduct the work due to financial inability.

Table 1
Chronology of Site Events
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Date	Event
December 1991 - April 1993	The RI/FS is conducted at the ACW Site.
February 7, 1992	The EPA proposes the ACW Site for inclusion on the National Priorities List (NPL).
July 29, 1992	The EPA issues the initial Proposed Plan to address the ACW Site.
October 14, 1992	The ACW Site is included on the NPL.
March 1, 1993	The EPA issues the final Proposed Plan to address the ACW Site.
April 28, 1993	The EPA signs the Record of Decision (ROD) for the ACW Site.
1992 - 1996	The EPA, through an iterative process, conducts the RD for the ACW Site. The RD was conducted in parallel with the writing of the ROD using an Expedited Remedial Design process in conjunction with the development of EPA's presumptive remedy guidance for wood treating sites.
June 1994	The Remedial Action Contract is signed.
December 1994	The United States Army Corps of Engineers (USACE) resident office is established in Winnfield.
March - September 1996	The fluids recovery, Process Liquid Treatment System (PLTS), and in-situ bioremediation systems are constructed.
October 1, 1996	Full-time operation of the fluids recover, PLTS, and in-situ bioremediation systems begins.
October 4, 1996	Substantial site RA operations associated with the excavation, materials handling, and incineration of the tar mat soils begins.
December 2-6, 1996	The trial burn for the site incinerator is performed.
January 1997	Full-scale incineration begins at the ACW Site.
February 1998	Incineration activities at the ACW Site are completed.
May 1999	The pre-final inspection is conducted at the ACW Site.
June 4, 1999	The EPA issues the Preliminary Closeout Report for the ACW Site
October 1, 1999	CH2M HILL takes over operations of the ACW Site.
February 16, 2000	An Interim Remedial Action Report is completed for the ACW Site RA. This report signifies the start of the Long-Term Remedial Action (LTRA) at the site.
September 19, 2003	The EPA completes the First Five-Year Review report for the ACW Site.
2003 - 2004	Additional field investigation activities are conducted at the site to address deficiencies noted in the First Five-Year Review Report.
January 2005	The EPA begins the Second Five-Year Review for the ACW Site.

Table 2
Summary of Well Field Operations
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

	Recovery Wells	Recovery Sumps	Injection Wells	Injection Sumps
Operated Continuously	R2, R4, R6, R8, R9, R10, R11, R12, R15, R17	S1, S2, S3, S4, S5, S11, S12	I1, I3, I4, I5, I6, I7	S6, S7, S8, S9, S10
Operated Intermittently	R14			
Not Used	R1, R3, R5, R7, R13, R16, R18		I2	

Note:
Recovery Well R14 is operated intermittently due to high Pentachlorophenol concentration. The high Pentachlorophenol concentration in this well causes adverse toxicity conditions in the bioreactor.

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Table 3
PLTS Maintenance and Inspection Schedule
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Schedule	Task	Purpose
Daily	All pipes and equipment	Check for leaks
	Chemical feed pumps	Check for normal operation and confirm delivery of fluids
	Air compressor	High operating temperature and excessive vibration
	Double diaphragm and end suction pump	Unusual sounds and operating pressures
	Sand and carbon filters	Determine need for backwash
	Liquid level bubbler	Check accuracy of reading
	Chemical feed tank levels	Determine need to add chemicals
	Lamella influent tank fast and slow mixers	Confirm normal operation
	Bioreactor blower	Confirm normal operation
	Bioreactor cell	Receiving air
	Bioreactor clarifier	Overflow is clear
	RAS pumps	Confirm normal operation
	Preventative maintenance schedule	Checked to confirm that scheduled maintenance has been performed
Weekly	Final polishing filter	Condition observed for need for cleaning or replacement
	Probe based instruments (pH, DO, conductivity)	Checked for proper operation and recalibrated if necessary
	Isolation valves between two OWS sludge hoppers	Cycled to confirm sludge is flowing through both
	Neutralization tank and downstream pipe	Checked for solids build-up to determine need to clean
	Air compressor	Oil level checked and topped-off as necessary
Monthly	Lamella slow mix tank	Checked for solids accumulation and cleaned as needed
	Lamella plates	Inspected for algae build-up and cleaned as needed
	Air compressor aftercooler	Inspected for dirt accumulation and cleaned as needed
Quarterly	Equalization tank	Excessive solids/sand accumulation checked and tank cleaned when more than 6-inches of accumulation
	Sand filter	Sand level checked to confirm 24-inch bed depth
	Air dryer	Moisture content in air tested to confirm dew-point less than -40^{o} F
Semiannual	Oil/Water Separator	Amount of sand/sludge in upstream end is checked and removed as necessary

Notes:
PLTS - Process Liquids Treatment System
DO - Dissolved Oxygen
OWS - Oil/Water Separator
F - Fahrenheit

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Table 4
PLTS Effluent Sampling and Analysis Requirements and Schedule
For Samples Analyzed Onsite
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Sample Parameter	Sample Frequency	Final Effluent Discharge Limit
Chemical Oxygen Demand	2 per week	70 mg/L
Dissolved Oxygen	daily	5 mg/L minimum
pH	2 per week	6.0 - 8.5
Turbidity	2 per week	50 NTU
Conductivity	2 per week	Report
Total Suspended Solids	2 per week	45 mg/L

Notes:
PLTS - Process Liquids Treatment System
mg/L - milligrams per liter
NTU - nephelometric turbidity unit

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Table 5
PLTS Effluent Sampling and Analysis Requirements and Schedule
For Samples Submitted to an Offsite Laboratory
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Sample Parameter	Sample Frequency	Final Effluent Discharge Limit
Oil & Grease	1 per quarter	15 mg/L
Chemical Oxygen Demand	1 per quarter	70 mg/L
Biochemical Oxygen Demand	1 per quarter	20 mg/L
Nitrate-N	1 per quarter	Report
Ammonia-N	1 per quarter	Report
Orthophosphate-P	1 per quarter	Report
Total Organic Carbon	1 per quarter	Report
Total Suspended Solids	1 per quarter	45 mg/L
Total Dissolved Solids	1 per quarter	2,000 mg/L
Chromium, Arsenic, & Zinc	1 per quarter	Arsenic - 0.05 mg/L Chromium - 0.5 mg/L Zinc - 0.15 mg/L
Turbidity	1 per quarter	50 NTU
Conductivity	1 per quarter	Report
pH	1 per quarter	6.0 - 8.5
VOCs	1 per quarter	Various*
SVOCs	1 per quarter	Various*
Phenols	1 per quarter	Report

Notes:
PLTS - Process Liquid Treatment System
VOCs - volatile organic compounds
SVOCs - semi-volatile organic compounds
mg/L - milligrams per liter
NTU - nephelometric turbidity unit
* - Effluent discharge limits have been established for 83 VOCs and SVOCs. The limits are contained in Appendix F of the Field Operations Plan.

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Table 6
Ground Water Sampling and Water Level Monitoring Schedule
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well/Sump Location	Weekly Water Level (1)	Semiannual Water Level	Semi-Annual Sampling	
			VOCs	SVOCs
Recovery Wells & Sumps				
R1		X		
R2		X		
R3		X	X	X
R4		X		
R5		X		
R6		X		
R7		X		
R8	X	X	X	X
R9		X		
R10		X		
R11		X		
R12		X		
R13		X	X	X
R14		X		
R15		X		
R16		X		
R17		X		
R18		X		
S1	X	X		
S2	X	X		
S3	X	X		
S4	X	X		
S5	X	X		
S11	X	X		
S12	X	X	X	X
Injection Wells & Sumps				
S6		X		
S7		X		
S8		X		
S9		X		
S10		X		
I1		X		
Injection Wells & Sumps				
I2 (Same as R15)		X		
I3		X		
I4		X		
I5		X		
I6		X		
I7		X		
Shallow Aquifer Monitor Wells				
MW-1A		X		
MW-2A	X	X	X	X
MW-3A		X	X	X
MW-4		X		
MW-5		X	X	X
MW-6		X	X	X
MW-8		X	X	X
SMW-1	X	X	X	X
SMW-2	X	X	X	X

Table 6
Ground Water Sampling and Water Level Monitoring Schedule
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well/Sump Location	Weekly Water Level (1)	Semiannual Water Level	Semi-Annual Sampling	
			VOCs	SVOCs
SMW-3	X	X	X	X
SMW-4		X		
SMW-5		X		
SMW-6		X	X	X
SMW-7		X	X	X
SMW-8		X	X	X
SMW-9		X	X	X
SMW-10		X	X	X
SMW-11		X	X	X
SMW-12		X	X	X
SMW-13		X	X	X
Shallow Aquifer Piezometers				
SP1		X	X	X
SP2	X	X	X	X
SP3		X	X	X
SP4		X	X	X
SP5	X	X	X	X
SP6	X	X	X	X
SP7	X	X	X	X
SP8	X	X	X	X
SP9	X	X	X	X
SP10	X	X	X	X
SP11	X	X	X	X
SP12	X	X	X	X
White Tube		X		
PZ-8		X		
MW0B-11		X		
Deep Aquifer Monitor Wells				
MW-1		X		
MW-2		X		
MW-3		X		
DMW-1		X		
DMW-2		X		
DMW-3		X		
DMW-4		X		
Deep Aquifer Piezometers				
DP1		X		
DP2		X		
DP3		X		
DP4		X		
DP5		X		

Notes:
1 - Weekly water level measurements are to document hydraulic gradient control.
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds

Table 7
Deficiencies, Recommendations, and Follow-up Actions
Identified in the First Five-Year Review Report
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Priority	Component of the Remedy	Deficiency	Affects Current or Future Protectiveness of the Remedy	Recommendation or Follow-up Action	Status
High	Fluids Recovery System	Clogged extraction trench sumps resulting in trench downtime	No	Remove accumulated sediment from sumps S3, S4, and S5	Completed
High	Fluids Recovery System	Presence of NAPL outside of fluids recovery system capture zone	No	Install pump in monitor well SMW-2 to remove NAPL and dissolved contamination	Completed
High	Fluids Recovery System	Presence of dissolved phase contamination down-gradient of the Tar mat area and outside the fluids recovery system capture zone	No	Sample monitor well SMW-4 to confirm the presence of contamination above protective levels	Completed
High	PLTS	Lack of a preventative maintenance program	No	Develop a written preventative maintenance program	Completed
High	Performance Monitoring Program	Inadequate parameters and locations to assess compliance with ROD remedial action objectives	Potentially	Modify the Operations and Monitoring Plan to incorporate a sampling and analysis program that yields the appropriate data	Completed
Medium	Fluids Recovery System	No pumping strategy	Yes (future)	Develop a pumping strategy that creates a uniform flow field, increases NAPL recovery rates, and provides more uniform distribution of oxygen and nutrients	Completed
Medium	PLTS	No regular biosolids wasting program	No	Develop a biosolids wasting program	Completed
Medium	PLTS	No vapor phase GAC monitoring program to verify performance	No	Develop a test method to evaluate the performance of the vapor phase GAC system.	Completed
Medium	In-Situ Bioremedation System	No information obtained to evaluate biodegredation rates or effectiveness	Yes (future)	No recommendation developed at the time the First Five-Year Review Report was issued.	Completed
Medium	In-Situ Bioremedation System	Lack of contaminant treatment in vadose zone	Yes (future)	No recommendation developed at the time the First Five-Year Review Report was issued.	In Progress
Medium	In-Situ Bioremedation System	Unreliable method used for measuring DO concentrations in ground water	Yes (future)	Develop an updated sample method for DO that minimizes sample aeration	Completed
Medium	Landfill Cover	Erosion on north side of Waste Cell	Yes (future)	Repair the cover and develop an inspection schedule and repair procedures	Completed
Medium	Institutional Controls	Access agreement does not address digging within landfill areas (Waste Cell and Tar Mat) or developing ground water as a water supply source	Yes (future)	Implement an institutional control that provides notice of site conditions and the need to preserve the integrity of the clay cover.	Not Completed

Table 7
Deficiencies, Recommendations, and Follow-up Actions
Identified in the First Five-Year Review Report
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Priority	Component of the Remedy	Deficiency	Affects Current or Future Protectiveness of the Remedy	Recommendation or Follow-up Action	Status
Low	Fluids Recovery System	Sample taps to recovery wellheads aerate sample, reducing its representativeness	No	Install threaded and tapered barb fitting at wells R1 to R18, sumps S1 to S5, S11, and S12 for non-aerated sample collection	Completed
Low	Fluids Recovery System	Defective pump cycle counter at recover well R2	No	Install pump discharge cycle counter on well R2	Completed
Low	Fluids Recovery System	Wells not appropriately marked or labeled	No	Paint all wells in accordance in accordance with color scheme included in First Five-Year Review Report. Label wells/sumps with 3-inch tall letters/numbers	Completed
Low	Fluids Recovery System	Rubber hoses used to convey fluid from the wells to double walled pipe are permeable to creosote	No	Replace fluids transfer hose with creosote compatible hose	Completed
Low	PLTS	No or worn labels on ferric chloride, hydrogen peroxide, and exsitu and insitu nutrient tanks	No	Label each tank. Also, label all sample ports with plastic, indelible ink tie-on cards	Completed
Low	In-Situ Bioremedation System	Defective flow meters on injection wells	No	Replace defective injection well and trench flow meters	Completed
Low	Other	Erosion cuts in site wide soil cover north of Waste Cell	No	Install culvert in erosion cut north of Waste Cell	Completed
Low	Other	Personal vehicles used for wellfield sampling and maintenance purposes	No	Lease a vehicle for on-site use during O&M activities	Completed
Low	Monitor Well Network	Stuck bailer in DMW-3	No	Remove stuck bailer	Completed
Low	Monitor Well Network	Locked wells at MW2, MWEXT10, MWOB12, and MW3 prevent access for water level measurement and sampling	No	Replace locks/caps at these wells	Completed
Low	Monitor Well Network	Unlocked monitor wells and enclosures on south property (MW1, MW1A, and DMW5)	No	Place locks on wells and enclosures	Completed
Low	Monitor Well Network	Monitor wells with large sediment accumulations	No	Redevelop wells MW8, SMW1, and DMW2	Completed
Low	Monitor Well Network	Piezometer "White Tube" not constructed in accordance with LaDOT standards	No	Sample piezometer "White Tube" and abandon/replace based on sample results	Not Completed

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Priority	Component of the Remedy	Deficiency	Affects Current or Future Protectiveness of the Remedy	Recommendation or Follow-up Action	Status
Low	Health and Safety Program	The HSP does not include all subtasks performed during PLTS O&M, procedures for confined space entry, electrical lockout/tagout procedures. Additional contaminants of concern need to be added to the HSP	No	Revise the HSP to incorporate subtask hazard analysis, PPE and monitoring for well pump removal, PLTS pump maintenance, OWS drive chain repair, carbon filter changeout, well sampling, drum handling, confined space entry and permit, and electrical lockout/tagout, and incorporate additional contaminants of concern. Schedule appropriate staff training as necessary to meet the additional requirements of the HSP.	Completed
Low	Health and Safety Program	Air monitoring procedures for PLTS O&M sub tasks need to be included	No	Revise the HSP to incorporate vapor monitoring	Completed
Low	Health and Safety Program	Contingency measures for grounds maintenance and security personnel when working alone at the site needs to be addressed	No	Acquire a cell phone for staff use when on-site alone	Completed
Low	Ventilation System	PLTS building PID monitoring needs to be performed during normal operations to confirm no volatile vapors accumulate inside the building	No	Revise the HSP to incorporate vapor monitoring	Completed
Low	Ventilation System	Carbon cartridge air discharge PID monitoring needs to be done to determine when cartridge change-out is required	No	Revise the HSP to incorporate vapor monitoring	Completed
Low	Pressure Vessels	Pressure relief valve must be installed and tested on each pressure vessel, according to ASME code.	Yes	Remove in-line valves located between tank and pressure relief valve and re-install downstream of pressure relief valve if needed	Completed
Low	Electrical, Fire, and Emergency Equipment	Fire extinguisher inspections must be documented monthly	No	Incorporate a written fire extinguisher inspection schedule and sign-off SOP	Completed
Low	Electrical, Fire, and Emergency Equipment	Eye wash/shower must be tested monthly and documented	No	Incorporate a written eye wash/shower inspection schedule and sign-off SOP	Completed
Low	Chemical Hazard Communication	The hazardous chemical inventory and MSDSs for each must be confirmed	No	Incorporate a written MSDS inspection and sign-off SOP	Completed

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Priority	Component of the Remedy	Deficiency	Affects Current or Future Protectiveness of the Remedy	Recommendation or Follow-up Action	Status
Low	Chemical Hazard Communication	Personal hazard communication training must be documented in the HSP	No	Ensure hazard communication training of all on-site personnel has been documented in the HSP	Completed
Low	Chemical Hazard Communication	Appropriate labels on day/portable tanks with hazardous chemicals must be confirmed	No	Confirm that day/portable tanks have appropriate labeling	Completed
Low	Spill Contingency Measures	The capacity of the PLTS facility secondary containment system must be confirmed	No	Verify in writing that secondary containment provides 100 percent capacity of the largest vessel (5,000 gal NAPL tank)	Completed
Low	Spill Contingency Measures	Need to address incidental spill control procedures and equipment for treatment chemical handling and storage	No	Verify that on-site staff have been instructed in hazardous chemical handling procedures	Completed
Low	Waste Disposal	Confirm waste disposal and manifest documentation procedures with EPA	No	Develop a written protocol for signing and recording hazardous waste manifests	Completed
Low	Stormwater	No stormwater plan in place	No	Revise the Pollution Control and Mitigation Plan to incorporate stormwater sampling protocols	Completed

Notes:
NAPL - Non-Aqueous Phase Liquid
ROD - Record of Decision
PLTS - Process Liquid Treatment System
GAC - Granular Activated Carbon
DO - Dissolved Oxygen
O&M - Operations and Maintenance
LaDOT - Louisiana Department of Transportation
OWS - Oil/Water Separator
PPE - Personal Protective Equipment
HSP - Health and Safety Plan
PID - Photoionization Detector
SOP - Standard Operating Procedure
ASME - American Society of Mechanical Engineers
MSDS - Materials Safety Data Sheet

Table 8
Monthly Volumes of Ground Water and NAPL Extracted &
Monthly Mass of Contaminants Removed
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Month	Ground Water Volume Extracted (Gallons)	NAPL Volume Extracted (Gallons)	Well Group Operated During Month	Dissolved Phase Contaminant Mass Removed (Pounds)	Monthly NAPL Mass Removed (Pounds)	Cumulative Monthly Mass Removed (Pounds)
Oct-96	189,636	55	All Wells & Sumps	790	496	1,285
Nov-96	492,111	0	All Wells & Sumps	2,049	0	2,049
Dec-96	679,880	0	All Wells & Sumps	2,831	0	2,831
Jan-97	586,880	0	All Wells & Sumps	2,443	0	2,443
Feb-97	521,530	360	All Wells & Sumps	2,171	3,243	5,415
Mar-97	523,560	0	All Wells & Sumps	2,180	0	2,180
Apr-97	422,331	0	All Wells & Sumps	1,758	0	1,758
May-97	477,425	680	All Wells & Sumps	1,988	6,127	8,114
Jun-97	539,080	0	All Wells & Sumps	2,244	0	2,244
Jul-97	677,268	0	All Wells & Sumps	2,820	0	2,820
Aug-97	474,680	3,605	All Wells & Sumps	1,976	32,480	34,456
Sep-97	602,585	0	All Wells & Sumps	2,509	0	2,509
Oct-97	555,420	2,050	All Wells & Sumps	2,312	18,470	20,782
Nov-97	515,900	475	All Wells & Sumps	2,148	4,280	6,428
Dec-97	595,780	0	All Wells & Sumps	2,481	0	2,481
Jan-98	534,650	0	All Wells & Sumps	2,226	0	2,226
Feb-98	477,350	0	All Wells & Sumps	1,987	0	1,987
Mar-98	457,990	1,612	All Wells & Sumps	1,907	14,524	16,430
Apr-98	453,170	2,220	All Wells & Sumps	1,887	20,001	21,888
May-98	397,690	1,456	All Wells & Sumps	1,656	13,118	14,774
Jun-98	457,880	780	All Wells & Sumps	1,906	7,028	8,934
Jul-98	303,670	780	All Wells & Sumps	1,264	7,028	8,292
Aug-98	392,879	780	All Wells & Sumps	1,636	7,028	8,663
Sep-98	421,176	780	All Wells & Sumps	1,754	7,028	8,781
Oct-98	466,563	780	All Wells & Sumps	1,943	7,028	8,970
Nov-98	475,487	1,248	All Wells & Sumps	1,980	11,244	13,224
Dec-98	461,846	1,860	All Wells & Sumps	1,923	16,758	18,681
Jan-99	416,512	1,860	All Wells & Sumps	1,734	16,758	18,492
Feb-99	358,741	1,608	All Wells & Sumps	1,494	14,487	15,981
Mar-99	458,142	1,612	All Wells & Sumps	1,907	14,524	16,431
Apr-99	441,981	1,612	All Wells & Sumps	1,840	14,524	16,364
May-99	396,850	1,612	All Wells & Sumps	1,652	14,524	16,176
Jun-99	381,502	1,560	All Wells & Sumps	1,588	14,055	15,643

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Jul-99	370,403	1,612	All Wells & Sumps	1,542	14,524	16,066
Aug-99	362,718	1,612	All Wells & Sumps	1,510	14,524	16,034
Sep-99	347,215	1,560	All Wells & Sumps	1,446	14,055	15,501
Oct-99	347,215	1,560	All Wells & Sumps	1,446	14,055	15,501
Nov-99	389,761	734	All Wells & Sumps	1,623	6,613	8,236
Dec-99	374,958	704	All Wells & Sumps	1,561	6,343	7,904
Jan-00	416,975	1,020	All Wells & Sumps	1,736	9,190	10,926
Feb-00	328,143	1,020	All Wells & Sumps	1,366	9,190	10,556
Mar-00	312,276	1,020	All Wells & Sumps	1,300	9,190	10,490
Apr-00	303,632	1,020	All Wells & Sumps	1,264	9,190	10,454
May-00	278,661	1,020	All Wells & Sumps	1,160	9,190	10,350
Jun-00	342,962	1,020	All Wells & Sumps	1,428	9,190	10,618
Jul-00	349,183	1,020	All Wells & Sumps	1,454	9,190	10,644
Aug-00	300,869	1,020	All Wells & Sumps	1,253	9,190	10,442
Sep-00	306,613	1,020	All Wells & Sumps	1,277	9,190	10,466
Oct-00	268,882	1,020	All Wells & Sumps	1,119	9,190	10,309
Nov-00	293,676	1,020	All Wells & Sumps	1,223	9,190	10,413
Dec-00	276,108	1,020	All Wells & Sumps	1,150	9,190	10,339
Jan-01	311,222	980	All Wells & Sumps	1,296	8,826	10,122
Feb-01	282,508	951	All Wells & Sumps	1,176	8,565	9,742
Mar-01	369,743	1,181	All Wells & Sumps	1,539	10,641	12,181
Apr-01	211,565	1,143	All Wells & Sumps	881	10,298	11,179
May-01	298,519	1,181	All Wells & Sumps	1,243	10,641	11,884
Jun-01	181,447	1,143	All Wells & Sumps	755	10,298	11,053
Jul-01	431,059	1,181	Phase I Group (Wells R-8 & R-11 added)	1,795	10,641	12,436
Aug-01	435,082	2,124	Phase I Group	1,811	19,136	20,948
Sep-01	435,340	792	Phase I Group	1,813	7,135	8,948
Oct-01	497,510	432	Phase I Group	2,071	3,892	5,963
Nov-01	522,756	3,708	Phase I Group	2,176	33,407	35,584
Dec-01	592,856	2,556	Phase I Group	2,468	23,028	25,497
Jan-02	762,091	2,628	Phase II Group	3,173	23,677	26,850

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Feb-02	343,398	1,584	Phase II Group	1,430	14,271	15,701
Mar-02	501,120	1,692	Phase II Group	2,086	15,244	17,330
Apr-02	384,762	1,404	Phase II Group	1,602	12,649	14,251
May-02	532,438	1,368	Phase II Group	2,217	12,325	14,542
Jun-02	516,870	900	Phase II Group	2,152	8,109	10,261
Jul-02	494,834	2,250	Phase I Group	2,060	20,271	22,332
Aug-02	503,209	1,350	Phase I Group (Wells I-3 & I-4 added)	2,095	12,163	14,258
Sep-02	495,198	1,836	Phase I Group	2,062	16,541	18,603
Oct-02	540,931	1,710	Phase I Group	2,252	15,406	17,658
Nov-02	536,421	1,710	Phase I Group	2,233	15,406	17,640
Dec-02	540,175	1,800	Phase I Group	2,249	16,217	18,466
Jan-03	504,026	1,728	Phase I Group	2,099	15,568	17,667
Feb-03	448,218	2,124	Phase I Group	1,866	19,136	21,002
Mar-03	514,021	1,908	Phase I Group	2,140	17,190	19,330
Apr-03	534,421	1,980	Phase I Group	2,225	17,839	20,064
May-03	544,535	1,591	Phase I Group	2,267	14,336	16,603
Jun-03	550,420	1,649	Phase I Group	2,292	14,855	17,146
Jul-03	567,814	1,620	Phase I Group	2,364	14,595	16,959
Aug-03	556,101	1,980	Phase I Group	2,315	17,839	20,154
Sep-03	522,014	1,890	Phase I Group	2,173	17,028	19,201
Oct-03	457,151	2,502	Phase I Group	1,903	22,542	24,445
Nov-03	488,951	1,656	Phase I Group	2,036	14,920	16,955
Dec-03	495,516	1,746	Phase I Group	2,063	15,731	17,794
Jan-04	503,325	1,638	Phase I Group	2,096	14,758	16,853
Feb-04	466,723	1,602	Phase I Group	1,943	14,433	16,376
Mar-04	478,163	1,782	Phase I Group	1,991	16,055	18,046
Apr-04	393,399	1,908	Phase I Group	1,638	17,190	18,828
May-04	515,488	1,656	Phase I Group	2,146	14,920	17,066
Jun-04	484,433	2,232	Phase I Group	2,017	20,109	22,126
Jul-04	526,439	1,824	Phase I Group (Wells R-14 and R-15 added)	2,192	16,434	18,625
Aug-04	508,828	1,032	Phase I Group	2,119	9,298	11,416

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Sep-04	511,497	2,641	Phase I Group	2,130	23,794	25,924
Oct-04	554,993	1,740	Phase I Group	2,311	15,677	17,987
Nov-04	528,773	1,668	Phase I Group	2,202	15,028	17,230
Dec-04	536,975	1,631	Phase I Group	2,236	14,695	16,930
Jan-05	500,377	1,908	Phase I Group	2,083	17,190	19,274
Feb-05	507,800	1,800	Phase I Group	2,114	16,217	18,332
Mar-05	540,008	1,872	Phase I Group	2,248	16,866	19,114
Apr-05	558,281	1,872	Phase I Group	2,324	16,866	19,190
Totals	46,598,139	138,189		194,011	1,245,035	1,439,047

<u>Notes:</u>
NAPL - Non-Aqueous Phase Liquid

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4-Methylphenol	Acenaphthene	Acenaphthylene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
MW-01A	06-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-02A	15-Dec-03	--	--	5.68	--	--	--	--	--	--	--	--	--	--	--	--	--	85.5	2.8
	14-Jun-04	--	--	1030	--	6.78	--	--	--	--	--	--	--	--	--	--	--	195	8.48
MW-03A	19-Mar-03	24.2	8.9	15.2	--	5.2	70.9	5	--	--	28.4	53.2	91.5	--	--	--	--	166	5
	15-Dec-03	--	14.6	52.4	--	--	--	--	--	4.58	--	--	--	--	--	--	--	208	8.66
	14-Jun-04	--	36.2	158	--	18.3	--	12.7	--	7.74	--	--	--	--	--	--	--	315	9.92
MW-04	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	630	--	--	--	--	680	60
	27-Jun-00	--	--	--	--	--	--	--	290	--	--	--	390	--	26	--	--	24	1274
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	1800	--	--	--	--	1300	132
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	11800	--	--	--	--	9400	--
	31-Mar-01	--	--	--	--	--	118	--	1000	--	103	81	18200	--	1000	--	--	22100	1300
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7940	3110
MW-05	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	345	--	--	--	59	--	44	--	--	26	27
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	428	--	--	--	--	--	246
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	27900	--	--	--	--	41800	--
	31-Mar-01	--	--	--	--	--	123	--	50	--	105	83	592	--	50	--	--	322	50
	05-Jul-01	--	--	435	--	--	--	--	--	--	--	--	--	--	--	--	--	741	247
	17-Mar-03	40.4	--	3830	--	--	108	--	--	--	41.9	85	562	1880	--	2100	--	264	10.4
	15-Dec-03	--	--	694	--	--	--	--	--	--	--	--	--	--	--	--	--	510	14.5
	14-Jun-04	--	--	1950	2.61	--	6.74	--	--	--	--	--	--	--	--	--	--	421	--
MW-06	05-Jul-01	--	--	12800	--	--	--	--	--	--	--	--	--	--	--	--	--	539	--
	18-Dec-01	--	--	19100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	19600	--	--	--	--	--	--	--	--	--	--	--	--	--	670	--
	19-Mar-03	112	--	8630	--	--	124	--	--	--	51	94.3	640	7880	--	17900	--	595	29.2
	15-Dec-03	--	--	8140	--	--	--	--	--	--	--	--	--	--	--	--	--	1280	51.6
	14-Jun-04	--	--	27100	--	--	--	--	--	--	--	--	--	--	--	--	--	10700	370
MW-08	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	--	1.67	--	--	--	--	--	--	--	--	--	--	--	--	--	13.2	--
SMW-1	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.3	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.8	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	29.5	--
SMW-2	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	32	--	--	--	--	52	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	1300	--	--	--	--	1000	--
	31-Mar-01	--	--	--	--	--	--	--	200	--	--	--	1400	--	200	--	--	1100	200
	18-Mar-03	2.4 LJ	2.9 LJ	540	--	4.1 LJ	--	--	--	--	--	--	9.9	98	--	--	18	110	6.2
	15-Dec-03	--	--	1930	--	--	--	--	--	--	--	--	--	--	--	--	--	1120	156
	14-Jun-04	--	--	1070	--	--	--	--	--	--	--	--	--	--	--	--	--	451	66.4

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4-Methylphenol	Acenaphthene	Acenaphthylene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
SMW-3	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	--	247	--	--	--	--	--	--	--	--	--	--	--	--	--	217	6.12
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.88	--
SMW-4	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-5	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-6	19-Mar-03	34	18.6	131	--	--	101	--	--	--	40	82.6	105	74.1	--	119	--	282	6.2
	15-Dec-03	--	11.2	18	--	--	--	3.28	--	--	--	--	--	--	--	--	--	207	6.74
	14-Jun-04	--	--	145	--	--	--	--	--	--	--	--	--	--	--	--	--	259	8.88
SMW-7	19-Mar-03	11.4	--	--	--	--	88.2	--	--	--	47	86	--	--	--	--	--	67	4.4
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	62.3	4.06
	14-Jun-04	--	1.09	3.69	--	--	--	--	--	--	--	--	--	--	--	--	--	55.1	5.01
SMW-8	17-Mar-03	--	--	20.8	--	--	108	--	--	--	42.9	70.5	2.2	21.1	--	15.1	--	97.8	--
	15-Dec-03	--	--	4.88	--	--	--	--	--	--	--	--	--	--	--	--	--	121	2.08
	14-Jun-04	--	--	14	--	--	--	--	--	--	--	--	--	--	--	--	--	65.3	--
SMW-9	19-Mar-03	59.2	--	2440	--	--	99.9	--	--	--	45.1	86.9	319	1170	--	2110	--	324	13.2
	15-Dec-03	--	21.7	2830	--	--	--	--	--	2.96	--	--	--	--	--	--	--	226	12.3
	14-Jun-04	--	115	4530	--	--	--	--	--	--	--	--	--	--	--	--	--	568	21.8
SMW-10	17-Mar-03	--	--	--	--	--	96.6	--	--	--	38.3	77.5	--	--	--	--	--	5.5	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.3	--
	14-Jun-04	--	--	2.14	--	5.58	--	1.94	--	--	--	--	--	--	--	--	--	21	--
SMW-11	19-Mar-03	8.2	--	316	--	--	86.1	--	--	--	41.6	90.8	3.4	24.6	--	--	--	32.3	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	978	26.4
	14-Jun-04	--	96.6	8520	--	40.2	--	--	--	--	--	--	--	--	--	--	--	554	22.5
SMW-12	26-Apr-04	--	--	--	--	--	73	--	--	--	30	60	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-13	26-Apr-04	--	--	--	--	--	75.2	--	--	--	26.2	49.1	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-01	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.1	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.2	--
	07-May-02	--	--	25.8	--	--	--	--	--	--	--	--	--	--	--	--	--	52	--
	20-Mar-03	6.7	--	--	--	1.2 LJ	--	--	--	--	--	--	28	--	--	--	--	49	1.3 LJ
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32.1	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24	--

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4-Methylphenol	Acenaphthene	Acenaphthylene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
SP-02	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	57	--	10	--	93	78	10	--	10	--	--	10	10
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	226	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	19.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-03	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	45.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.53 LJ	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-04	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	76.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	58.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.47	--
SP-05	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	23.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-06	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-08	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-09	16-Dec-03	--	--	2240	--	--	--	--	--	--	--	--	--	--	--	--	--	482	36.2
	15-Jun-04	--	--	15.1	--	--	--	--	--	--	--	--	--	--	--	--	--	452	30
SP-11	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.6	1.3

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butoxyethoxy ethanol isomer	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Di-n-Butylphthalate	Ethanol, 2-(2-butoxyethoxy)-acetate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Nitrobenzene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL				6												1			
MW-01A	06-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-02A	15-Dec-03	--	20.5	--	--	--	--	--	--	--	--	48.1	77.4	--	401	--	--	100	--	29
	14-Jun-04	--	7.18	--	--	--	--	--	--	--	--	33.4	68.2	--	812	--	16.1	67.3	--	22.4
MW-03A	19-Mar-03	--	6.3	--	--	--	--	89.6	85.9	--	--	2.8	75.9	--	1800	--	315	57	--	--
	15-Dec-03	--	12.9	--	--	--	--	--	--	--	--	27.8	114	--	2860	--	92.6	111	--	15.8
	14-Jun-04	--	9.99	--	--	--	--	--	--	--	--	5.53	131	--	3910	--	943	92.5	--	2.92
MW-04	31-Mar-00	--	240	60	--	--	--	420	560	--	--	850	670	--	4800	--	--	1800	--	570
	27-Jun-00	--	14	17	--	--	--	12.9	670	--	--	69	97	--	18	--	90	13	--	11
	28-Sep-00	--	--	57	--	--	--	821	1000	--	--	1800	1400	--	7200	--	2300	3600	--	1200
	30-Dec-00	--	--	--	--	--	--	1600	7300	--	--	10500	--	--	48600	--	--	28400	--	--
	31-Mar-01	--	67700	1000	--	--	--	5400	17100	--	--	1000	26100	1000	48200	78	1000	77400	--	1000
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	11100	7470	--	19100	--	--	23200	--	9760
MW-05	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	91	61	--	--	--	23	--	--	--	--	--	--	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	94	139	--	--	64	146	--	5000	--	358	175	--	46
	30-Dec-00	--	35500	--	--	--	--	6400	30400	--	--	--	41800	--	90000	--	80400	124100	--	--
	31-Mar-01	--	50	50	--	--	--	50	191	--	--	50	230	50	4500	81	50	515	--	50
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	555	642	--	10800	--	--	1530	--	375
	17-Mar-03	--	19.9	--	7.5	--	--	288	155	--	--	25.5	149	--	9980	--	21.9	165	625	20.8
	15-Dec-03	--	49.8	4.16	--	--	--	--	--	--	--	103	216	--	14500	--	16.3	265	--	60.1
	14-Jun-04	--	26.6	--	2.6	--	--	--	--	--	--	28.9	219	--	14100	--	32.4	165	157	19.1
MW-06	05-Jul-01	--	--	--	--	--	--	--	--	--	--	291	362	--	8830	--	11900	843	6600	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	8200	--	12200	--	7590	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	215	414	--	10800	--	9130	662	7140	--
	19-Mar-03	--	111	--	--	--	--	706	372	--	--	291	361	--	9880	--	8500	805	13000	180
	15-Dec-03	--	344	--	--	--	--	--	--	--	--	1190	944	--	11000	--	9570	2210	7760	661
	14-Jun-04	--	2690	92.2	--	--	--	--	--	--	--	12700	8760	--	45000	--	2770	25400	22900	9750
MW-08	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	15.2	--	--	22.5	--	--
	18-Dec-01	--	--	--	14.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	6.05	--	--	--	--	--
	20-Mar-03	--	0.41 LJ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	--	1.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	2.54	--	--	--	--	--	--	--	--	10.3	10.4	--	38.6	--	7.65	26.3	--	7.52
SMW-1	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	42.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	8.7	--	--	5.47	--	--
	18-Mar-03	--	--	--	--	--	--	--	1.3 LJ	--	--	--	--	--	0.78 LJ	--	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	1.29	--	--	--	--	--	--	--	--	4.58	4.48	--	6.52	--	--	11.8	--	3.58
SMW-2	31-Mar-00	--	12	--	--	--	--	27	38	--	--	23	51	--	165	--	--	117	--	14
	27-Jun-00	--	--	1211	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	1200	--	--	--	--	480	170	--	--	--	980	--	6900	--	--	2400	--	--
	31-Mar-01	--	200	200	--	--	--	664	200	--	--	200	1200	200	10400	--	200	3800	--	200
	18-Mar-03	5.7	4.5 LJ	--	--	--	--	--	--	--	--	1.3	34	--	52	--	4.7 LJ	5.1	5.3	0.74 LJ
	15-Dec-03	--	388	118	--	--	--	--	--	--	--	1060	980	--	17800	--	--	1940	161	645
	14-Jun-04	--	88.9	14	--	--	--	--	--	--	--	166	337	--	18300	--	--	468	62.5	129

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butoxyethoxy ethanol isomer	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Di-n-Butylphthalate	Ethanol, 2-(2-butoxyethoxy)-acetate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Nitrobenzene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL				6												1			
SMW-3	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	15.1	--	--	--	--	--
	18-Dec-01	--	--	--	90.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	43.2	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	18	--	--	--	--	--	--	--	--	25.1	139	--	2020	--	--	69	--	12.7
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	2.4	2.78	--	134	--	--	6.15	--	1.78
SMW-4	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-5	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-6	19-Mar-03	8.8	6.2	--	--	--	--	117	125	--	--	6.7	80	--	2930	--	81.9	74.8	274	3.9
	15-Dec-03	--	12.1	--	--	--	--	--	--	--	--	24.2	80.4	--	1540	--	124	72.5	60.9	12.3
	14-Jun-04	--	17.6	--	--	--	--	--	--	--	--	27.5	101	--	2120	--	17.4	85.5	--	18.9
SMW-7	19-Mar-03	--	16.5	--	--	--	--	92.6	34.4	--	--	2.8	34.4	--	123	--	10	14.7	--	--
	15-Dec-03	--	14.9	--	--	--	--	--	--	--	--	--	29.8	--	273	--	--	3.1	--	--
	14-Jun-04	--	21.7	--	--	--	--	--	--	--	--	1.8	28.6	--	212	--	9.73	3.32	--	1.19
SMW-8	17-Mar-03	--	2.3	--	--	--	--	35.1	19.4	--	--	--	28.3	--	244	--	--	8.6	11.6	--
	15-Dec-03	--	2.82	--	--	--	--	--	--	--	--	3.74	30.8	--	27.2	--	--	4.74	--	2.26
	14-Jun-04	--	1.71	--	--	--	--	--	--	--	--	1.54	19.7	--	122	--	--	2.63	--	1.08
SMW-9	19-Mar-03	45.2	21.2	--	--	--	--	371	160	--	--	43.4	146	--	5400	--	934	184	1820	29.3
	15-Dec-03	--	21.7	2	--	--	--	--	--	--	--	83.6	109	--	7900	--	4.3	156	--	49.6
	14-Jun-04	--	20.8	--	1.62	--	--	--	--	--	--	40.6	79.4	--	7120	--	--	175	365	16.9
SMW-10	17-Mar-03	--	--	--	--	--	--	6.6	--	--	--	2.5	3.4	--	--	--	773	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	3.02	7.42	--	65.1	--	209	7.36	--	--
	14-Jun-04	--	1.82	--	--	--	--	--	--	--	--	1.91	12.8	--	49.5	--	263	8.33	--	1.23
SMW-11	19-Mar-03	--	7.8	--	--	--	--	36	23.6	--	--	24.1	34.6	--	--	--	10.4	65.9	--	13.6
	15-Dec-03	--	328	18.4	--	--	--	--	--	--	--	--	884	--	12000	--	164	1940	--	--
	14-Jun-04	--	135	16.8	--	--	--	--	--	--	--	456	474	--	8720	--	94.7	968	--	305
SMW-12	26-Apr-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	2.71	--	--	--	--	9.84	--	--	--	--	--
SMW-13	26-Apr-04	--	--	--	--	11.2	--	--	--	--	6.6	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	4.15	--	--	--	--	8.28	--	--	--	--	--
SP-01	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	145	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	14.3	--	65.5	--	58.9	20.6	--	--
	07-May-02	--	--	--	7.59	--	--	--	--	--	--	--	28.3	--	232	--	187	25.6	--	--
	20-Mar-03	--	4.5 LJ	--	--	--	--	--	27	--	--	5.7	32	--	31	--	160	41	--	3.1 LJ
	16-Dec-03	--	3.28	--	--	--	--	--	--	--	--	5.74	20.5	--	97.3	--	82.6	32.1	--	3.42
	15-Jun-04	--	3.42	--	--	--	1.13	--	--	--	--	6.24	18.7	--	51.3	--	102	25.3	--	4.23

Table 9
Summary of SVOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butoxyethoxy ethanol isomer	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Di-n-Butylphthalate	Ethanol, 2-(2-butoxyethoxy)-acetate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Nitrobenzene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL				6												1			
SP-02	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	335	--	--	--	--	--	--	--	24	--	--	145	--	--	--	--	52
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	--	10	10	--	--	--	10	10	--	--	10	10	10	10	--	10	10	--	10
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	9.97	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	43.7	--	215	--	28.4	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	10.3	--	15.4	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	3.22	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	24.5	--	7.64	--	--	--
SP-03	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	7.98	--	18.9	--	--	--
	20-Mar-03	--	0.49 LJ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	1.03	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	4.26	--	--	23.7	--	--	4.7	--	3.22
SP-04	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	16.5	--	--	--	--	--	--	--	--	--	19.2	--	74.3	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	5.95	--	13.3	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	18.9	--	--	--	--	--	--	1.15	--	--	19.3	--	--	--	--	--
SP-05	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	7.79	--	--	--	--	--
	07-May-02	--	--	--	19.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12-Mar-03	--	--	--	--	--	--	--	--	0.83 LJ	--	--	--	--	--	--	--	--	--	--
SP-06	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	4.5	--	--	--	--	--
SP-08	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	1.1	--	--	--	--	--	--	--	--	--	--	--	3.96	--	--	--	--	--
SP-09	16-Dec-03	--	57.8	--	--	--	--	--	--	--	--	108	322	--	16600	--	--	415	--	52.8
	15-Jun-04	--	103	--	--	--	--	--	--	--	--	300	394	--	3370	--	--	768	--	199
SP-11	16-Dec-03	--	--	--	--	--	--	--	--	--	--	18.5	--	--	1.7	--	--	--	--	9.88
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	13	2.73	--	6.89	--	9.63	1.3	--	8.53

Notes:
µg/l = micrograms per liter
SVOC = Semivolatile Organic Compounds
MCL - Maximum Contaminant Level
-- = not analyzed for or not detected at sample quantitation limit
J = estimated concentration
LJ = estimated concentration, analyte detected below the reporting limit
1 - Naphthalene can be analyzed as both a SVOC and VOC. The highest result is listed in the table.
Green shading indicates an exceedance of the MCL

Table 10

Summary of SVOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4,6-Dinitro-2-methylphenol	4-Methylphenol	4-Methyl-2-pentanone
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
R-01	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-02	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.35 LJ	--
R-03	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	2400	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	145	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	147	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	9200	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	250	--	--	--	3500	--	250	--	--	--	--
	02-Jul-01	--	--	428	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	1890	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	859	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	--	--	3060	--	--	--	--	--	--	50.4	78.7	2970	2110	--	4020	--	--	--
	15-Dec-03	--	--	1940	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	--	3440	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-04	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	660	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	283	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	5400	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	500	--	--	--	27900	--	500	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	646	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	906	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	230	15.1	644	--	--	104	--	--	--	43	85	997	437	--	608	--	--	--
R-05	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	88	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	146	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	7100	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	500	--	--	--	20800	--	500	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	2650	--	394	--	--	105	--	--	--	49	47.1	15000	--	--	--	--	--	--
R-06	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	150	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	141	--	--	--	1371	--	37	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	326	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	2100	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	2500	--	--	--	38300	--	2500	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-07	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	17	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	138	--	--	--	349	--	94	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	851	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	50	--	--	--	2000	--	50	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	31.6	263	--	--	--	--	--	--	--	--	--	--	--	--	246	--	--
	07-May-02	--	43.3	25.8	21	--	21	--	--	--	--	--	--	--	--	--	--	--	--
	19-Mar-03	40.6	61.7	56.3	--	63.9	104	5.2	--	29.6 J	47.7	91.8	191	20.1	--	55	--	--	--

Table 10
Summary of SVOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4,6-Dinitro-2-methylphenol	4-Methylphenol	4-Methyl-2-pentanone
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
R-08	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	50	--	--	--	60	--	138	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	10	--	--	--	10	--	10	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	--	--	--	--	--	103	--	--	--	38.6	72.8	--	--	--	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-09	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	720	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	33	--	--	--	56	--	67	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	4100	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	8100	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	500	--	--	--	28400	--	500	--	--	--	--
	02-Jul-01	--	--	17600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-10	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	1900	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	107	--	--	--	--	--	57	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	991	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	4700	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	2500	--	--	--	75800	--	2500	--	--	--	--
	02-Jul-01	--	--	11700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-11	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	33	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	105	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	215	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	25	--	--	--	25	--	25	--	--	--	--
	02-Jul-01	--	--	68.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	32.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	90.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	334	--	1020	--	--	108	--	--	--	47.2	78.4	1210	785	--	637	--	--	--
R-12	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	106	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	24	--	--	--	--	--	43	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	79	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	20700	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	10	--	--	--	103	--	10	--	--	--	--
	02-Jul-01	--	--	241	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	2250	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	441	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	827	--	4180	--	--	110	--	--	--	49.8	78.1	4440	2660	--	4710	--	--	6.2
R-13	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	8500	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	50	--	--	--	870	--	50	--	--	--	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	12.4	--	--	--	--	--	--	22.2	--	--	--	--	--	--	224	--	--
	07-May-02	--	65.3	79.4	52.4	--	--	--	--	99.5	--	--	--	--	--	--	--	--	--
	17-Mar-03	315	45.9	122	--	81.3 J	72.4	--	--	30.7	40.9	67	1120	42.8	--	59.1	--	--	--
	15-Dec-03	--	74.6	87.4	--	--	--	--	--	75.4	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	63.2	--	--	63	--	31	--	88.4	--	--	--	--	--	--	--	--	--

Table 10
Summary of SVOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,1'-Biphenyl	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4,5-Tribromophenol	2,4,5-Trichlorophenol	2,4,6-Tribromophenol	2,4,6-Trichlorophenol	2-Chloronaphthalene	2-Chlorophenol	2-Fluorobiphenyl	2-Fluorophenol	2-Methylnaphthalene	2-Methylphenol	3,3'-Dichlorobenzidine	3&4-Methylphenol	4,6-Dinitro-2-methylphenol	4-Methylphenol	4-Methyl-2-pentanone
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL																		
R-14	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	9100	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	435	--	--	--	9608	--	--	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	610	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	237700	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	2500	--	--	--	359300	--	2500	--	--	--	--
	02-Jul-01	--	--	17900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	30900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	29100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	375	--	21400	--	--	92.2	--	--	--	45	43.2	1880	21300	--	50800	--	--	--
R-16	18-Dec-01	--	--	1390	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	698	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	19-Mar-03	4280	--	2700	--	--	68	--	--	--	40.4	27.2	16800	1340	--	2420	--	--	--
S-01	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-02	02-Jul-01	--	--	486	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	497	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	1.4 LJ	--	82	--	--	--	--	--	--	--	--	9.1 LJ	96	--	--	--	19	--
S-03	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	--	227	--	--	--	--	--	112	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	1300	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	--	--	50	--	--	--	646	--	50	--	--	--	--
	02-Jul-01	--	--	959	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	2440	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	17-Mar-03	136	--	1440	--	--	109	--	--	--	42.9	74.6	774	823	--	569	--	--	--
S-12	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	379	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	19-Mar-03	561	--	345	46.8	--	--	--	--	--	19.9	31.8	2380	183	--	316	--	--	--
	15-Dec-03	--	--	68.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	4.72	182	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 10
Summary of SVOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	Acenaphthene	Acenaphthylene	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Dimethyl phthalate	Di-n-Octylphthalate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL						6										1			
R-01	20-Mar-03	7.1	0.32 LJ	--	--	--	--	--	--	--	1.6 LJ	--	--	--	--	--	--	--	--	--
R-02	18-Mar-03	6.1	1.2 LJ	--	1.6 LJ	1 LJ	--	1.6 LJ	--	2 LJ	--	8.6	12	3.9 LJ	--	--	--	2.8 LJ	--	6.6
R-03	31-Mar-00	4900	--	--	1300	--	--	--	--	3400	--	--	6500	4000	--	4500	--	1600	--	4300
	27-Jun-00	55	--	--	73	50	--	--	29700	121	--	--	--	253	--	--	--	26	--	--
	28-Sep-00	250	10	--	27	--	--	--	35	163	--	--	93	162	--	106	105	293	--	61
	30-Dec-00	17600	--	--	29300	--	--	--	1800	11000	--	--	--	14300	--	37100	--	52600	--	22600
	31-Mar-01	4900	250	--	14400	250	--	--	940	3300	--	--	250	4200	250	14600	250	14800	--	250
	02-Jul-01	11000	--	--	2440	--	--	--	--	--	--	--	22600	11900	--	90500	--	47200	--	7740
	18-Dec-01	4680	475	--	3060	336	--	--	--	--	--	--	7390	4790	--	18800	2710	13500	--	4740
	07-May-02	1510	--	--	246	--	--	--	--	--	--	--	1130	1080	--	9430	1390	2140	--	733
	17-Mar-03	5100	125	--	964	65.7 J	58.7 J	--	1010	3140	--	--	5470	3600	--	20300	116 J	12700	3050	5320
	15-Dec-03	15100	401	--	3430	240	--	--	--	--	--	--	19500	11400	--	30000	342	30000	590	11500
	14-Jun-04	2410	70.4	--	365	24.4	--	--	--	--	--	--	2160	1730	--	17200	111	4390	1240	1460
R-04	31-Mar-00	1000	--	--	420	--	--	--	70	760	--	--	1500	920	--	1400	1000	3600	--	--
	27-Jun-00	83	--	--	33	99	--	--	7318	19	--	--	78	278	--	--	32	108	--	--
	28-Sep-00	348	12	--	41	--	--	--	111	210	--	--	231	222	--	1300	155	459	--	155
	30-Dec-00	9700	--	--	16300	--	--	--	1500	6200	--	--	7800	--	--	25100	--	28200	--	10900
	31-Mar-01	38800	1300	--	500	500	--	--	500	27000	--	--	500	33400	500	71200	870	101200	--	500
	02-Jul-01	1980	--	--	472	--	--	--	--	--	--	--	2900	1810	--	31300	--	7160	--	1430
	18-Dec-01	2340	--	--	936	--	--	--	--	--	--	--	2350	2090	--	6340	4280	4550	--	1800
	07-May-02	916	--	--	--	--	--	--	--	--	--	--	565	661	--	9570	3700	1230	--	370
	17-Mar-03	1370	35.5	10.8	380	14 J	--	--	281	819	--	--	1210	1110	--	3250	4860	3080	534	816
R-05	31-Mar-00	68	--	--	--	--	--	--	--	50	--	--	--	48	--	300	--	200	--	--
	27-Jun-00	804	--	--	--	113	--	--	7318	223	--	--	88	184	29	--	108	--	--	--
	28-Sep-00	173	10	--	26	--	--	--	43	112	--	--	69	133	--	444	93	199	--	42
	30-Dec-00	11800	--	--	15700	--	--	--	1400	7400	--	--	--	9000	--	29700	--	30600	--	12500
	31-Mar-01	29900	1200	--	500	500	--	--	6600	21000	--	--	61000	26800	500	52900	560	103200	--	500
	02-Jul-01	3220	--	--	650	--	--	--	--	--	--	--	5050	2980	--	40600	--	14500	--	2130
	17-Mar-03	12900	594	--	5160	413	--	--	2050	9060	--	--	14500	12800	--	69100	1680	35100	--	9590
R-06	31-Mar-00	150	--	--	--	--	--	--	50	100	--	--	80	90	--	1300	1500	210	--	50
	27-Jun-00	236	325	--	--	23	--	--	496	52	--	--	7470	196	37	--	56	614	--	1514
	28-Sep-00	301	24	--	--	--	--	--	165	218	--	--	252	251	--	1500	2100	561	--	323
	30-Dec-00	2600	95	--	3700	--	--	--	890	1800	--	--	2300	--	--	8200	51000	13100	--	--
	31-Mar-01	45300	3200	--	158300	2500	--	--	6200	37100	--	--	2500	53100	2500	103200	2500	168200	--	2500
	02-Jul-01	1170	--	--	--	--	--	--	--	--	--	--	1570	1020	--	8070	--	3660	--	725
R-07	31-Mar-00	23	--	--	--	--	--	--	57	10	--	--	--	--	--	304	377	--	--	--
	27-Jun-00	39	280	--	--	37	--	--	129	276	--	--	261	--	--	217	1162	67	--	--
	28-Sep-00	1400	43	--	--	20	--	--	405	902	--	--	20	1100	--	4400	24900	3000	--	1300
	30-Dec-00	82	--	--	183	--	--	--	--	57	--	--	--	95	--	--	52	272	--	--
	31-Mar-01	2500	100	--	50	50	--	--	2800	2000	--	--	4500	3400	50	7400	34700	10400	--	50
	02-Jul-01	12000	--	--	3260	--	--	--	--	--	--	--	14600	9780	--	29900	29600	--	--	11500
	18-Dec-01	80.4	--	--	--	--	--	--	--	--	--	--	14	36.1	--	460	501	39.6	--	--
	07-May-02	133	--	--	--	--	--	--	--	--	--	--	--	65.2	--	607	1390	53	--	--
	19-Mar-03	334	7.9	5.4	7.5	--	--	--	76.6	126	--	--	2.3	116	--	1410	7100 J	37.5	28.2 J	--

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American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	Acenaphthene	Acenaphthylene	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Dimethyl phthalate	Di-n-Octylphthalate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL						6										1			
R-08	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	43	--	--	--	30	--	--	--	--	--	--	351	--	413	114	--	12	--	20
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	10	10	--	10	10	--	--	10	10	--	--	10	10	10	10	50	10	--	10
	02-Jul-01	12.7	--	--	--	--	--	--	--	--	--	--	--	--	--	8.89	--	--	--	--
	17-Mar-03	6.8	--	--	--	--	--	--	6.9	--	--	--	--	2.5	--	5.3	--	--	--	--
	15-Dec-03	224	6.48	--	48.8	3.5	--	--	--	--	--	--	308	173	--	574	--	601	--	203
	14-Jun-04	6.79	--	--	--	--	--	--	--	--	--	--	1.68	2.38	--	3.73	--	5.07	--	1.13
R-09	31-Mar-00	510	35	--	120	--	--	--	280	390	--	--	340	420	--	6200	900	--	--	220
	27-Jun-00	71	--	--	94	138	--	--	143	--	--	--	--	394	--	52	573	258	--	177
	28-Sep-00	3200	281	--	--	140	--	--	1200	2500	--	--	4300	3400	--	12500	1800	8800	--	2800
	30-Dec-00	6900	--	--	--	--	--	--	1400	5000	--	--	--	7200	--	38400	--	23100	--	7500
	31-Mar-01	24300	2000	--	500	500	--	--	10400	18800	--	--	48300	26700	500	80100	9000	90000	--	500
	02-Jul-01	12300	--	--	4580	--	--	--	--	--	--	--	15000	11900	--	47700	--	30600	8430	9700
R-10	31-Mar-00	1500	100	--	1500	70	--	--	520	1300	--	--	1900	1500	--	10500	--	4100	--	1200
	27-Jun-00	96	643	--	--	97	--	--	69	1539	--	--	302	--	--	2200	66	19	--	46
	28-Sep-00	855	--	--	228	--	--	--	531	581	--	--	768	752	--	7700	863	1500	--	516
	30-Dec-00	4100	--	--	--	--	--	--	1100	3000	--	--	--	4300	--	23400	--	13600	--	--
	31-Mar-01	66400	4600	--	2500	2500	--	--	17600	51000	--	--	2500	74700	2500	220100	10900	213500	--	2500
	02-Jul-01	32400	2480	--	15500	2010	--	--	--	--	--	--	37400	33400	--	77300	--	56200	--	31600
R-11	31-Mar-00	21	--	--	22	--	--	--	--	22	--	--	220	78	--	36	--	160	--	130
	27-Jun-00	49	--	--	--	43	--	--	--	228	--	--	--	91	--	--	--	--	--	--
	28-Sep-00	391	--	--	64	--	--	--	134	262	--	--	235	332	--	55	825	621	--	162
	30-Dec-00	291	--	--	--	--	--	--	276	175	--	--	--	263	--	231	--	647	--	50
	31-Mar-01	315	25	--	1500	25	--	--	25	140	--	--	1600	322	25	42	125	1500	--	25
	02-Jul-01	354	--	--	29.4	--	--	--	--	--	--	--	101	258	--	1950	--	412	52	99.2
	18-Dec-01	281	--	--	69.4	--	--	--	--	--	--	--	467	282	--	769	--	646	--	308
	07-May-02	598	--	--	93.5	--	--	--	--	--	--	--	356	473	--	850	--	820	57.5	455
	17-Mar-03	3800	74.3	6.6	878	39.9 J	--	--	208	2340	--	--	5700	3250	--	1250	23.7 J	11600	552	5100
R-12	31-Mar-00	54	--	--	--	--	--	--	30	32	--	--	--	29	--	212	--	--	--	--
	27-Jun-00	36	93	--	--	--	--	--	69	--	--	--	335	72	16	--	--	--	--	131
	28-Sep-00	78	--	--	10	--	--	--	60	46	--	--	21	52	--	653	81	70	--	13
	30-Dec-00	25900	--	--	75600	--	--	--	6400	9800	--	--	29200	--	--	71200	--	120600	--	--
	31-Mar-01	83	10	--	77	10	--	--	38	10	--	--	10	61	10	372	10	89	--	10
	02-Jul-01	211	--	--	--	--	--	--	--	--	--	--	--	51.8	--	3040	--	--	--	--
	18-Dec-01	115	12.8	--	10.3	--	--	--	--	--	--	--	20.3	68.3	--	3330	--	75.7	442	13.6
	07-May-02	181	--	--	--	--	--	--	--	--	--	--	103	--	--	4280	--	97.2	--	23.1
	17-Mar-03	4310	340	--	1380	129 J	--	--	937	2910	--	--	4580	3550	--	24100	62.2	10800	1660	4110
R-13	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	100	457	--	--	--	--	--	--	1597	--	--	--	373	--	93	--	--	--	--
	28-Sep-00	--	--	--	--	--	--	--	24	--	--	--	25	--	--	26	736	--	--	22
	30-Dec-00	12900	--	--	37600	--	--	--	2000	4800	--	--	--	15800	--	25500	2700	53000	--	--
	31-Mar-01	910	50	--	50	50	--	--	40	50	--	--	50	700	50	5500	18000	2000	--	50
	02-Jul-01	502	--	--	281	--	--	--	--	--	--	--	1190	554	--	168	--	2350	--	750
	18-Dec-01	56	--	--	--	--	--	--	--	--	--	--	16	38.2	--	46.9	308	49.9	--	10.2
	07-May-02	158	--	--	24.9	--	--	--	--	--	--	--	40	120	--	677	3270	180	61.4	64.5
	17-Mar-03	2350	28.9 J	--	980	22.2	236	--	419	1390	--	--	3990	2370	--	3770	11900	8100	33.7	2510
	15-Dec-03	931	28.8	--	292	--	--	--	--	--	--	--	1160	817	--	2300	9930	2050	26.4	621
	14-Jun-04	297	--	--	43.6	--	--	--	--	--	--	--	95.6	218	--	2210	7770	350	71.4	66.8

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Well or Sump ID	Date	Acenaphthene	Acenaphthylene	Acetophenone	Anthracene	Benzo (g,h,i) Perylene	Bis(2-Ethylhexyl) phthalate	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Dimethyl phthalate	Di-n-Octylphthalate	Fluoranthene	Fluorene	Isophorone	Naphthalene (1)	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
	MCL						6										1			
R-14	31-Mar-00	1600	480	--	--	--	--	--	450	1300	--	--	1800	1400	--	11600	520	3600	--	--
	27-Jun-00	766	--	--	--	26	--	--	155	--	--	--	2858	2649	--	3662	80	1506	--	206
	28-Sep-00	720	30	--	103	--	--	--	423	428	--	--	592	488	--	5100	1600	1100	--	395
	30-Dec-00	236800	16200	--	--	--	--	--	63600	175700	--	--	415100	231200	--	587500	267300	735700	--	--
	31-Mar-01	187700	26700	--	2500	2500	--	--	96000	220900	--	--	5400	282200	2500	478400	2500	461900	--	6400
	02-Jul-01	9610	--	--	--	--	--	--	--	--	--	--	9970	6970	--	29800	--	20600	17100	7300
	18-Dec-01	6140	--	--	--	--	--	--	--	--	--	--	6640	5430	--	32600	--	14300	10700	4370
	07-May-02	4890	--	--	--	--	--	--	--	--	--	--	5380	4210	--	29800	--	10900	9570	3470
	17-Mar-03	2520	95.8	--	652	--	--	--	1040	1500	--	--	2380	1800	--	17200	1890	5990	33900	1580
R-16	18-Dec-01	2950	--	--	1090	--	--	--	--	--	--	--	3890	2660	--	7730	--	6400	--	2750
	07-May-02	1980	42.8	--	183	21.8	16.8	--	--	--	--	--	1600	1390	--	9880	32.9	3090	53.8	1110
	19-Mar-03	27500	605	--	7470	646	--	--	3900	17900	--	--	35500	24500	--	63300	--	72400	1900	24500
S-01	02-Jul-01	20.2	--	--	--	--	--	--	--	--	--	--	--	18.3	--	6.67	--	11	--	--
	18-Dec-01	19.7	--	--	--	--	--	--	--	--	--	--	--	13.9	--	16.7	--	--	--	--
	07-May-02	66.3	--	--	--	--	--	--	--	--	--	--	46.7	53.6	--	--	--	111	--	61.5
	18-Mar-03	--	--	--	--	--	45	--	--	--	--	--	--	--	--	--	--	--	--	--
S-02	02-Jul-01	595	--	--	--	--	--	--	--	--	--	--	384	483	--	5470	--	1050	--	222
	18-Dec-01	89.4	--	--	11.3	--	--	--	--	--	--	--	57.9	59.4	--	38.9	--	51.4	--	28.2
	07-May-02	422	--	--	73.4	--	--	--	--	--	--	--	132	344	--	4380	--	465	40.1	195
	18-Mar-03	150	4.2 LJ	--	4.5 LJ	--	--	--	--	81	--	--	26	78	--	3.1 LJ	--	5.2 LJ	13	15
S-03	31-Mar-00	26	--	--	--	--	--	--	--	11	--	--	21	31	--	28	--	16	--	10
	27-Jun-00	61	231	--	28	112	--	--	137	32	--	--	--	360	251	17	--	22	--	23
	28-Sep-00	224	--	--	29	--	--	--	30	124	--	--	68	205	--	74	344	270	--	45
	30-Dec-00	1200	--	--	2400	--	--	--	240	320	--	--	--	1200	--	3800	--	3200	--	--
	31-Mar-01	676	50	--	1700	50	--	--	173	488	--	--	50	723	50	1600	50	2000	--	50
	02-Jul-01	954	--	--	269	--	--	--	--	--	--	--	907	915	--	10200	--	2340	--	555
	18-Dec-01	40300	--	--	19000	--	--	--	--	--	--	--	51600	42800	--	93800	--	93800	--	37500
	07-May-02	1400	--	--	395	--	--	--	--	--	--	--	1370	1320	--	21800	--	2520	217	867
	17-Mar-03	800	30.6	--	172	11 J	67.9	--	516	540	--	--	529	642	--	6890	6.8	1610	240	449
S-12	02-Jul-01	14900	--	--	7780	--	--	--	--	--	--	--	21300	16800	--	32600	--	40900	--	17600
	18-Dec-01	10500	--	--	4990	--	--	--	--	--	--	--	13900	11600	--	33700	--	27400	--	9530
	07-May-02	426	30.9	--	79.6	--	--	--	--	--	--	--	282	349	--	9440	2080	878	--	210
	19-Mar-03	3720	79.8	--	1070	72.9	--	--	586	2600	--	--	4980	3310	--	9580	160	9790	254	2950
	15-Dec-03	2210	129	--	846	96	--	--	--	--	--	--	2810	2260	--	13800	72.8	6230	--	1550
	14-Jun-04	1270	39.2	--	198	8.46	--	--	--	--	--	--	872	876	--	7860	1430	2110	15.8	668

Notes:
µg/l = micrograms per liter
VOCs = Volatile Organic Compounds
MCL - Maximum Contaminant Level
-- = not analyzed for or not detected at sample quantitation limit
J = estimated concentration
LJ = estimated concentration, analyte detected below the reporting limit
1 - Naphthalene can be analyzed as both a SVOC and VOC. The highest result is listed in the table.
Green shading indicates an exceedance of the MCL

Table 11
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
in Ground Water in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
MW-02A	15-Dec-03	7.48	0.748	2.4	2.4	2.4	0.24	2.66	0.0266	7.16	0.00716	--	--	--	--	3.42
	14-Jun-04	4.64	0.464	--	--	--	--	--	--	3.78	0.00378	--	--	--	--	0.47
MW-03A	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	3.94	0.394	--	--	--	--	--	--	3.7	0.0037	--	--	--	--	0.40
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
MW-04	31-Mar-00	--	--	190	190	--	--	--	--	160	0.16	--	--	--	--	190.16
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	10	10	--	--	10.00
	28-Sep-00	406	40.6	208	208	271	27.1	127	1.27	360	0.36	--	--	76	7.6	284.93
	30-Dec-00	3200	320	1100	1100	2300	230	--	--	2200	2.2	--	--	--	--	1652.20
	31-Mar-01	10800	1080	3800	3800	1000	100	4300	43	8300	8.3	1000	1000	1000	100	6131.30
	05-Jul-01	2540	254	--	--	2130	213	--	--	2080	2.08	--	--	--	--	469.08
MW-05	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	76	7.6	41	41	36	3.6	12	0.12	--	--	--	--	75	7.5	59.82
	28-Sep-00	26	2.6	--	--	--	--	--	--	--	--	--	--	--	--	2.60
	30-Dec-00	12700	1270	2300	2300	4700	470	2100	21	11500	11.5	--	--	--	--	4072.50
	31-Mar-01	55	5.5	50	50	50	5	50	0.5	50	0.05	50	50	50	5	116.05
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	17-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	17.1	1.71	7.76	7.76	6.6	0.66	6.82	0.0682	18	0.018	--	--	3.58	0.358	10.57
	14-Jun-04	2.56	0.256	1.12	1.12	--	--	--	--	2.52	0.00252	--	--	--	--	1.38
MW-06	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	181	18.1	47.8	47.8	62.6	6.26	47.6	0.476	184	0.184	--	--	--	--	72.82
	14-Jun-04	1740	174	502	502	502	50.2	584	5.84	1690	1.69	43	43	111	11.1	787.83
MW-08	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	1.21	1.21	1.19	0.119	1.33
	14-Jun-04	1.51	0.151	--	--	--	--	--	--	1.56	0.00156	--	--	--	--	0.15

Table 11
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
in Ground Water in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
SMW-2	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	583	583	--	--	583.00
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	30-Dec-00	240	24	84	84	160	16	51	0.51	--	--	--	--	--	--	124.51
	31-Mar-01	492	49.2	222	222	356	35.6	200	2	280	0.28	200	200	200	20	529.08
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	27	27	--	--	27.00
	15-Dec-03	304	30.4	193	193	173	17.3	163	1.63	300	0.3	40.8	40.8	106	10.6	294.03
	14-Jun-04	40.4	4.04	27.1	27.1	25.5	2.55	22.9	0.229	40.2	0.0402	--	--	11.4	1.14	35.10
SMW-6	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	3.46	0.346	--	--	--	--	--	--	3.96	0.00396	--	--	--	--	0.35
	14-Jun-04	6.52	0.652	3.34	3.34	3.24	0.324	3.88	0.0388	6.04	0.00604	--	--	--	--	4.36
SMW-9	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	15	1.5	5.56	5.56	6.32	0.632	6.08	0.0608	16.6	0.0166	--	--	2.18	0.218	7.99
	14-Jun-04	2.49	0.249	1.44	1.44	1.39	0.139	1.52	0.0152	3.2	0.0032	--	--	--	--	1.85
SMW-11	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	149	14.9	63.4	63.4	68.2	6.82	64.1	0.641	127	0.127	8.42	8.42	21	2.1	96.41
	14-Jun-04	96.7	9.67	46.4	46.4	43.3	4.33	41.1	0.411	85.4	0.0854	--	--	15.6	1.56	62.46
SP-02	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	13	1.3	--	--	--	--	--	--	61	0.061	823	823	239	23.9	848.26
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	31-Mar-01	10	1	10	10	10	1	10	0.1	10	0.01	10	10	10	1	23.11
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
SP-09	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Jun-04	55.6	5.56	25.1	25.1	24.2	2.42	23.2	0.232	57.4	0.0574	--	--	--	--	33.37
SP-11	16-Dec-03	--	--	--	--	--	--	--	--	1.11	0.00111	--	--	--	--	0.00
	15-Jun-04	1.36	0.136	--	--	--	--	--	--	1.81	0.00181	--	--	--	--	0.14

Table 11
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
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Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
R-01	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
R-02	18-Mar-03	2.7 LJ	0.27	2.4 LJ	2.4	3.7 LJ	0.37	1.2 LJ	0.012	2.5 LJ	0.0025	--	--	1.2 LJ	0.12	3.17
R-03	31-Mar-00	860	86	--	--	--	--	--	--	800	0.8	--	--	--	--	86.80
	27-Jun-00	12	1.2	60	60	20	2	--	--	18	0.018	77	77	472	47.2	187.42
	28-Sep-00	16	1.6	10	10	11	1.1	10	0.1	13	0.013	--	--	--	--	12.81
	30-Dec-00	5800	580	1200	1200	2800	280	--	--	4600	4.6	--	--	--	--	2064.60
	31-Mar-01	1300	130	360	360	250	25	460	4.6	1100	1.1	250	250	250	25	795.70
	02-Jul-01	1610	161	608	608	898	89.8	--	--	1290	1.29	--	--	--	--	860.09
	18-Dec-01	2100	210	627	627	974	97.4	807	8.07	2230	2.23	--	--	359	35.9	980.60
	07-May-02	178	17.8	59.8	59.8	56.4	5.64	--	--	--	--	--	--	--	--	83.24
	17-Mar-03	964	96.4	316	316	527	52.7	175 J	1.75	876	0.876	24.6 J	24.6	74 J	7.4	499.73
	15-Dec-03	3120	312	927	927	1000	100	933	9.33	3020	3.02	95	95	267	26.7	1473.05
	14-Jun-04	324	32.4	104	104	106	10.6	113	1.13	299	0.299	--	--	24.8	2.48	150.91
R-04	31-Mar-00	260	26	80	80	--	--	--	--	220	0.22	--	--	--	--	106.22
	27-Jun-00	--	--	11	11	32	3.2	14	0.14	--	--	93	93	133	13.3	120.64
	28-Sep-00	37	3.7	16	16	23	2.3	11	0.11	32	0.032	--	--	--	--	22.14
	30-Dec-00	2800	280	650	650	1400	140	--	--	2300	2.3	--	--	--	--	1072.30
	31-Mar-01	500	50	2700	2700	500	50	5800	58	9200	9.2	500	500	500	50	3417.20
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	563	56.3	217	217	225	22.5	225	2.25	595	0.595	--	--	--	--	298.65
	07-May-02	91.4	9.14	31	31	33	3.3	--	--	--	--	--	--	--	--	43.44
	17-Mar-03	210	21	73.4	73.4	119	11.9	42.2	0.422	165	0.165	6.4 J	6.4	16 J	1.6	114.89
R-05	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	14	1.4	--	--	--	--	19	19	93	9.3	29.70
	28-Sep-00	10	1	10	10	10	1	--	--	10	0.01	--	--	--	--	12.01
	30-Dec-00	3400	340	700	700	1600	160	510	5.1	2600	2.6	--	--	--	--	1207.70
	31-Mar-01	500	50	3300	3300	500	50	6800	68	18400	18.4	540	540	500	50	4076.40
	02-Jul-01	592	59.2	--	--	--	--	--	--	--	--	--	--	--	--	59.20
	17-Mar-03	2990	299	1210	1210	1860	186	469	4.69	2410	2.41	93.7 J	93.7	413	41.3	1837.10

Table 11
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American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
R-06	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	71	7.1	--	--	--	--	--	--	10	0.01	--	--	118	11.8	18.91
	28-Sep-00	50	5	20	20	27	2.7	14	0.14	43	0.043	--	--	--	--	27.88
	30-Dec-00	1300	130	140	140	280	28	100	1	620	0.62	--	--	--	--	299.62
	31-Mar-01	15000	1500	4100	4100	2500	250	5200	52	13800	13.8	2500	2500	2500	250	8665.80
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
R-07	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	57	5.7	--	--	--	--	--	--	23	2.3	8.00
	28-Sep-00	314	31.4	106	106	151	15.1	69	0.69	282	0.282	--	--	32	3.2	156.67
	30-Dec-00	54	5.4	24	24	41	4.1	17	0.17	89	0.089	--	--	--	--	33.76
	31-Mar-01	830	83	170	170	50	5	390	3.9	970	0.97	50	50	50	5	317.87
	02-Jul-01	2500	250	--	--	--	--	--	--	2260	2.26	--	--	--	--	252.26
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	19-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
R-08	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	17	1.7	15	0.15	31	0.031	182	182	--	--	183.88
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	31-Mar-01	10	1	10	10	10	1	10	0.1	10	0.01	10	10	10	1	23.11
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	17-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	15-Dec-03	50.2	5.02	13.4	13.4	15.1	1.51	16.6	0.166	45.1	0.0451	--	--	3.28	0.328	20.47
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
R-09	31-Mar-00	70	7	30	30	--	--	--	--	60	0.06	--	--	--	--	37.06
	27-Jun-00	12	1.2	18	18	62	6.2	--	--	72	0.072	196	196	--	--	221.47
	28-Sep-00	1000	100	509	509	583	58.3	295	2.95	914	0.914	--	--	--	--	671.16
	30-Dec-00	2500	250	1800	1800	--	--	--	--	1400	1.4	--	--	--	--	2051.40
	31-Mar-01	500	50	3200	3200	500	50	6500	65	11700	11.7	500	500	500	50	3926.70
	02-Jul-01	3080	308	--	--	--	--	--	--	2840	2.84	--	--	--	--	310.84
R-10	31-Mar-00	390	39	190	190	110	11	--	--	360	0.36	--	--	100	10	250.36
	27-Jun-00	10	1	81	81	31	3.1	17	0.17	--	--	--	--	2980	298	383.27
	28-Sep-00	147	14.7	100	100	125	12.5	74	0.74	127	0.127	--	--	--	--	128.07
	30-Dec-00	1500	150	510	510	1000	100	--	--	1000	1	--	--	--	--	761.00
	31-Mar-01	22900	2290	8900	8900	2500	250	17500	175	30900	30.9	2500	2500	2500	250	14395.90
	02-Jul-01	9410	941	4700	4700	6730	673	2330	23.3	8610	8.61	--	--	--	--	6345.91

Table 11
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
in Ground Water in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
R-11	31-Mar-00	27	2.7	--	--	--	--	--	--	--	--	--	--	--	--	2.70
	27-Jun-00	15	1.5	11	11	72	7.2	39	0.39	--	--	260	260	420	42	322.09
	28-Sep-00	--	--	--	--	54	5.4	--	--	--	--	--	--	--	--	5.40
	30-Dec-00	--	--	--	--	--	--	--	--	38	0.038	--	--	--	--	0.04
	31-Mar-01	283	28.3	68	68	25	2.5	131	1.31	283	0.283	25	25	25	2.5	127.89
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	66.1	6.61	19.6	19.6	29.2	2.92	27.1	0.271	63.4	0.0634	--	--	--	--	29.46
	07-May-02	75.9	7.59	24.4	24.4	28.5	2.85	27.9	0.279	65.3	0.0653	3.24	3.24	7	0.7	39.12
	17-Mar-03	915	91.5	273	273	449	44.9	98.6 J	0.986	828	0.828	14.8 J	14.8	47 J	4.7	430.71
R-12	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	108	10.8	--	--	14	0.014	--	--	--	--	10.81
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	30-Dec-00	10700	1070	3200	3200	6600	660	--	--	--	--	--	--	--	--	4930.00
	31-Mar-01	10	1	10	10	10	1	10	0.1	10	0.01	10	10	10	1	23.11
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	17-Mar-03	940	94	365	365	491	49.1	147 J	1.47	768	0.768	--	--	125 J	12.5	522.84
R-13	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	30-Dec-00	4800	480	1600	1600	3200	320	--	--	--	--	--	--	--	--	2400.00
	31-Mar-01	150	15	50	50	50	5	50	0.5	110	0.11	50	50	50	5	125.61
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	6.54	0.654	--	--	2.54	0.254	--	--	--	--	--	--	--	--	0.91
	17-Mar-03	534	53.4	128	128	270	27	78.1	0.781	526	0.526	--	--	34.7	3.47	213.18
	15-Dec-03	151	15.1	31.4	31.4	42.2	4.22	46.6	0.466	162	0.162	--	--	--	--	51.35
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
R-14	31-Mar-00	330	33	100	100	60	6	--	--	330	0.33	--	--	--	--	139.33
	27-Jun-00	--	--	--	--	--	--	--	--	10	0.01	34	34	80	8	42.01
	28-Sep-00	85	8.5	37	37	49	4.9	30	0.3	75	0.075	--	--	--	--	50.78
	30-Dec-00	88500	8850	19500	19500	--	--	22800	228	79000	79	--	--	--	--	28657.00
	31-Mar-01	2500	250	2500	2500	27400	2740	2500	25	139400	139.4	2500	2500	2500	250	8404.40
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	748	74.8	--	--	--	--	--	--	--	--	--	--	--	--	74.80
	17-Mar-03	391	39.1	120	120	206	20.6	--	--	351	0.351	--	--	--	--	180.05

Table 11
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
in Ground Water in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Benzo (k) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Dibenzo(a,h)anthracene	Benzo (a) Pyrene Equivalents	Indeno (1,2,3-cd) pyrene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.1		0.01		0.001		1		0.1		
R-16	18-Dec-01	970	97	383	383	427	42.7	374	3.74	999	0.999	--	--	--	--	527.44
	07-May-02	159	15.9	64.8	64.8	69	6.9	65.6	0.656	138	0.138	9.06	9.06	22.5	2.25	99.70
	19-Mar-03	6580	658	2330	2330	2620	262	2400	24	5340	5.34	208	208	759	75.9	3563.24
S-01	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	10.2	1.02	3.78	3.78	4.26	0.426	--	--	--	--	--	--	--	--	5.23
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
S-02	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	07-May-02	35.1	3.51	18.3	18.3	19.6	1.96	--	--	32.7	0.0327	2.9	2.9	7.06	0.706	27.41
	18-Mar-03	1.3 LJ	0.13	--	--	--	--	--	--	0.89 LJ	0.00089	--	--	--	--	0.13
S-03	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	27-Jun-00	84	8.4	86	86	--	--	--	--	47	0.047	242	242	18	1.8	338.25
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	30-Dec-00	390	39	140	140	240	24	81	0.81	--	--	--	--	--	--	203.81
	31-Mar-01	256	25.6	92	92	50	5	50	0.5	187	0.187	50	50	50	5	178.29
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	14000	1400	4560	4560	7380	738	5600	56	15500	15.5	--	--	--	--	6769.50
	07-May-02	258	25.8	108	108	110	11	--	--	246	0.246	--	--	36.6	3.66	148.71
	17-Mar-03	120	12	52.2 J	52.2	85.3 J	8.53	28.5 J	0.285	97.9	0.0979	--	--	11.6 J	1.16	74.27
S-12	02-Jul-01	5100	510	2270	2270	3120	312	--	--	4380	4.38	--	--	--	--	3096.38
	18-Dec-01	3360	336	--	--	--	--	--	--	3580	3.58	--	--	--	--	339.58
	07-May-02	46.5	4.65	13.8	13.8	14.4	1.44	--	--	43.2	0.0432	--	--	3.68	0.368	20.30
	19-Mar-03	816	81.6	312	312	513	51.3	114	1.14	704	0.704	32.8	32.8	77.6	7.76	487.30
	15-Dec-03	569	56.9	220	220	217	21.7	214	2.14	552	0.552	--	--	91.8	9.18	310.47
	14-Jun-04	137	13.7	39.7	39.7	39.1	3.91	48.7	0.487	130	0.13	4.22	4.22	9.36	0.936	63.08

Notes:
PAH - Polynuclear Aromatic Hydrocarbon
µg/l - micrograms per liter
TEF - Benzo (a) Pyrene Toxicity Equivalency Factor
LJ = estimated concentration, analyte detected below the reporting limit
J = estimated concentration
-- = not analyzed for or not detected at sample quantitation limit
Yellow shading indicates an exceedance of the Remediation Goal

Table 12
Summary of VOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,2-Dichlorobenzene	1,2,3-Trimethylbenzene	1,2,4-Trimethylbenzene	4-Bromofluorobenzene	4-Methyl-2-pentanone	Acetone	Benzene	Carbon disulfide	Chloroform	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	p-Isopropyltoluene	Styrene	Toluene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory	**Remediation Goal**							5											
Standards	**MCL**							5		80*	700			10,000**		10,000**		100	1,000
MW-01A	06-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-02A	15-Dec-03	--	--	1.06	--	--	--	16.6	--	--	1.12	--	--	1.46	401	1.32	--	--	--
	14-Jun-04	--	--	--	--	--	--	24.8	--	--	--	--	--	--	812	--	--	--	10.3
MW-03A	19-Mar-03	--	--	--	51.6	--	12.4	34.8	--	--	18.2	2.5	--	26	1800	20.5	--	--	28.7
	15-Dec-03	--	6.8	14.2	--	--	16.1	19	--	--	14.6	1.8	--	13.8	2860	14.3	1.29	--	--
	14-Jun-04	--	--	12.9	--	--	--	17.5	--	--	16.1	--	--	--	3910	12.2	--	--	17.7
MW-04	31-Mar-00	--	--	--	--	--	--	397.7	--	--	49.1	--	--	191.6	4800	209.6	--	--	431.9
	27-Jun-00	--	--	--	--	--	--	874	--	--	416	--	--	273	18	970	--	--	1458
	28-Sep-00	--	--	--	--	--	--	98.6	--	--	106.6	--	--	266.2	7200	230.7	--	--	303.2
	30-Dec-00	--	--	--	--	--	--	40.3	--	--	21.8	--	--	63.3	48600	35.6	--	--	41.1
	31-Mar-01	--	--	--	--	--	--	22.6	--	--	9.3	--	--	30.8	48200	25.7	--	--	25.3
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	19100	--	--	--	--
MW-05	31-Mar-00	--	--	--	--	--	--	66.6	--	--	96.2	--	--	209.3	--	92.6	--	--	145.2
	27-Jun-00	--	--	--	--	--	--	787	--	--	522	--	--	364	--	123	--	--	1368
	28-Sep-00	--	--	--	--	--	--	36.6	--	--	57	--	--	226.1	5000	107.6	--	--	144.7
	30-Dec-00	--	--	--	--	--	--	14.7	--	--	8.9	--	--	35	90000	16.6	--	--	18.7
	31-Mar-01	--	--	--	--	--	--	56.5	--	--	48.6	--	--	62.2	4500	47	--	--	50.2
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	10800	--	--	--	--
	17-Mar-03	--	--	--	498	--	--	490	--	--	212	--	93	302	9980	171	--	--	415
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	14500	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	161	--	--	100	--	--	--	14100	--	--	--	161
MW-06	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	8830	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	8200	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	10800	--	--	--	--
	19-Mar-03	--	--	--	493	--	363	146	--	--	35.2	--	280	79.2	9880	44.1	--	--	138
	15-Dec-03	--	--	--	--	--	858	--	--	--	--	--	--	--	11000	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	292	--	--	--	--	--	--	45000	--	--	--	--
MW-08	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	15.2	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	6.05	--	--	--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	--	--	--	--	3.11	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	38.6	--	--	--	--
SMW-1	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	8.7	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	0.78 LJ	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	6.52	--	--	--	--
SMW-2	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	165	--	--	--	--
	27-Jun-00	--	--	--	--	--	--	48.2	--	--	315	--	--	220	--	680	--	--	1097
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	30-Dec-00	--	--	--	--	--	--	12.2	--	--	17.3	--	--	42.6	6900	20.4	--	--	25.4
	31-Mar-01	--	--	--	--	--	--	65	--	--	93.4	--	--	103.8	10400	87.8	--	--	80.8
	18-Mar-03	--	--	--	--	--	11 J	48 J	0.24 LJ	--	11	0.78	--	--	52	--	--	--	--
	15-Dec-03	--	--	171	--	--	261	357	--	--	470	--	--	--	17800	304	--	--	782
	14-Jun-04	--	--	142	--	--	--	180	--	--	432	--	--	463	18300	252	--	--	636

Table 12
Summary of VOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,2-Dichlorobenzene	1,2,3-Trimethylbenzene	1,2,4-Trimethylbenzene	4-Bromofluorobenzene	4-Methyl-2-pentanone	Acetone	Benzene	Carbon disulfide	Chloroform	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	p-Isopropyltoluene	Styrene	Toluene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	**Remediation Goal**							5											
	MCL							5		80*	700			10,000**		10,000**		100	1,000
SMW-3	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	15.1	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	43.2	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	0.32 LJ	--	--	--	--	--	--	--	--
	15-Dec-03	--	7.98	17.6	--	--	--	16.4	--	--	18.4	2.22	--	12.9	2020	13.4	--	--	4.45
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	134	--	--	--	--
SMW-4	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SMW-5	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	0.68 J	--	--	--	--	--	--	--	--	--
SMW-6	19-Mar-03	--	--	--	52.7	--	15.9	52	--	--	79.6	9.1	--	46.9	2930	80	--	--	45.8
	15-Dec-03	--	6.17	17.2	--	--	13.6	24.1	--	--	21.6	2.6	--	9.94	1540	26.6	1.59	--	8.1
	14-Jun-04	--	--	25.3	--	--	--	23.8	--	--	27.4	--	--	--	2120	30.1	--	--	12.8
SMW-7	19-Mar-03	--	--	--	49.4	--	--	11.2	--	--	6.9	--	--	--	123	6.5	--	--	6.7
	15-Dec-03	--	--	1.75	--	--	5.1	5.61	--	--	5.25	--	--	2.62	273	4.92	--	--	3.62
	14-Jun-04	--	--	1.54	--	--	--	7.31	--	--	5.32	--	--	2.59	212	5.08	--	--	4.44
SMW-8	17-Mar-03	--	--	--	47.2	--	--	62.4	--	--	15.2	--	--	6.8	244	10	--	--	8.9
	15-Dec-03	--	--	1.27	--	--	7.82	15.9	--	--	1.43	--	--	1.63	27.2	2.36	--	--	--
	14-Jun-04	--	--	1.84	--	--	--	25	--	--	5.01	--	--	--	122	3.3	--	--	2.62
SMW-9	19-Mar-03	--	--	--	50.8	11.3	28.2	112	--	--	37.3	2.4	11.1	45.1	5400	31.6	--	15.5	66.5
	15-Dec-03	--	5.67	16.4	--	7.66	21.2	95.3	--	--	28	2.06	7.38	32.6	7900	23	--	--	32.7
	14-Jun-04	--	--	--	--	--	--	106	--	--	--	--	--	--	7120	--	--	--	--
SMW-10	17-Mar-03	--	--	--	47.6	--	--	--	--	2.2	--	--	--	--	--	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	2.08	--	--	1.63	--	--	--	65.1	--	--	--	--
	14-Jun-04	--	--	2.06	--	--	--	12.9	--	--	6.57	--	--	2.05	49.5	2.12	--	--	1.8
SMW-11	19-Mar-03	--	--	--	47.6	--	--	11.3	--	--	4.2	--	--	10.2	--	5.1	--	--	11.1
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	12000	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	8720	--	--	--	--
SMW-12	26-Apr-04	--	--	--	49.3	--	6.4	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	2.51	--	--	--	--	--	--	--	9.84	--	--	--	--
SMW-13	26-Apr-04	--	--	--	44.8	--	7.7	--	--	--	--	--	--	--	--	--	--	--	--
	15-Jun-04	--	--	--	--	--	5.72	--	--	--	--	--	--	--	8.28	--	--	--	--
SP-01	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	145	--		--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	65.5	--		--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	232	--		--	--
	20-Mar-03	--	--	--	--	--		--	--	--	--	--	--	--	31	--		--	--
	16-Dec-03	1.89	--	--	--	--	3.15	--	--	--	--	--	--	--	97.3	--		--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	51.3	--		--	--

Table 12
Summary of VOC Detections in
Monitor Wells in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	1,2-Dichlorobenzene	1,2,3-Trimethylbenzene	1,2,4-Trimethylbenzene	4-Bromofluorobenzene	4-Methyl-2-pentanone	Acetone	Benzene	Carbon disulfide	Chloroform	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	p-Isopropyltoluene	Styrene	Toluene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	**Remediation Goal**							5											
	MCL							5		80*	700			10,000**		10,000**		100	1,000
SP-02	31-Mar-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	27-Jun-00	--	--	--	--	--	--	--	--	--	--	--	--	--	145	--		--	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	30-Dec-00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	31-Mar-01	--	--	--	--	--	--	1	--	--	1	--	--	1	10	1		--	1
	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	9.97	--		--	--
	18-Dec-01	--	--	--	--	--	--	5.06	--	--	--	--	--	--	43.7	--		--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	10.3	--		--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	16-Dec-03	--	--	--	--	--	3.37	--	--	--	--	--	--	--	3.22	--		--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	24.5	--		--	--
SP-03	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4	--		--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	7.98	--		--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	16-Dec-03	--	--	--	--	--	3.59	--	--	--	--	--	--	--	1.03	--		--	--
	15-Jun-04	--	--	--	--	--	3.87	--	--	--	--	--	--	--	23.7	--		--	--
SP-04	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	19.2	--		--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	5.95	--		--	--
	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	16-Dec-03	--	--	--	--	--	3.67	--	--	--	--	--	--	--	--	--		--	--
	15-Jun-04	--	--	--	--	--	13.8	--	--	--	--	--	--	--	19.3	--		--	--
SP-05	05-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	--	7.79	--		--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	12-Mar-03	--	--	--	--	--	--	--	0.5	--	--	--	--	--	--	--		--	--
SP-06	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	--	4.5	--		--	--
SP-08	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
	15-Jun-04	--	--	--	--	--	--	2.51	--	--	--	--	--	--	3.96	--		--	--
SP-09	16-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	--	16600	--		--	--
	15-Jun-04	--	--	--	--	--	--	--	--	--	51.5	--	--	--	3370	--		--	--
SP-11	16-Dec-03	--	--	--	--	--	--	19.7	--	--	--	--	--	--	1.7	--		--	--
	15-Jun-04	--	--	--	--	--	--	8.67	--	--	1.75	--	--	--	6.89	--		--	--

Notes:
µg/l = micrograms per liter
VOCs = Volatile Organic Compounds
MCL = Maximum Contaminant Level
-- = not analyzed for or not detected at sample quantitation limit
J = estimated concentration
LJ = estimated concentration, analyte detected below the reporting limit
1 - Naphthalene can be analyzed as both a SVOC and VOC. The highest result is listed in the table.
Yellow shading indicates an exceedance of the Remediation Goal
Green shading indicates an exceedance of the MCL

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Table 13
Summary of VOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	4-Bromofluorobenzene	Acetone	Benzene	Bromoform	Carbon disulfide	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	Styrene	Toluene	Xylenes, Total
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	**Remediation Goal**						5											
	MCL	5					5	80*		700			10,000**		10,000**	100	1,000	10,000**
R-01	20-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
R-02	18-Mar-03	--	--	--	--	--	--	0.41 LJ	--	0.24 LJ	--	--	--	--	--	--	--	1 J
R-03	31-Mar-00	--	--	--	--	--	30.8	--	--	12	--	--	27.8	4500	14.3	--	22.5	--
	27-Jun-00	--	--	--	--	--	368	--	--	276	--	--	313	--	17	--	274	--
	28-Sep-00	--	--	--	--	--	22.4	--	--	12.8	--	--	27.2	106	18.9	--	17.9	--
	30-Dec-00	--	--	--	--	--	33.2	--	--	10.2	--	--	25	37100	16.2	--	15.5	--
	31-Mar-01	--	--	--	--	--	50.6	--	--	29.9	--	--	59.3	14600	45.1	--	49.8	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	90500	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	18800	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	9430	--	--	--	--
	17-Mar-03	--	--	--	495	--	103	--	--	56	--	--	88.1	20300	48.5	--	108	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	30000	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	17200	--	--	--	--
R-04	31-Mar-00	--	--	--	--	--	23.2	--	--	14.2	--	--	22.1	1400	13.2	--	18.9	--
	27-Jun-00	--	--	--	--	--	207	--	--	111	--	--	120	--	90	--	165	--
	28-Sep-00	--	--	--	--	--	14.7	--	--	12.1	--	--	42.2	1300	21.6	--	16.6	--
	30-Dec-00	--	--	--	--	--	43.2	--	--	8.1	--	--	19.3	25100	13.1	--	13.6	--
	31-Mar-01	--	--	--	--	--	8	--	--	10	--	--	17.5	71200	10.2	--	7.2	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	31300	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	6340	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	9570	--	--	--	--
	17-Mar-03	--	--	--	485	--	86.8	--	--	42.8	--	--	73.2	3250	36.3	--	67.7	--
R-05	31-Mar-00	--	--	--	--	--	18.8	--	--	10.2	--	--	23.6	300	13.8	--	24.9	--
	27-Jun-00	--	--	--	--	--	409	--	--	537	--	--	430	--	145	--	383	--
	28-Sep-00	--	--	--	--	--	14.1	--	--	13.7	--	--	30.5	444	20.6	--	24.4	--
	30-Dec-00	--	--	--	--	--	6.4	--	--	12.6	--	--	23.5	29700	14.6	--	13.6	--
	31-Mar-01	--	--	--	--	--	41.1	--	--	27.2	--	--	57.4	52900	28.8	--	41.2	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	40600	--	--	--	--
	17-Mar-03	--	--	--	986	--	200	--	--	216	--	152	535	69100	225	79.6	377	--
R-06	31-Mar-00	--	--	--	--	--	14.2	--	--	21.2	--	--	84.4	1300	41.9	--	48.4	--
	27-Jun-00	--	--	--	--	--	159	--	--	--	--	--	--	--	--	--	57	--
	28-Sep-00	--	--	--	--	--	12.3	--	--	18.8	--	--	36.8	1500	25.1	--	30.4	--
	30-Dec-00	--	--	--	--	--	7.4	--	--	10.3	--	--	27	8200	14.8	--	17.1	--
	31-Mar-01	--	--	--	--	--	35.3	--	--	59.3	--	--	130.4	103200	80.3	--	95.4	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	8070	--	--	--	--
R-07	31-Mar-00	--	--	--	--	--	15.8	--	--	2.8	--	--	2.9	304	3.9	--	7.4	--
	27-Jun-00	--	--	--	--	--	134	--	--	229	--	--	327	217	230	--	448	--
	28-Sep-00	--	--	--	--	--	111.6	--	--	146.1	--	--	80.3	4400	215.5	--	95.2	--
	30-Dec-00	--	--	--	--	--	22.3	--	--	12.9	--	--	42.9	--	18	--	29	--
	31-Mar-01	--	--	--	--	--	10.7	--	--	9.5	--	--	21	7400	15.6	--	17.9	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	29900	--	--	--	--
	18-Dec-01	--	--	--	--	--	14.8	--	--	--	--	--	--	460	--	--	--	5.98
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	607	--	--	--	--
	19-Mar-03	--	--	--	45.7	18.8	--	--	--	3.3	--	--	4.5	1410	3.1	--	8.2	--

Table 13
Summary of VOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	4-Bromofluorobenzene	Acetone	Benzene	Bromoform	Carbon disulfide	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	Styrene	Toluene	Xylenes, Total
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	**Remediation Goal**						5											
	MCL	5					5	80*		700			10,000**		10,000**	100	1,000	10,000**
R-08	31-Mar-00	--	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--
	27-Jun-00	--	--	--	--	--	145	--	--	--	--	--	--	114	4.6	--	--	--
	30-Dec-00	--	--	--	--	--	25.9	--	--	--	--	--	--	--	--	--	--	--
	31-Mar-01	--	--	--	--	--	3.2	--	--	1	--	--	1	10	1	--	1	--
	02-Jul-01	--	--	--	--	--	4.9	--	--	--	--	--	--	8.89	--	--	--	--
	17-Mar-03	--	--	--	48.4	--	--	--	--	--	--	--	--	5.3	--	--	--	--
	15-Dec-03	--	--	--	--	--	--	--	--	--	--	--	--	574	--	--	--	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	3.73	--	--	--	--
R-09	31-Mar-00	--	--	--	--	--	318.7	--	--	131	--	--	322.3	6200	237.2	--	423.8	--
	27-Jun-00	--	--	--	--	--	751	--	--	568	--	--	916	52	331	--	1391	--
	28-Sep-00	--	--	--	--	--	--	--	--	--	--	--	--	12500	--	--	--	--
	30-Dec-00	--	--	--	--	--	248.9	--	--	43.3	--	--	126.5	38400	76.4	--	124.1	--
	31-Mar-01	--	--	--	--	--	58.2	--	--	32.1	--	--	66.7	80100	55.4	--	55.5	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	47700	--	--	--	--
R-10	31-Mar-00	--	--	--	--	--	312.8	--	--	152.4	--	--	434.2	10500	278.6	--	481.2	--
	27-Jun-00	--	--	--	--	--	507	--	--	548	--	--	933	2200	324	--	1278	--
	28-Sep-00	--	--	--	--	--	144.5	--	--	116.8	--	--	311	7700	307.5	--	361.3	--
	30-Dec-00	--	--	--	--	--	306.2	--	--	84.4	--	--	199.2	23400	127.2	--	184.7	--
	31-Mar-01	--	--	--	--	--	162.2	--	--	90.5	--	--	211.2	220100	151.3	--	202.2	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	77300	--	--	--	--
R-11	31-Mar-00	--	--	--	--	--	2.6	--	--	2.4	--	--	4.7	36	3.3	--	4.2	--
	27-Jun-00	--	--	--	--	--	568	--	--	612	--	--	345	--	936	--	1596	--
	28-Sep-00	--	--	--	--	--	11.8	--	--	21.9	--	--	37.5	55	27.7	--	29.1	--
	30-Dec-00	--	--	--	--	--	5.7	--	--	--	--	--	--	231	--	--	--	--
	31-Mar-01	--	--	--	--	--	2.4	--	--	2	--	--	3.8	42	2	--	2.4	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	1950	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	769	--	--	--	5.4
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	850	--	--	--	--
	17-Mar-03	--	--	--	48.1	37.7	28.2	--	--	8.5	--	37.9	17	1250	9.8	--	23.7	--
R-12	31-Mar-00	--	--	--	--	--	166.4	--	--	68.1	--	--	93.6	212	83.4	--	232	--
	27-Jun-00	--	--	--	--	--	564	--	--	737	--	--	411	--	117	--	1698	--
	28-Sep-00	--	--	--	--	--	26.8	--	--	22.4	--	--	92.9	653	41.1	--	79	--
	30-Dec-00	--	--	--	--	--	196.4	--	--	79.6	--	--	210.3	71200	129.4	--	187.7	--
	31-Mar-01	--	--	--	--	--	51.9	--	--	26.4	--	--	40.3	372	34	--	44	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	3040	--	--	--	--
	18-Dec-01	--	33	--	--	--	235	--	--	76.2	--	--	--	3330	--	--	208	168
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	4280	--	--	--	--
	17-Mar-03	--	--	--	50.5	18.1	371	--	--	148	10.3	9	266	24100	141	90	370	--
R-13	31-Mar-00	--	--	--	--	--	19	--	--	3.7	--	--	2.2	--	3.1	--	7.6	--
	27-Jun-00	--	--	--	--	--	385	--	--	95.4	--	--	29.5	93	55.8	--	209	--
	28-Sep-00	--	--	--	--	--	9.2	--	--	--	--	--	3.5	26	3.3	--	3.3	--
	30-Dec-00	--	--	--	--	--	115.2	--	--	29	--	--	33.6	25500	39	--	61.6	--
	31-Mar-01	--	--	--	--	--	6.5	--	--	9.7	--	--	20.4	5500	14.3	--	12.7	--
	02-Jul-01	--	--	--	--	21.6	4.75	--	--	--	--	--	--	168	--	--	5.19	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	46.9	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	677	--	--	9.61	5.13
	17-Mar-03	--	--	--	48	45.1	5.5	--	--	8.2	7.5	9.9	17	3770	11.5	--	25.4	--
	15-Dec-03	--	--	--	--	38.1	--	--	--	--	--	--	--	2300	--	--	10.8	--
	14-Jun-04	--	--	--	--	--	--	--	--	--	--	--	--	2210	--	--	11.8	--

Table 13
Summary of VOC Detections in Recovery
Wells and Sumps in the Shallow Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well or Sump ID	Date	1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	4-Bromofluorobenzene	Acetone	Benzene	Bromoform	Carbon disulfide	Ethylbenzene	Isopropylbenzene (Cumene)	Methyl ethyl ketone (2-Butanone)	m,p-Xylene	Naphthalene (1)	o-Xylene	Styrene	Toluene	Xylenes, Total
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	Remediation Goal						5											
	MCL	5					5	80*		700			10,000**		10,000**	100	1,000	10,000**
R-14	31-Mar-00	--	--	--	--	--	253.8	--	--	55.6	--	--	167.8	11600	141.2	--	254.7	--
	27-Jun-00	--	--	--	--	--	431	--	--	627	--	--	322	3662	877	--	1354	--
	28-Sep-00	--	--	--	--	--	102.6	--	--	49.7	--	--	85.5	5100	110.8	--	178.7	--
	30-Dec-00	--	--	--	--	--	419.8	--	--	34.4	--	--	45.8	587500	71.2	--	165.8	--
	31-Mar-01	--	--	--	--	--	103.3	--	--	25.2	--	--	78.3	478400	70.3	--	85.7	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	29800	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	32600	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	29800	--	--	--	--
	17-Mar-03	--	--	--	505	402	316	--	--	57.8	--	335	145	17200	77.3	39.1	256	--
R-16	18-Dec-01	--	27.3	--	--	--	85	--	--	31.7	--	--	--	7730	--	--	34	72.7
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	9880	--	--	--	--
	19-Mar-03	--	--	--	496	369	72.8	--	--	78.2	--	259	141	63300	64.8	--	86.7	--
S-01	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	6.67	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	16.7	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	18-Mar-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-02	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	5470	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	38.9	--	--	--	--
	07-May-02	--	51.7	22.1	--	--	26.4	--	--	39.4	--	--	--	4380	--	--	46.6	89.4
	18-Mar-03	--	--	--	--	--	16	--	0.25 LJ	0.91	0.2 LJ	--	--	3.1 LJ	--	--	3.6	2.7
S-03	31-Mar-00	--	--	--	--	--	23.4	--	--	21.3	--	--	35.9	28	23.5	--	46.1	--
	27-Jun-00	--	--	--	--	--	345	--	--	33.3	--	--	17.8	17	25.1	--	157	--
	28-Sep-00	--	--	--	--	--	12.5	--	--	24.7	--	--	47.5	74	28.8	--	33.7	--
	30-Dec-00	--	--	--	--	--	12.2	--	--	--	--	--	42.6	3800	19.7	--	24.3	--
	31-Mar-01	--	--	--	--	--	10.5	--	--	16.6	--	--	18.5	1600	13.1	--	15.3	--
	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	10200	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	93800	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	21800	--	--	--	--
	17-Mar-03	--	--	--	493	--	58.9	--	--	58.9	--	68.6	78.4	6890	54.8	--	81.6	--
S-12	02-Jul-01	--	--	--	--	--	--	--	--	--	--	--	--	32600	--	--	--	--
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--	--	33700	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--	--	9440	--	--	--	--
	19-Mar-03	--	--	--	53.1	--	15.5	--	3	20.5	3.1	--	44.3	9580	24.7	--	32.6	--
	15-Dec-03	--	--	--	--	2300	--	--	--	--	--	--	--	13800	--	--	--	--
	14-Jun-04	218	--	--	--	--	--	--	--	--	--	--	--	7860	--	--	94.5	--

Notes:
µg/l = micrograms per liter
VOCs = Volatile Organic Compounds
MCL = Maximum Contaminant Level
-- = not analyzed for or not detected at sample quantitation limit
J = estimated concentration
LJ = estimated concentration, analyte detected below the reporting limit
1 - Naphthalene can be analyzed as both a SVOC and VOC. The highest result is listed in the table.
Yellow shading indicates an exceedance of the Remediation Goal
Green shading indicates an exceedance of the MCL

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Table 14
Summary of Detections in Ground Water in the Deep Aquifer
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Well ID	Date	Acenaphthene	Bis(2-Ethylhexyl) phthalate	Bromoform	Butyl benzyl phthalate	Carbon Disulfide	Di-n-Butylphthalate	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene
	Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Regulatory Standards	**MCL**		6	80								
DMW-1	12-Mar-03	--	--	0.45 LJ	--	--	0.95 LJ	--	--	--	--	--
DMW-2	14-Nov-02	--	7.03	--	--	--	--	--	--	--	--	--
	12-Mar-03	0.48 LJ	3.2 LJ	--	--	--	1.2 LJ	1.1 LJ	0.51 LJ	--	1.3 LJ	1 LJ
DMW-3	14-Nov-02	--	96.3	--	--	--	--	--	--	--	--	--
	12-Mar-03	--	2.3 LJ	--	--	--	--	--	--	--	--	--
DMW-4	13-Mar-03	--	--	--	--	--	--	--	--	--	--	--
DP-01	11-Mar-03	--	1.5 LJ	--	--	.23 LJ	1.5 LJ	--	--	--	--	--
DP-02	11-Mar-03	--	2.1 LJ	--	--	--	--	--	--	--	--	--
DP-03	12-Mar-03	--	--	--	--	0.59	0.91 LJ	--	--	--	--	--
DP-04	12-Mar-03	--	--	--	--	0.34 LJ	--	--	--	--	--	--
DP-05	18-Mar-03	--	--	--	--	2.5	--	--	--	--	--	--
MW-01	06-Mar-03	--	--	--	--	--	--	--	--	--	--	--
MW-02	05-Jul-01	--	--	--	--	--	--	--	--	--	12.4	--
	18-Dec-01	--	43.8	--	--	--	--	--	--	--	--	--
	07-May-02	17	--	--	--	--	--	12	17.7	9.48	45.9	16.6
	13-Mar-03	--	--	--	0.87 LJ	--	--	--	--	--	--	--
MW-03	05-Jul-01	--	--			--		14.3	--	9.03	24.4	10.1
	18-Dec-01	--	--	--	--	--	--	--	--	--	--	--
	07-May-02	--	--	--	--	--	--	--	--	--	--	--
	13-Mar-03	--	--	--	--	--	--	--	--	--	--	--

Notes:

µg/l = micrograms per liter

MCL - Maximum Contaminant Level

-- = Not detected at sample quantitation limit

LJ = estimated concentration, analyte detected below the reporting limit

Yellow highlighting indicates that analyte is a semivolatile organic compound

Blue highlighting indicates that analyte is a volatile organic compound

Naphthalene can be analyzed as both a semivolatile and volatile organic compound, highest result listed in table.

Orange highlighting indicates an exceedance of the MCL

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Table 15
Summary of Carcinogenic PAHs and Benzo (a) Pyrene Equivalents
in Ground Water in the Deep Aquifer
Second Five-Year Review
American Creosote Works Superfund Site, Winnfield, Louisiana

Well ID	Date	Benzo (a) Anthracene	Benzo (a) Pyrene Equivalents	Benzo (a) Pyrene	Benzo (a) Pyrene Equivalents	Benzo (b) Fluoranthene	Benzo (a) Pyrene Equivalents	Chrysene	Benzo (a) Pyrene Equivalents	Total Benzo (a) Pyrene Equivalents
	Unit	µg/l		µg/l		µg/l		µg/l		µg/l
	Remediation Goal	0.2		0.2		0.2		0.2		0.2
	TEF	0.1		1		0.01		0.001		
DMW-2	14-Nov-02	--	--	--	--	--	--	--	--	0.00
	12-Mar-03	0.72 LJ	0.072	0.79 LJ	0.79	1.2 LJ	0.012	0.76 LJ	0.00076	0.87
MW-02	05-Jul-01	--	--	--	--	--	--	--	--	0.00
	18-Dec-01	--	--	--	--	--	--	--	--	0.00
	07-May-02	2.4	0.24	--	--	--	--	--	--	0.24
	13-Mar-03	--	--	--	--	--	--	--	--	0.00

Notes:
PAH - Polynuclear Arromatic Hydrocarbon
µg/l - micrograms per liter
TEF - Benzo (a) Pyrene Toxicity Equivalency Factor
LJ = estimated concentration, analyte detected below the reporting limit
-- = not analyzed for or not detected at sample quantitation limit
Yellow shading indicates an exceedance of the Remediation Goal

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Table 16
Summary of Detections in
PLTS Effluent Samples - Quarterly Sampling
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

			Date														
Analyte	**Unit**	**Effluent Limit**	**14-Sep-01**	**12-Dec-01**	**27-Mar-02**	**21-May-02**	**17-Sep-02**	**10-Dec-02**	**08-Jan-03**	**25-Mar-03**	**19-Jun-03**	**14-Oct-03**	**08-Jan-04**	**24-Mar-04**	**29-Jun-04**	**24-Sep-04**	**28-Dec-04**
General																	
Biochemical Oxygen Demand (BOD5)	mg/L	20 mg/L	2.4	6.3	6.7	--	3.6	5.6	--	3.2	4.4	5.6	6.5	6.3	9.9	7.5	10
Chemical Oxygen Demand	mg/L	70	--	--	--	--	--	--	--	34	34	29	40	--	24	--	49
Nitrate-Nitrogen	mg/L	Report	0.278	61.6	24.8	2.14	15.1	26.1	--	4.3	0.363	--	67	--	38.9	1.75	18
Nitrogen, Ammonia (as N)	mg/L	Report	0.14	0.14	0.17	0.27	7.07	0.0531	--	0.11	0.3	--	33	0.033	26	6.1	19
Oil & Grease	mg/L	15 mg/L	--	--	--	--	--	--	--	5.4	--	15	--	--	--	--	--
pH	SU	6.0 - 8.5	7.9	8	8	8.1	8.2	8	--	7.1	7.8	7.7	7.6	7.6	8.1	7.4	8.0
Phosphorus (as Phosphate)	mg/L		NA	NA	1.76	--	0.37	--	--	--	0.643	NA	NA	NA	NA	NA	NA
Phosphorus, Ortho-Phosphate	mg/L	Report	NA	NA	NA	NA	NA	NA	--	--	NA	0.037	0.39	--	0.442	59.8	0.18
Specific Conductance	umhos/cm	Report	670	650	910	770	690	990	--	660	660	630	850	1000	1300	790	1200
Total Dissolved Solids	mg/L	2,000 mg/L	572	480	668	564	466	666	--	694	442	420	402	788	630	476	590
Total Organic Carbon	mg/L	Report	--	8.24	9.95	--	5.39	7.87	--	9.9	16.5	14	9.9	8.2	5.42	12.2	14
Total Suspended Solids	mg/L	45 mg/L	2	32	24	2	6	9.5	--	5.3	12	--	12	10	--	12.8	7
Turbidity	NTU	50 NTU	1.2	15	12	--	3.6	4.8	--	1.1	5	5.5	2.4	3.2	2.7	22	12
SVOCs																	
2,4,5-Trichlorophenol	µg/l	No limit specified	--	--	--	--	--	--	--	--	--	--	--	6.37	--	--	--
2,4,6-Trichlorophenol	µg/l	100 µg/l	--	--	--	--	--	--	--	--	--	--	--	6.01	--	--	--
2,4-Dimethylphenol	µg/l	36 mg/L	--	--	--	--	--	--	--	--	--	8.5	--	5.41	--	--	1.3
Acenaphthene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	--	1.7	--	36.4	--	--	13
Acenaphthylene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	1.82	--	--	1.69	--	--	--
Anthracene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	0.74	--	--	2.88	--	1.42	7.4
Benzo (a) Anthracene	µg/l	47 µg/l	--	--	1.57	--	--	1.64	1.7	--	1.51	--	--	--	--	--	1.6
Benzo (a) Pyrene	µg/l	48 µg/l	--	--	11.1	--	--	6.29	5.8	--	8.03	1.5	--	7.82	--	--	--
Benzo (b) Fluoranthene	µg/l	100 µg/l	--	--	10.7	--	--	5.27	4.6	--	7.23	1.4	--	6.07	--	1.02	--
Benzo (g,h,I) Perylene	µg/l	100 µg/l	--	--	--	--	--	--	--	--	5.53	--	--	--	--	--	--
Benzo (k) Fluoranthene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	4.79	--	--	--	--	--	--
Chrysene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	2.1	1.1	--	--	--	--	1.5
Di-n-Butylphthalate	µg/l	43 µg/l	--	--	--	--	--	--	43	--	--	--	--	--	--	--	--
Dibenzo (a,h) Anthracene	µg/l	100 µg/l	--	--	--	--	--	1.36	--	--	--	--	--	--	--	--	--
Fluoranthene	µg/l	54 µg/l	--	--	--	--	--	--	--	--	0.74	4.2	--	5.19	--	--	11
Fluorene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	--	1.1	--	16.4	--	--	--
Indeno (1,2,3-cd) Pyrene	µg/l	100 µg/l	--	--	6.55	--	--	3.78	3.9	--	5.96	--	--	5.83	--	--	--
Naphthalene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	--	1.3	--	--	--	--	1.3
Pentachlorophenol	µg/l	100 µg/l	--	--	--	--	--	--	164	--	42.6	64	24	254	--	69.4	250
Phenanthrene	µg/l	47 µg/l	--	--	--	--	--	--	--	--	--	2.6	--	1.99	1.28	--	2
Phenol	µg/l	Report	37	6.8	--	--	--	--	--	--	--	--	--	0.031	0.0073	--	--
Pyrene	µg/l	48 µg/l	--	--	--	--	--	--	--	--	0.65	1.8	--	--	--	--	2
Metals																	
Arsenic	µg/l	50 µg/l	--	1.53	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	µg/l	500 µg/l	--	1.44	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	µg/l	150 µg/l	9.34	27	9.88	5 U	9.84	11.9	--	7.6	27.4	--	30	24.6	12.5	12.2	12

Notes:
PLTS = process liquids treatment system
SVOCs = semi volatile organic compounds
mg/L = milligrams per liter
SU = standard units
umhos/cm = micromohs per centimeter
NTU = nephelometric turbidity units
µg/l = micrograms per liter
NA = not analyzed
-- = not detected at the specified value
Yellow highlighting indicates exceedence of the specified discharge limit

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Table 17
Changes in Toxicity Equivalence Factors Used
To Calculate Carcinogenic PAH B(a)P Equivalent Concentrations
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

Carcinogenic PAH	TEF Value Used in Site BHHRA	Revised TEF Value - July 1993
Benzo (a) Anthracene	0.01	0.1
Benzo (a) Pyrene	1	1
Benzo (b) Fluoranthene	1	0.1
Benzo (k) Fluoranthene	0.01	0.01
Chrysene	0.01	0.001
Dibenzo (a,h) Anthracene	1	1
Indeno (1,2,3-cd) Pyrene	0.01	0.1

Notes:
TEF - Benzo (a) Pyrene Toxicity Equivalency Factor
BHHRA - Baseline Human Health Risk Assessment

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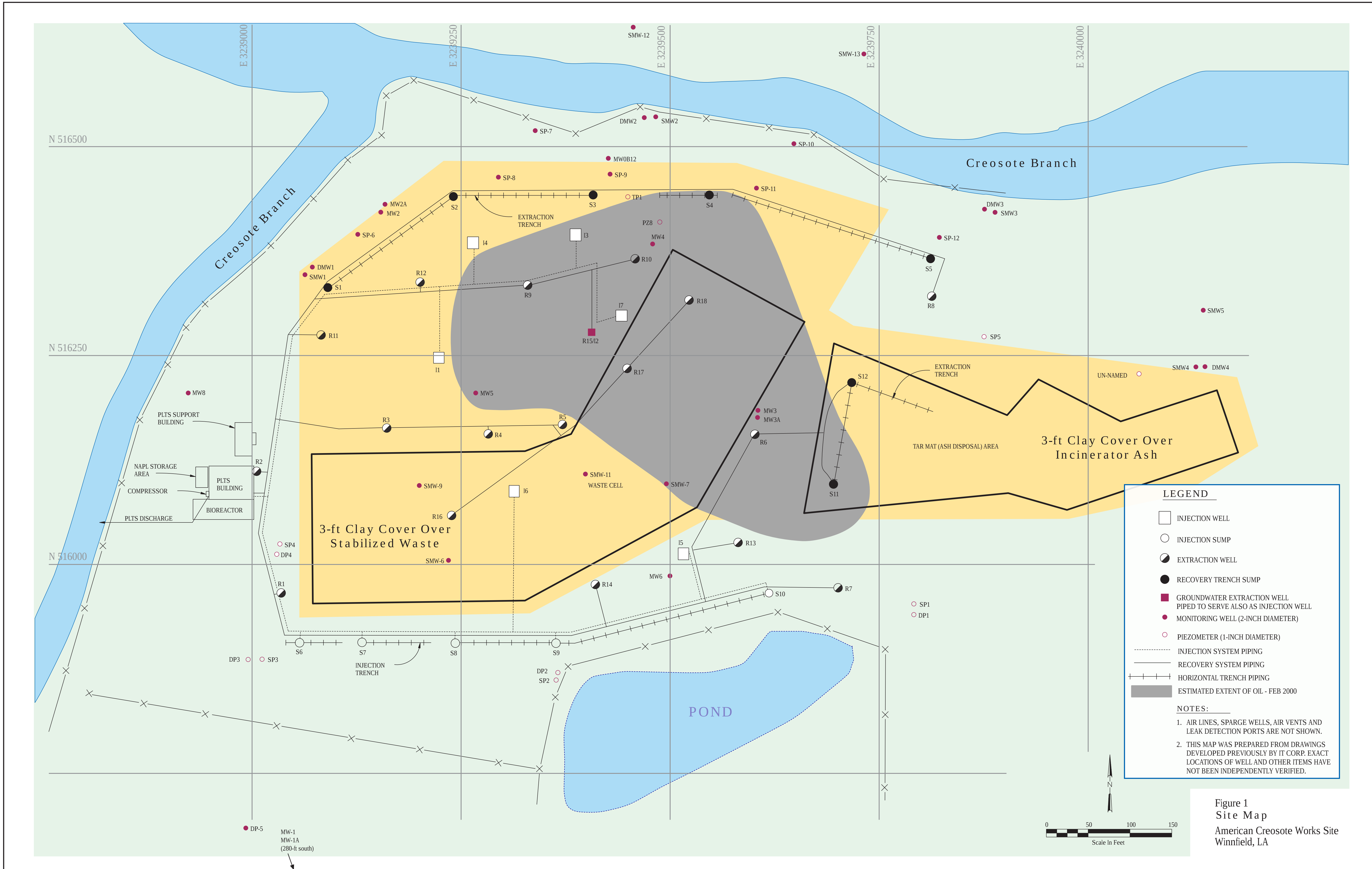

Figure 1
Site Map
American Creosote Works Site
Winnfield, LA

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Figure 2
Fluids Injection and Recovery System Location Map

American Creosote Works
Winnfield, LA

CH2MHILL

E062005003CVO-AMCR_100_02 186092.FR.02 American Creosote 06/10/05 amh

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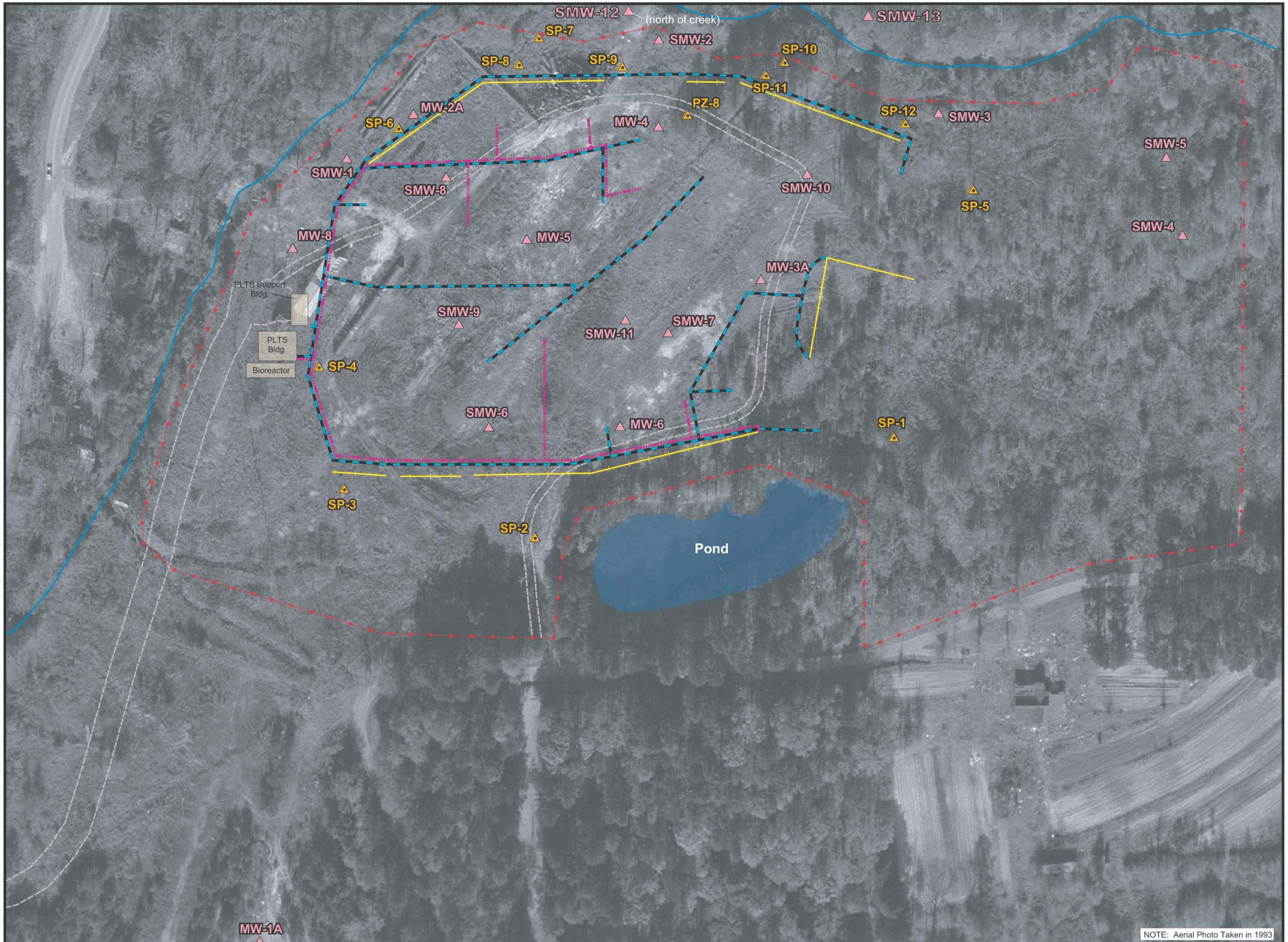

LEGEND

- Shallow Aquifer Monitor Well Location
- Shallow Aquifer Piezometer Location
- Horizontal Trench Piping
- Injection System Piping
- Recovery System Piping
- Fence
- Creek (Creosote Branch)
- Site Utility Roads
- Pond
- Current Location of Buildings

0 67.5 135
Feet

N

Figure 3
Shallow Aquifer Monitoring Network Site Map

American Creosote Works
Winnfield, LA

CH2MHILL

E062005003CVO-AMCR_101_02 186092.FR.02 American Creosote 06/10/05 amh

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LEGEND

- Deep Monitor Well Location
- Deep Piezometer Location
- Horizontal Trench Piping
- Injection System Piping
- Recovery System Piping
- Fence
- Creek (Creosote Branch)
- Site Utility Roads
- Pond
- Current Location of Buildings

0 67.5 135
Feet

N

Figure 4
Deep Aquifer Monitoring Network Site Map

American Creosote Works
Winnfield, LA

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E062005003CVO-AMCR_102_01 186092.FR.02 American Creosote 06/10/05 amh

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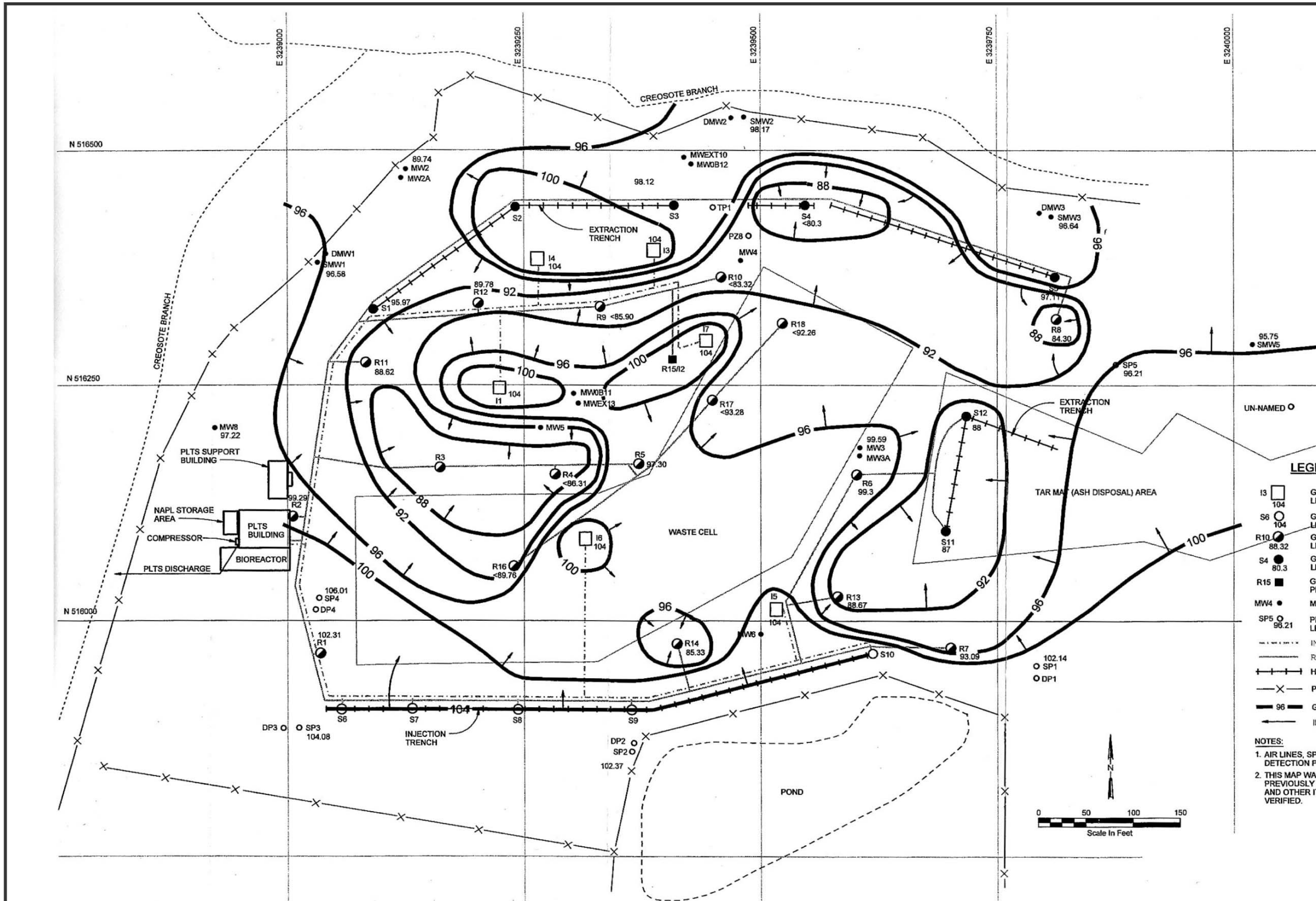

Figure 5
Groundwater Elevation and Flow Shallow Aquifer
February 23, 2000

American Creosote Works
Winnfield, LA

CH2MHILL

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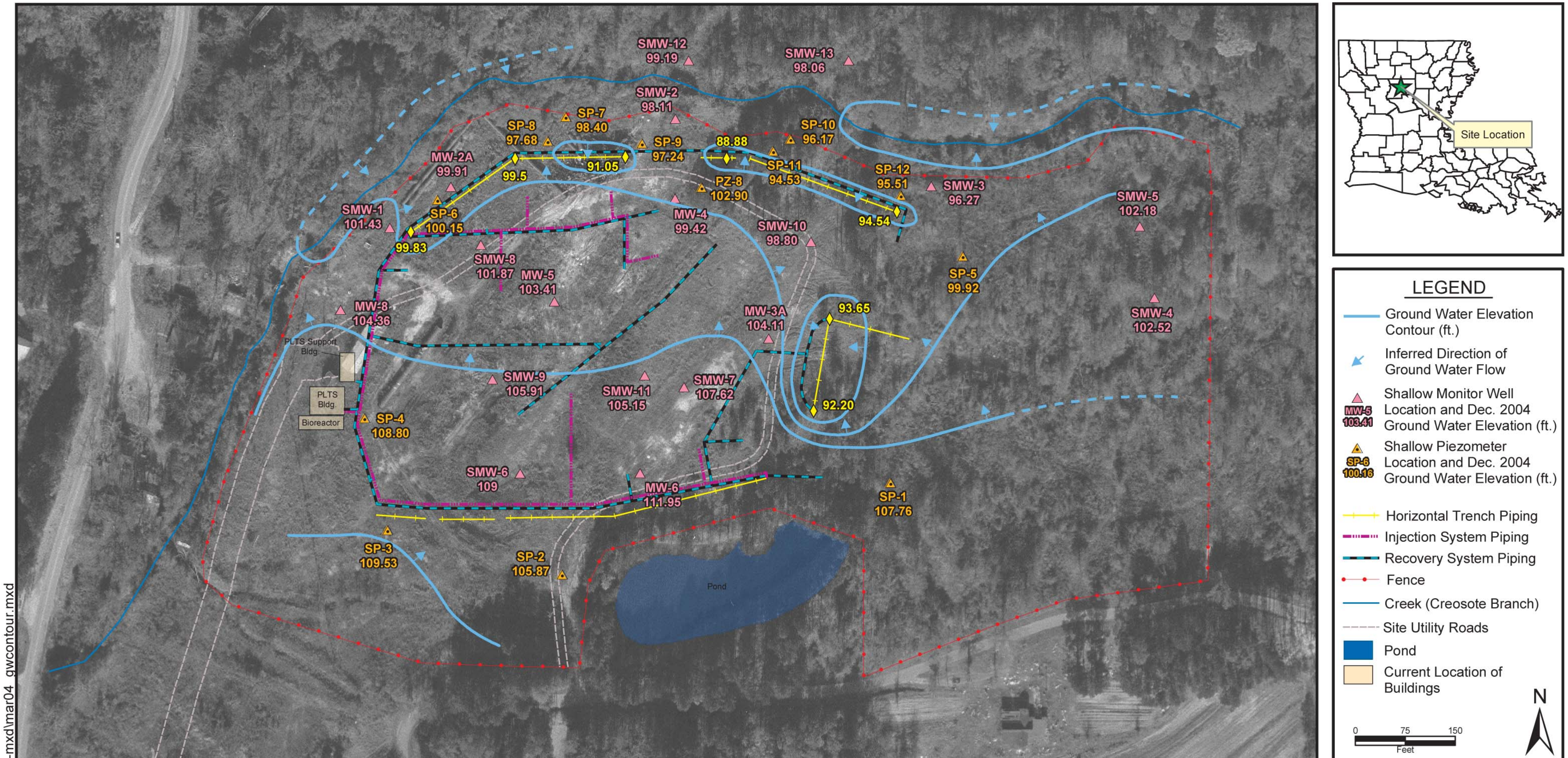

Figure 6
Shallow Aquifer Ground Water Elevation Contour and Flow Map
December 2004

American Creosote Works
Winnfield, LA

PRELIMINARY

CH2MHILL

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Figure 7
Monthly Ground Water and NAPL Extraction Volumes
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana

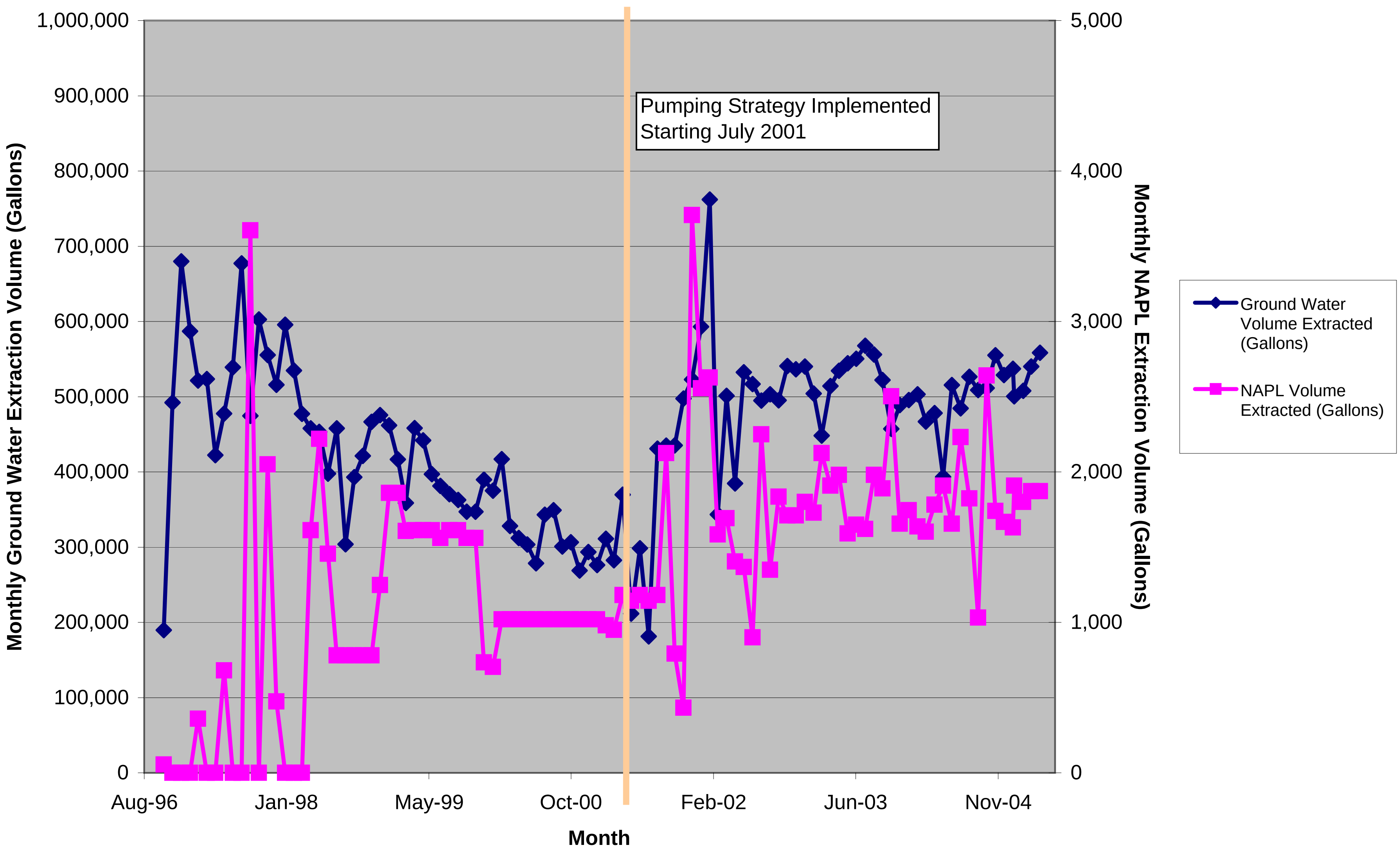

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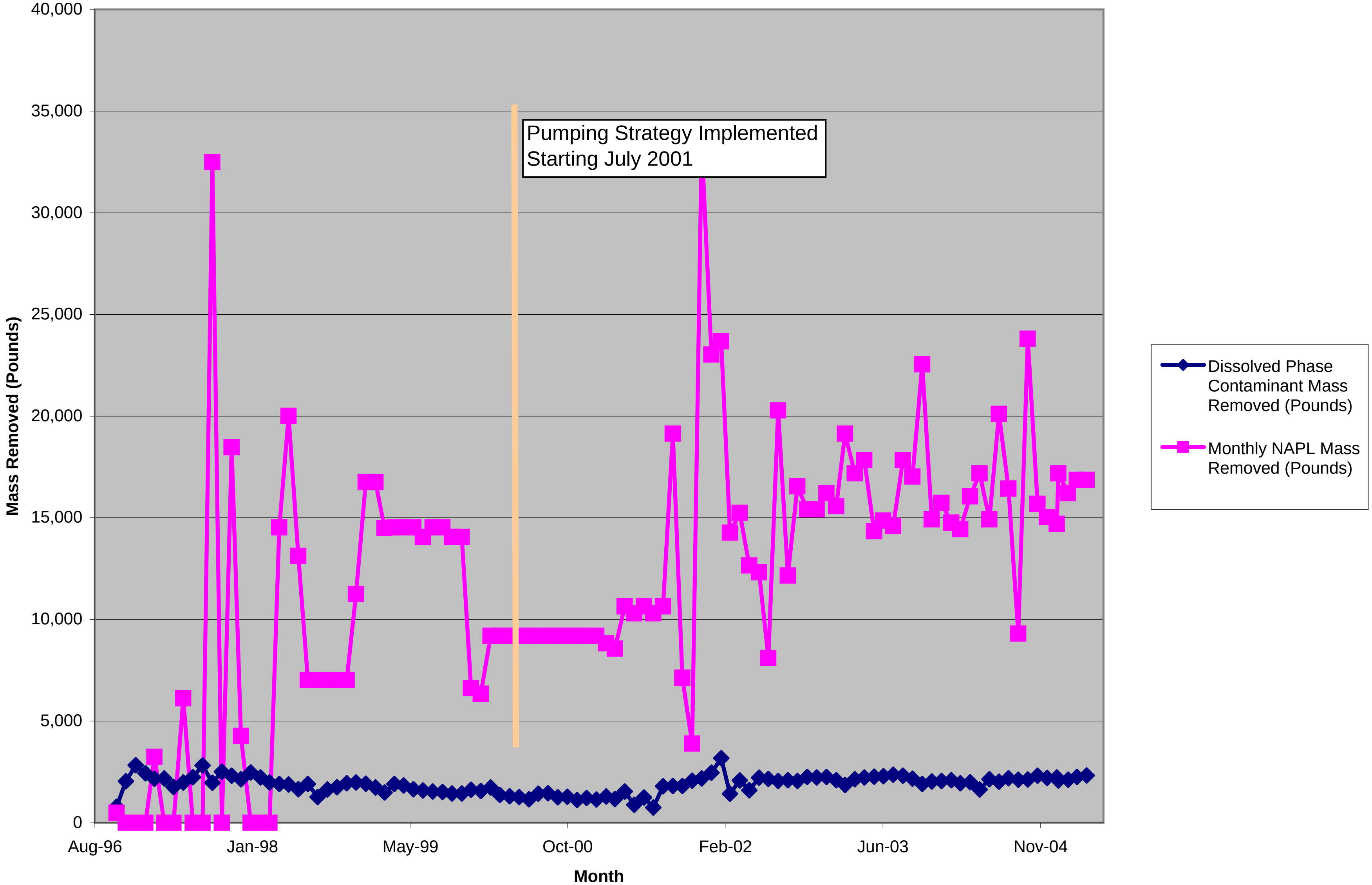
Figure 8
Monthly Contaminant Mass Removal
Second Five-Year Review
American Creosote Works Superfund Site
Winnfield, Louisiana



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Attachment 1
Documents Reviewed

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Attachment 1a
List of Documents Reviewed

CH2M HILL, 1999. *Long Term Remedial Action Plans, Prepared for American Creosote Works Project, Winnfield, Louisiana.* August, 1999.

CH2M HILL, 2001. *Field Operations Plan.* July, 2001.

CH2M HILL, 2002. *Technical Memorandum, American Creosote Works – Site Characterization and Remedial System Evaluation.* October 14, 2002.

CH2M HILL, 2004. *American Creosote Works Subsurface Investigation Data Evaluation Report*. June, 2004.

CH2M HILL, 2005. *Work Assignment Progress Report, Long-Term Remedial Action, WA No. 135-RARA-06G3, American Creosote Site, Prepared for the Period Ending April 2005*. April, 2005.

U. S. Environmental Protection Agency (EPA), 1993a. *Record of Decision, American Creosote Works, Inc. Site, Winnfield, Louisiana*. April 28, 1993.

U. S. Environmental Protection Agency (EPA), 1993b. *Provisional Guidance for Quantitative Risk Assessment of Polynuclear Arromatic Hydrocarbons*. EPA/600/R-93/089. July 1993.

U. S. Environmental Protection Agency (EPA), 1999. *Superfund Preliminary Site Close Out Report (Final Operable Unit Remedial Action), American Creosote Site, Winnfield, Winn Parish, Louisiana*. June 4, 1999.

U. S. Environmental Protection Agency (EPA), 2000. *Five-Year Review Report, First Five-Year Review for American Creosote Works, Winnfield, Winn Parish, Louisiana*. Prepared by CH2M HILL for the U. S. Environmental Protection Agency (EPA) Region 6. August, 2000.

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Attachment 2
Interview Record Forms

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Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana			**Interviewee: John Nugent, Joe Hambrick – CH2M HILL** Site O&M Staff 318-648-0392 email: jhambric@ch2m.com, jnugent@ch2m.com		
Site Name		**EPA ID No.**		**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site		EPA ID# LAD000239814		June 1, 2005	Phone
Interview Contacts	**Organization**	**Phone**	**Email**	**Address**	
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733	
Margaret O:Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (ie. after August 2000)?

Response:

Both Mr. Hambrick and Mr. Nugent stated that they believed that overall operation of the site had improved considerably since completion of the first five-year review. They stated that the review resulted in the implementation of changes in O&M that made things operate much more smoothly. In addition, they specifically stated that a lot had been learned about the site and site operations since completion of the first five-year review, and that the volume of creosote extracted had increased from approximately 1,500 gallons per month to 1,800 gallons per month.

2. From your perspective, is the remediation system functioning as expected?

Response:

Yes.

3. 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 give details.

Response:

Mr. Hambrick and Mr. Nugent were not aware of any incidents such as the question describes.

4. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in O&M procedures? Please describe changes and impacts.

Response:

Mr. Hambrick and Mr. Nugent stated that the increase in ground water and creosote production has resulted in increased frequency of maintenance at the site. They both stated that this has not resulted in any changes in operating procedures.

5. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since the first Five-Year Review? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

Response:

Mr. Hambrick and Mr. Nugent stated that the wells selected for sampling has changed.

6. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site, and have such changes been adopted? Please describe changes and desired cost savings or improved efficiency.

Response:

Mr. Nugent and Mr. Hambrick indicated that they were not aware of or had identified any additional changes to the way the site is operated that would reduce costs or improve the operation.

7. Do you have any suggestions on how to change the remedy to expedite achieving the remediation goals and/or to make it more cost effective?

Response:

No.

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

Response:

Mr. Hambrick and Mr. Nugent both stated that they were satisfied with the way the site was operated.

Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana	**Interviewee: District Attorney Terry R. Reeves** 318-628-2141 email:

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site	EPA ID# LAD000239814	May 17, 2005	in person

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733
Margaret O=Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (i.e. after August 2000)?

Response:

Mr. Reeves indicated that in his opinion the work was done well, and he had no problems with the site.

2. From your perspective, what effect have 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?

Response:

Mr. Reeves stated that, as far as he knew, there were no concerns or complaints within the community regarding the site.

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 purpose and results.

Response:

No.

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 give details.

Response:

Mr. Reeves stated that he was not aware of any recently. He did stated that there was initially some vandalism at the site that his office had to deal with. He also was not aware of any emergency responses 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.

Response:

No.

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

Response:

Mr. Reeves stated that he felt well-informed about what is going on at the site.

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

Response:

Mr. Reeves expressed concerns about creosote that may have washed or migrated down the creek while the site was still operating. He indicated that creosote was still observed in the creek, and he specifically mentioned that it was recently observed at a construction site where a new bridge is being built over the creek where Highway 167 crosses the creek on the east side of town. Mr. Reeves also indicated that he would like to see security remain at the site, and he expressed the desire to see the site put back to use. Finally, Mr. Reeves stated that he was disappointed at the length of time the incineration took to be completed, and the he did not like that waste was left on-site.

Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana	**Interviewee: Mark Purcell – USEPA** Former Site RPM 214-665-6707 email: purcell.mark@epamail.gov

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site	EPA ID# LAD000239814	May 20, 2005	by email

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733
Margaret O:Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (i.e. after August 2000)?

Response:

The work conducted at the American Creosote Works (ACW) Superfund Site (Site) since the first 5-Year Review has been performed in a thorough, effiecient and technically sound manner. The work focused on (1) the continued operation and maintenance of the remedy to ensure the protectiveness of human health and the environment; (2) the additional subsurface investigations to address deficiencies identified in the first 5-Year Review Report, including creosote in SMW-2, a monitoring well outside of the containment and extraction system; and (3) an evaluation of the effectiveness of the remedy in achieving the performance standards set forth in EPA's Record of Decision.

The work has been conducted in a professional manner. The Site operational plant and grounds have been maintained at a high-quality level, in good and safe condition and with adequate security. The safety record of plant operations has been exceptional over the last five years.

2. From your perspective, what effect have 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?

Response:

I am not aware of any adverse effect on the surrounding community by the continued remedial operations at the Site. The EPA obtained an access agreement with the property owner to the north of the Site to install two monitoring wells. Those wells were installed a couple of years ago without incident or complaint and they continue to be monitored quarterly. Further, I am not aware of any ongoing community concerns regarding the Site or its operation and maintenance.

3. 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 give details.

Response:

I am not aware of any such event, incident or activity.

4. 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.

Response:

No.

5. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in O&M procedures? Please describe changes and impacts.

Response:

No.

6. The first Five-Year Review recommended that an institutional control be put in place that provides notice of the site conditions relative to the presence of ground water contamination and the need to not dig within the landfill areas. Please describe the status of this institutional control.

Response:

The EPA contractor prepared a document requesting the institutional control, along with a land plat showing property ownership and submitted it to EPA. To date, the institutional control has not been established nor has the EPA selected the institutional control as a component of the remedy in any EPA decision document.

7. The ROD states, in 9.2.1, last paragraph, that ecological monitoring will be performed for 5 to 10 years after implementation of the remedial activities at the site. It further states that the extent of ecological studies will be determined as part of the Remedial Design and would include an evaluation of wetlands and streams as EPA and LDEQ consider appropriate. Please describe the status of the ecological monitoring.

Response:

I am not aware of any ecological monitoring of the wetlands and streams at the Site since the start of the remedial action. I also do not know if such monitoring was included in the Remedial Design, since I have not read the design. Since the remedial action is ongoing and will continue for the next twenty plus years, it may not be appropriate for such monitoring until the remedial activities are complete (as stated in the ROD). However, some limited sampling of the stream and sediments in the vicinity of the Site and downstream of the Site may be warranted at this time.

8. Have the deficiencies and recommendations identified in the first Five-Year Review been effectively addressed? Have additional issues arisen since the first Five-Year Review that you think should be identified as part of the second Five-Year Review?

Response:

I believe that the majority of the recommendations identified in the first 5-Year Review Report have been addressed as they relate to the evaluation of creosote in monitoring well SMW-2 and the evaluation of the effectiveness of the remedy in achieving the performance standards set forth in the ROD.

Additional issues have been identified since the completion of the first 5-Year Review. The inability of the current remedy to mitigate soil contamination in the shallow unsaturated zone above the water table is one issue that needs to be addressed in the second 5-Year Review. Another issue is the need for sampling the surface water and sediment of Creosote Branch Creek and part of any future long-term monitoring program to assess the impacts of the cleanup on the creek.

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

Response:

I am not aware of any changes in the state or federal environmental standards that would be relevant to the Site cleanup. However, the review of all Applicable or Relevant and Appropriate Requirements (ARARs) to be performed as part of the second 5-Year Review will help determine whether there are any relevant changes.

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

Response:

Yes. CH2M Hill, with EPA approval, has made several operational changes to the fluid (creosote, oil and water) separation and treatment processes that have improved the performance and cost-effectiveness of the remedy.

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

Response:

No.

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Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana	**Interviewee: Rich Johnson** LDEQ email: Rich.Johnson@LA.GOV

Site Name	**EPA ID No.**	**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site	EPA ID# LAD000239814	April 20, 2005	by email

Interview Contacts	**Organization**	**Phone**	**Email**	**Address**
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733
Margaret O=Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (i.e. after August 2000)?

Response: Work appears to be satisfactory.

2. From your perspective, what effect have 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?

Response: Positive affect, I'm not aware of any community concerns.

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 purpose and results.

Response: LDEQ is required to visit the site semi-annually for a physical inspection. The EPA contacts the LDEQ occasionally when there are significant field activities. LDEQ will visit the site at these times to meet with EPA and Contractors.

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 give details.

Response: No.

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.

Response: No.

6. Are you aware of any problems or difficulties encountered since the first Five-Year Review which have impacted progress or resulted in a change in O&M procedures? Please describe changes and impacts.

Response: No.

7. What is your impression of how long it will take until the remediation goals are met, and do you have any concerns about the estimated length of time it will take to achieve the remediation goals?

Response: My understanding is that the remedy will be on going for decades. I have no concerns regarding the length of time because the remediation appears to be using the best available technology at this time.

8. Do you have any suggestions on how to change the remedy to expedite achieving the remediation goals and/or to make it more cost effective?

Response: No.

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

Response: Not that I'm aware of.

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

Response: No.

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

Response: Somewhat.

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

Response: Site summary of activities would be helpful to the state. Possibly submitted once or twice a year.

Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana			**Interviewee: Mayor Deano Thornton** City of Winnfield 318-628-3939 email: cityofwinnfield@bellsouth.net		
Site Name		**EPA ID No.**		**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site		EPA ID# LAD000239814		May 17, 2005	in person
Interview Contacts	**Organization**	**Phone**	**Email**	**Address**	
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733	
Margaret O=Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (i.e. after August 2000)?

Response:

Mayor Thornton stated that he had no complaints, and that he had received no recent inquiries regarding the site. He also stated that he was not aware of any problems at the site. His final observation was the no one notices the site anymore.

2. From your perspective, what effect has continued remedial operations at the site had on the surrounding community?

Response:

Mayor Thornton noted that the site was a good neighbor from the perspective that there are no complaints, employs two people, and purchases items locally when possible. He also stated that he did not know much about the site relative to progress towards achieving the remedial goals.

3. Are you aware of any ongoing community concerns regarding the site or its operation and maintenance?

Response:

Mayor Thornton commented that there were City supply wells located within ½ mile of the site, and he expressed that he had some concerns regarding protection of those wells. He stated that he was not aware of any concerns from the community.

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

Response:

No.

5. 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 give details.

Response:

Mayor Thornton stated that there were problems related to the security of the site during the early period, but he was not aware of any problems recently.

6. Is your office aware of any changes in land use at the site or portions of the site? Has your office had any inquiries regarding potential reuse of the property, and if so, what were they?

Response:

Mayor Thornton stated that he was not aware of anything relative to the portion of the site still under EPA control. He did state that the Police Jury had leased the south portion of the site to a construction company to use as a vehicle parking yard. Also, he stated that a company was in the process of developing the property north of the railroad tracks as an asphalt plant.

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

Response:

Mayor Thornton stated that he would like some sort of communication regarding the site. He stated that he would like to know more about its progress.

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

Response:

Mayor Thornton reiterated his response to question 7. He suggested that he receive a short annual progress summary so that the City would be aware of what is going on at the site and be able to answer any questions citizens might ask regarding the site.

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Five-Year Review Interview Record American Creosote Works Superfund Site Winnfield, Winn Parish, Louisiana			**Interviewee: Robert Hutto** Winn Parish Police Jury 318-628-6363 email: winn@bayou.com		
Site Name		**EPA ID No.**		**Date of Interview**	**Interview Method**
American Creosote Works Superfund Site		EPA ID# LAD000239814		May 17, 2005	in person
Interview Contacts	**Organization**	**Phone**	**Email**	**Address**	
Michael Hebert	EPA Region 6	214-665-8315	hebert.michael@epamail.gov	1445 Ross Ave Dallas, Texas 75202-2733	
Margaret O=Hare	CH2M HILL, as rep of EPA	972-980-2170	mohare@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	
Darren Davis	CH2M HILL, as rep of EPA	972-980-2170	ddavis9@ch2m.com	12377 Merit, Suite 1000 Dallas, Texas 75251	

Interview Questions

1. What is your overall impression of the work conducted at the site since the first Five-Year Review period (i.e. after August 2000)?

Response:

Mr. Hutto stated that he thought the work was going well.

2. From your perspective, what effects have 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?

Response:

Mr. Hutto stated that he was not aware of any community concerns or problems related to the site. He stated that the site is great now when compared to how it was. Mr. Hutto stated that the Police Jury had leased the south portion of the site, but he would like to find someone to develop that portion of the site. He further indicated that the Police Jury was looking at options for using the site. A trucking company has expressed interest in using the site for parking trucks and storage.

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 purpose and results.

Response:

Mr. Hutto stated that Parish personnel occasionally go by the site and look around to see that there have not been any problems.

4. The first Five-Year review recommended that an institutional control be put in place that provides notice of the site conditions relative to the presence of ground water contamination and the need to not dig within the landfill areas. Has this notice been put in place?

Response:

Mr. Hutto indicated that access to the site is currently restricted by the fence. He stated that the Police Jury had not enacted any ordinances involving the site.

5. Are you aware of any events, incidents, or activities that have occurred at the site, such as dumping, vandalism, or agency response from local authorities? If so, please give details.

Response:

Mr. Hutto stated that he was not aware of any incidents that the Police Jury had been contacted about. Also, he stated that the company currently leasing the site has not brought any problems to the attention of the police jury.

6. 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.

Response:

Mr. Hutto stated that he was not aware of anything that required a response by the Police Jury.

7. Is your office aware of any changes in land use at the site or portions of the site? Has your office had any inquiries regarding potential reuse of the property, and if so, what were they?

Response:

Mr. Hutto stated that there had been no zoning changes for the site. He stated that the Police Jury was looking at options for reusing the south portion, such as a recreational area.

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

Response:

Mr. Hutto stated that he would like the Police Jury to receive a summary of the status of the site and progress of the remediation.

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

Response:

Mr. Hutto reiterated his response to question 8.

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Attachment 3
Site Inspection Checklist

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American Creosote Works
Winnfield, Winn Parish, Louisiana
Five-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program. N/A means "not applicable".

I. SITE INFORMATION

Site Name: American Creosote Works Superfund Site	**EPA ID:** LAD000239814
City/State: Winnfield, Louisiana	**Date of Inspection:** May 16, 2005
Agency Completing 5 Year Review: EPA	**Weather/temperature:** Sunny, approximately 70°F

Remedy Includes: (Check all that apply)
- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other:

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. O&M site manager:
Name: Joe Hambrick
Title: Site Monitoring Officer
Date:
Interviewed: ☐ at site ☐ at office ☒ by phone Phone Number: 318-648-0392
Problems, suggestions: ☒ Additional report attached (if additional space required).

2. O&M staff:
Name: John Nugent
Title: Lead PLTS Operator
Date:
Interviewed: ☐ at site ☐ at office ☒ by phone Phone Number: 318-648-0392
Problems, suggestions: ☒ Additional report attached (if additional space required).

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: Louisiana Department of Environmental Quality
Contact:
Name: Rich Johnson
Title:
Date: April 20, 2005

Phone Number: 225-654-1164
Problems, suggestions: ☒ Additional report attached (if additional space required).

Agency: City of Winnfield
Contact:
Name: Deano Thornton
Title: Mayor
Date: May 17, 2005
Phone Number: 318-628-3939
Problems, suggestions: ☒ Additional report attached (if additional space required).

Agency: Winn Parish Police Jury
Contact:
Name: Robert Hutto
Title: Police Juror
Date: May 17, 2005
Phone Number: 318-628-5824
Problems, suggestions: ☒ Additional report attached (if additional space required).

Agency: Winn Parish
Contact:
Name: Terry R. Reeves
Title: District Attorney
Date: May 17, 2005
Phone Number: 318-628-2141
Problems, suggestions: ☒ Additional report attached (if additional space required).

4. Other interviews (optional) ☐ N/A ☒ Additional report attached (if additional space required).

Mark Purcell – Former Site Remedial Project Manager, USEPA

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☒ O&M Manuals	☒ 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: Site operation's staff create daily operations reports that are sent to the Project Manager.

2. Health and Safety Plan Documents

☒ 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:

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: Effluent discharge limits are set by the LDEQ. No permit required since site is a Superfund site. Limits are included as part of the Field Operations Plan (O&M Plan).

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A
Remarks:

6. Settlement Monument Records ☐ Readily available ☐ Up to date ☒ N/A
Remarks:

7. Groundwater Monitoring Records ☒ Readily available ☒ Up to date ☐ N/A
Remarks: Ground water monitoring data is maintained in a site-wide database.

8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A
Remarks:

9. Discharge Compliance Records ☒ Readily available ☒ Up to date ☐ N/A
Remarks: On-site discharge monitoring data kept at the site and in the site-wide database. Off-site analytical data is kept in the site-wide database only.

10. Daily Access/Security Logs ☒ Readily available ☒ Up to date ☐ N/A
Remarks: Site visitors are noted in the daily log. A sign-in sheet was present for the site inspection. Joe Hambrick stated that there are usually no visitors to the site.

IV. O&M Costs ☒ Applicable ☐ N/A

1. O&M Organization
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☒ Other: Contractor for USEPA

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

From (Date): To (Date): Total cost: ☐ Breakdown attached

From (Date): To (Date): Total cost: ☐ Breakdown attached

From (Date): To (Date): Total cost: ☐ Breakdown attached

From (Date): To (Date): Total cost: ☐ Breakdown attached

From (Date): To (Date): Total cost: ☐ Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period ☒ N/A
Describe costs and reasons:

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

1. Fencing

1. Fencing damaged ☒ Location shown on site map ☒ Gates secured ☐ N/A
Remarks: Site fence is in good condition and well maintained.

2. Other Access Restrictions

1. Signs and other security measures ☐ Location shown on site map ☐ N/A
Remarks: Signs are posted on site gates and at regular intervals on the surrounding fence.

3. 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):
Frequency:
Responsible party/agency:
Contact:
Name:
Title:
Date:
Phone Number:
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: ☐ Additional report attached (if additional space required).

2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks: Ground water use at the site is currently restricted due to restricted access to the site. The site fence currently restricts access to the site.

4. General

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

2. Land use changes onsite ☐ N/A
Remarks: None.

3. Land use changes offsite ☐ N/A
Remarks: No apparent changes.

VI. GENERAL SITE CONDITIONS

1. Roads ☒ Applicable ☐ N/A

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

2. Other Site Conditions

Remarks: None.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

1. 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: Depth: Remarks:
5.	Vegetative Cover ☒ Cover properly established ☒ No signs of stress ☐ Grass ☐ Trees/Shrubs Remarks:
6.	Alternative Cover (armored rock, concrete, etc.) ☒ N/A Remarks:
7.	Bulges ☐ Location shown on site map ☒ Bulges not evident Areal extent: Height: 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:
2.	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:
3.	Letdown Channels ☐ Applicable ☒ N/A
1.	Settlement ☐ Location shown on site map ☐ No evidence of settlement Areal extent: Depth: Remarks:

2.	Material Degradation Material type: Remarks:	☐ Location shown on site map Areal extent:	☐ No evidence of degradation
3.	Erosion Areal extent: Remarks:	☐ Location shown on site map Depth:	☐ No evidence of erosion
4.	Undercutting Areal extent: Remarks:	☐ Location shown on site map Depth:	☐ No evidence of undercutting
5.	Obstructions Type: Areal extent: Remarks:	☐ Location shown on site map Height:	☐ N/A
6.	Excessive Vegetative Growth ☐ Evidence of excessive growth ☐ Location shown on site map Remarks:	☐ No evidence of excessive growth ☐ Vegetation in channels but does not obstruct flow Areal extent:	
4.	Cover Penetrations	☐ Applicable ☒ N/A	
1.	Gas Vents ☐ Active ☐ Passive ☐ Properly secured/locked _ Evidence of leakage at penetration Remarks:	 ☐ Routinely sampled ☐ Functioning ☐ Needs O& M	☐ N/A ☐ Good condition
2.	Gas Monitoring Probes ☐ Routinely sampled ☐ Properly secured/locked ☐ Evidence of leakage at penetration Remarks:	 ☐ Functioning ☐ Needs O&M	☐ N/A ☐ Good condition
3.	Monitoring Wells (within surface area of landfill) ☐ Routinely sampled ☐ Properly secured/locked ☐ Evidence of leakage at penetration Remarks:	 ☐ Functioning ☐ Needs O&M	☐ N/A ☐ Good condition
4.	Leachate Extraction Wells ☐ Routinely sampled ☐ Properly secured/locked ☐ Evidence of leakage at penetration Remarks:	 ☐ Functioning ☐ Needs O&M	☐ N/A ☐ Good condition

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

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

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

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

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

6. Cover Drainage Layer ☐ Applicable ☒ N/A

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

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

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

1. Siltation ☐ Siltation evident ☐ N/A
Areal extent: Depth:
Remarks:

2. Erosion ☐ Erosion evident ☐ N/A
Areal extent: Depth:
Remarks:

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

4. Dam ☐ Functioning ☐ N/A
Remarks:

8. 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:

1. 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 ☐ 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 ☐ Location shown on site map ☐ N/A
☐ Functioning ☐ Good Condition
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 ☐ N/A
☐ Performance not monitored
☐ Performance monitored Frequency:
☐ Evidence of breaching Head differential:
Remarks:

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

1. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical ☐ N/A
☒ All required wells located ☒ Good condition ☐ Needs O& M
Remarks: Wells are color coded to indicate the type of well (injection, extraction, monitoring, etc.). Problems with sand infiltration into the extraction trench is still a problem. The trench has to be cleaned out every couple of years to remove the sand. Due to the nature of the waste being extracted (creosote), the pumps require frequent maintenance. All well maintenance is performed on-site.

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ N/A
☐ System located ☐ Good condition ☐ Needs O& M
Remarks: Piping for the injection/extraction systems are all buried underground and could not be inspected visually.

3. Spare Parts and Equipment ☐ N/A
☒ Readily available ☐ Good condition
☐ Requires Upgrade ☐ Needs to be provided
Remarks: Parts are kept at the site to repair, rebuild, and replace equipment as necessary.

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

1. Collection Structures, Pumps, and Electrical ☐ N/A
☐ Good condition ☐ Needs O& M
Remarks:

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ N/A
☐ Good condition ☐ Needs O& M
Remarks: Not observed.

3. Spare Parts and Equipment ☐ N/A
☐ Readily available ☐ Good condition
☐ Requires Upgrade ☐ Needs to be provided
Remarks:

3. Treatment System ☒ Applicable ☐ N/A

1. Treatment Train (Check components that apply)
☐ Metals removal ☒ Oil/water separation ☒ Bioremediation
☐ Air stripping ☒ Carbon adsorbers ☒ Filters (list type): Sand
☐ Additive (list type, e.g., chelation agent, flocculent)
☒ Others (list): Lamella clarifier
☒ Good condition ☐ Needs O&M
☒ Sampling ports properly marked and functional
☒ Sampling/maintenance log displayed and up to date
☒ Equipment properly identified
☐ Quantity of groundwater treated annually (list volume): Approximately 6,000,000 gallons
☐ Quantity of surface water treated annually (list volume): 0
Remarks:

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) ☐ N/A
☒ All required wells located ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled
☒ Good condition ☐ Needs O&M
Remarks:
Monitor wells sampled according to the schedule outlined in the Field Operations Plan. All monitor wells are in good condition. Locks were placed on two monitor wells on the south property at the time of the site inspection.

4. Monitored Natural Attenuation ☐ Applicable ☒ N/A

1. Monitoring Wells (natural attenuation remedy) ☐ N/A
☐ All required wells located ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ Needs O&M
Remarks:

5. Long Term Monitoring ☐ Applicable ☒ N/A

2. Monitoring Wells ☐ N/A
☐ All required wells located ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ Needs O&M
Remarks:

X. OTHER REMEDIES ☒ Applicable ☐ N/A

The site remedy also includes the use of in-situ bioremediation to treat contaminated soils. The in-situ bioremediation system includes the addition of nutrients and hydrogen peroxide (to increase dissolved oxygen) to enhance bioremediation. Treated effluent from the extraction system is amended to increase nutrients and dissolved oxygen, and it is then injected into the aquifer through an injection trench and several injection wells.

All components of the in-situ bioremediation system appeared to be well maintained and in good working condition.

XI. OVERALL OBSERVATIONS

1. 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.).

The American Creosote Works remedy was to achieve four goals: prevent exposure to on-site contaminated ground water in the shallow aquifer in amounts above human health-based standards, restore ground water quality in the shallow aquifer, prevent exposure through direct contact to contaminated site surface soils, and to protect the ground water in the shallow aquifer from additional contaminant migration from site subsurface soils.

Incineration was used to address contaminated surface soils in the area of the Tar Mat. Approximately 56,500 tons of material were incinerated, and an additional 7,000 cubic yards of material were placed in the waste cell. This portion of the remedy was completed in February 1998. The incineration and disposal of contaminated surface soils has effectively removed the exposure potential related to the tar mat area materials.

A ground water and NAPL extraction and Process Liquids Treatment System (PLTS) was installed and completed in 1996. The system extracts contaminated ground water and NAPL through a trench and several extraction wells. The objective of this system is to prevent off-site migration and to treat contaminated ground water present in the shallow aquifer. The treated effluent is either used for the in-situ bioremediation system or discharged to Creosote Branch. In addition, a monitor well network was installed to monitor hydraulic gradients and contaminant concentrations at the site. Monitoring data indicate that ground water contamination may have migrated beyond the extraction trench.

An in-situ treatment system was installed and completed in 1996. This system injects amended PLTS effluent into site ground water to enhance in-situ biological degradation of contaminated subsurface soils. This system injects amended water into the upper portion of the deep aquifer and does not currently affect contaminated soils present in the vadose zone.

Based on the site inspection, all components of the remedy appear to be functioning as designed.

2. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M at the site includes maintenance of the injection/extraction wells and trenches, long-term monitoring of the site ground water, maintenance of the two burial areas at the site, maintenance of the site perimeter fence, and O&M of the PLTS and in-situ bioremediation systems. Site monitoring data demonstrates that inward hydraulic gradients are regularly maintained by the extraction system. There have been no exceedences of site remediation goals in off-site monitor wells, however, monitoring data due suggest that some site contamination has migrated beyond the extraction trench. The PLTS effluent is monitored to ensure that the treatment and discharge criteria are met. A few exceedences of the discharge limits for pentachlorophenol have occurred. These exceedences were the result of depletion of the carbon in the carbon filters. Proper inspection and maintenance procedures are in place and implemented to ensure the integrity of the clay caps on the two burial areas and to ensure the integrity of the site perimeter fence.

3. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

There are no issues related to the O&M procedures (cost or scope) that would indicate the protectiveness of the remedy may be compromised in the future. The design of the system and the nature of the NAPL are such that a constant O&M presence on-site will be required for the foreseeable future.

4. Opportunities for Optimization

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

Long-term monitoring activities are evaluated yearly to determine if changes are necessary. An optimization study of the site remedy is currently being conducted for the site to evaluate changes to site operations.

American Creosote Works Site Inspection – Inspection Team Roster

Date of Site Inspection – May 16, 2005

Name	Organization	Title
Michael Hebert	USEPA	Remedial Project Manager
Margaret O'Hare	CH2M HILL	5-Year Review Project Manager
Darren Davis	CH2M HILL	Staff Consultant
Bill Faught	CH2M HILL	Site Remedial Action Project Manager
John Nugent	CH2M HILL	Site Operator
Joe Hambrick	CH2M HILL	Site Operator

Site Inspection Roster (continued)

Name	Organization	Title
Rich Johnson	LDEQ	State Site Project Manager
Tom Reilly	USEPA	Project Officer
Sing Chia	USEPA	Chief, Oklahoma/Louisiana Program Management Section
Mark Purcell	USEPA	Former Remedial Project Manager

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Attachment 4
Site Inspection Photographs

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[filename: ACW_DSCN0511.jpg]

Photo 1: Monitor Wells MW-1 and MW-1A inside enclosed fence on south property.

[filename: ACW_DSCN0512.jpg]

Photo 2: View of the south property, looking north towards the PLTS. Deep Piezometer DP-5 is located at center-right of photograph.

[filename: ACW_DSCN0513.jpg]

Photo 3: View of south property facing south. Building at center of photograph was used as part of the incinerator operation.

[filename: ACW_DSCN0514.jpg]

Photo 4: These containers show visually the clarity of the PLTS process water as it enters the PLTS (influent), at various stages of the treatment process, and after treatment (final effluent).

[filename: ACW_DSCN0515.jpg]

Photo 5: Inside of the PLTS Building. The tank in center background is the equalization tank (used to store water from the well field as it enters the PLTS). To the right of the equalization tank is the NAPL storage tank. The Oil/Water Separator is on the left.

[filename: ACW_DSCN0516.jpg]

Photo 6: View of the Oil/Water Separator located inside the PLTS.

[filename: ACW_DSCN0517.jpg]

Photo 7: View of the carbon and sand filters inside the PLTS building. The Oil/Water Separator is to the right.

[filename: ACW_DSCN0518.jpg]

Photo 8: View of the effluent storage tank, and hydrogen peroxide and nutrient amendment tanks inside the PLTS building.

[filename: ACW_DSCN0519.jpg]

Photo 9: View of the lamella clarifier and bioreactor located outside the PLTS on the south side of the building.

[filename: ACW_DSCN0520.jpg]

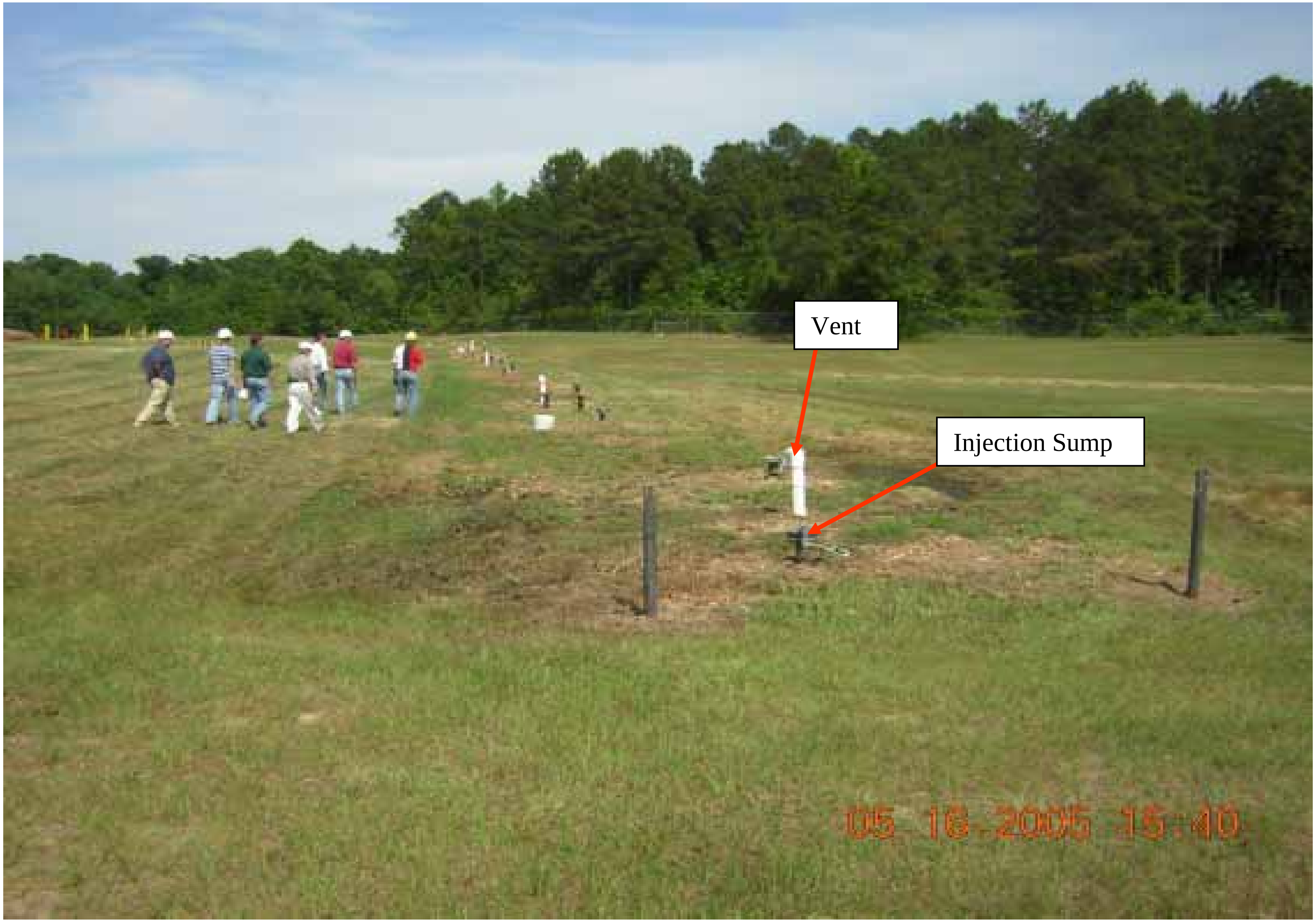
Photo 10: View of water inside the first cell of the bioreactor.

[filename: ACW_DSCN0521.jpg]

Photo 11: View on top of the bioreactor.

Photo 12: View of water in the last cell of the bioreactor.

[filename: ACW_DSCN0522.jpg]



[filename: ACW_DSCN0523.jpg]

Photo 13: View of the injection trench along the southern portion of the well field.

[filename: ACW_DSCN0524.jpg]

Photo 14: Closer view of the injection trench along its eastern end.

[filename: ACW_DSCN0525.jpg]

Photo 15: View of the Waste Cell and bio-cell (used to manage bio-solids). The Waste Cell is the grassy area in the center of the photograph. The PLTS is located in the center background.

[filename: ACW_DSCN0526.jpg]

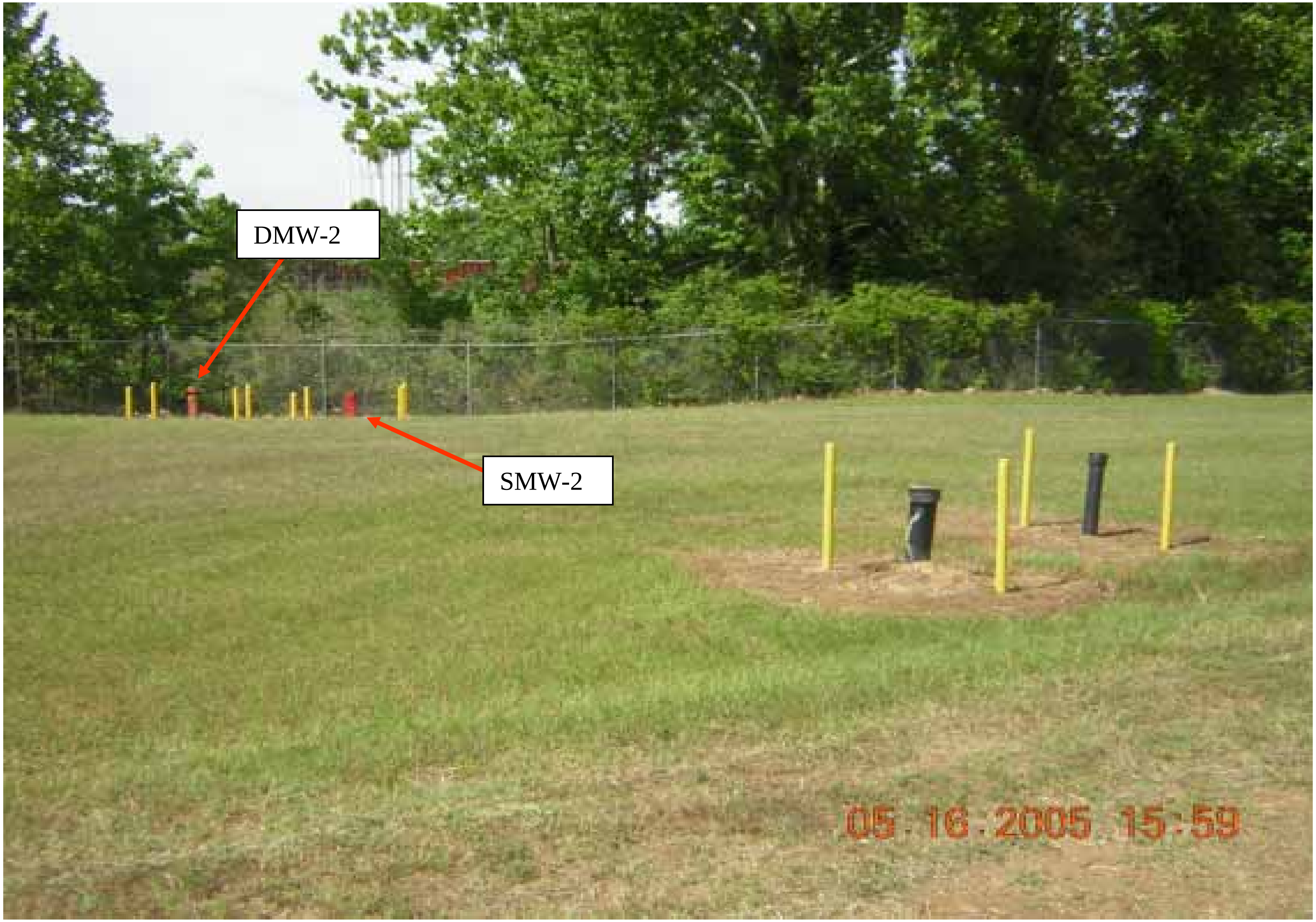
Photo 16: View of the Tar Mat waste burial area facing east. Sump S-11 is at the center-right of the photograph.

[filename: ACW_DSCN0527.jpg]

Photo 17: View of the well field from the road along the western portion of the tar mat, facing northwest.

[filename: ACW_DSCN0528.jpg]

Photo 18: View of a sump in the recovery well.



[filename: ACW_DSCN0529.jpg]

Photo 19: View of site fence along northern portion of the site. Monitor wells SMW-2 and DMW-2 are in background ate center-left.

[filename: ACW_DSCN0530.jpg]

Photo 20: Close-up view of a recovery well.

[filename: ACW_DSCN0531.jpg]

Photo 21: Decon pad located on the west side of the PLTS. This area is not used to change-out the carbon in the carbon filter. Sump in the center of the pad returns fluids to the PLTS.

[filename: ACW_DSCN0532.jpg]

Photo 22: view of the bioreactor facing east.

[filename: ACW_DSCN0533.jpg]

Photo 23: Gate that leads to PLTS discharge outfall pipe, which is located west of the PLTS.

[filename: ACW_DSCN0534.jpg]

Photo 24: PLTS Outfall discharge pipe.

[filename: ACW_DSCN0535.jpg]

Photo 25: PLTS outfall discharge pipe.

Photo 26: View of Creosote Branch creek at the PLTS outfall.

[filename: ACW_DSCN0536.jpg]

[filename: ACW_DSCN0537.jpg]

Photo 27: Close-up view of deep piezometer DP-5.

[filename: ACW_DSCN0538.jpg]

Photo 28: View of Creosote Branch creek at the Highway 167 Bridge/creek crossing facing west (upstream).

[filename: ACW_DSCN0539.jpg]

Photo 29: View of Creosote Branch creek at the Highway 167 Bridge/creek crossing.

[filename: ACW_DSCN0540.jpg]

Photo 30: View of Creosote Branch creek down stream of the PLTS outfall.

[filename: ACW_DSCN0541.jpg]

Photo 31: View of Creosote Branch creek near monitor well SMW-2.

[filename: ACW_DSCN0542.jpg]

Photo 32: View of Creosote Branch creek near monitor well SMW-2

[filename: ACW_DSCN0543.jpg]

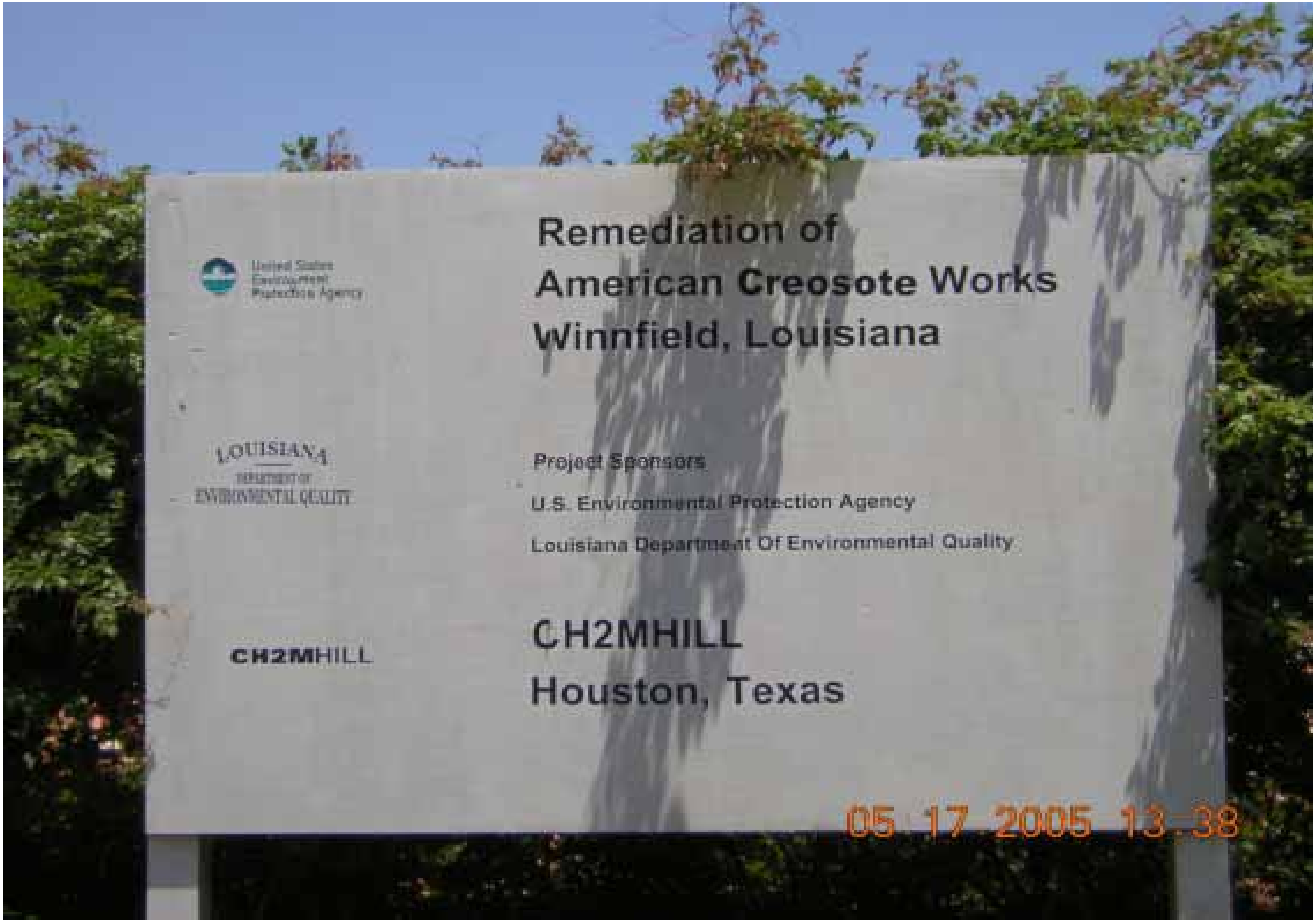
Photo 33: Monitor well SMW-12, located on north side of Creosote Branch creek.

[filename: ACW_DSCN0544.jpg]

Photo 34: Monitor well SMW-13, located on the north side of Creosote Branch creek.

[filename: ACW_DSCN0545.jpg]

Photo 35: View of front entrance to site, located on Front Street.



[filename: ACW_DSCN0546.jpg]

Photo 36: Close-up view of sign located at front gate.

Attachment 5
Notices to the Public Regarding the Five-Year Review

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AMERICAN CREOSOTE WORKS, INC. SUPERFUND SITE

U.S. EPA Region 6 Begins Second Five-Year Review of Site Remedy

April 2005

The U.S. Environmental Protection Agency Region 6 (EPA) is conducting the second five-year review of the remedy for the American Creosote Works, Inc., Superfund site in Winnfield, Louisiana. The review will evaluate if the remedy continues to protect public health and the environment.

The EPA began the remedy at the site approximately 10 years ago and completed the removal and incineration of 56,500 tons of soil from the Tar Mat area in 1998. The Agency has been pumping and treating free-phased creosote and groundwater since 1996.

The American Creosote Works site is located in the southern portion of the City of Winnfield, Winn Parish, Louisiana. The property consists of approximately 34 acres east of Front Road, and north of Watts and Grove Streets. The facility was used in the treatment of lumber with preservatives.

The second five-year review is scheduled to be completed in September 2005. Results of the second five-year review will be made available to the public at the following information repository:

Winn Parish Public Library
205 West Main Street
Winnfield, Louisiana 71483
(318) 628-4478
Mon., Tues., Wed., and Fri. 8:30 a.m. to 5:30 p.m.
Thurs. 8:30 a.m. to 7:00 p.m.
Sat. 8:30 a.m. to 12:30 p.m.

Questions concerning the American Creosote Works Superfund site should be directed to Beverly Negri at (214) 665-8157 or 1-800-533-3508 (toll free).

CONFIRMED PUBLICATION in the Winn Parish Enterprise on April 27, 2005
CH2M HILL/Bernard Hodes 972-980-2188, ext. 234

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