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American Creosote Works, Inc.
Remedial Action
Winnfield, Louisiana

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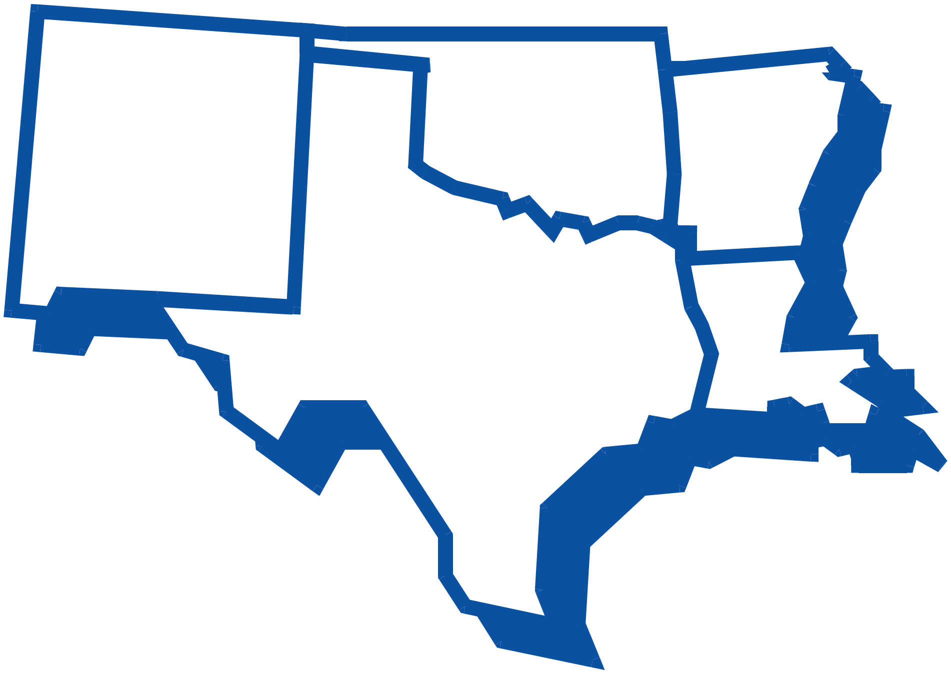

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American Creosote Works, Inc. Remedial Action

Year 2015 Annual Operations Report
DCN: 0001-02033

Prepared for

U.S. Environmental Protection Agency

April 2016

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Executive Summary

This report presents the 2015 remedial action operations summary for the American Creosote Works (ACW) Superfund Site (site) in Winnfield, Louisiana. This report was prepared under Contract No. EP-W-06-021, *Fixed Rate Incentive Task Order Work Plan - Task Order No. 0001-RARA-06G3 for American Creosote Works, Inc.* (CH2M HILL, Inc. [CH2M], 2006a).

Purpose

The purpose of this report is to summarize general system operation and performance monitoring data, collected between January 1 and December 31, 2015, with the overall objective of confirming that the deep subsurface soil and groundwater remedy is performing as expected. The evaluations presented in this report are used, as appropriate, to identify potential operational modifications for accelerating cleanup progress while maintaining the overall protectiveness of the current remedy.

In June 2010, the U.S. Environmental Protection Agency (EPA) tasked CH2M to conduct a feasibility study (FS) for the site. The EPA statement of work for the FS recognizes that the current remedy may be unable to achieve the soil and groundwater remedial action goals specified in the Record of Decision (ROD [EPA, 1993]). Therefore, the current remedy may need to be modified or replaced with a different array of technologies, to ensure that the remedial action, when complete, is protective of human health and the environment. The FS is expected to conclude with a proposed plan and ROD amendment in 2016.

Remedy Description

The site is a 34-acre former wood-treating facility, which used creosote and pentachlorophenol (PCP)-based oil to treat wood products between 1901 and 1984. The facility was placed on the National Priorities List in 1992 and has undergone extensive remediation since the ROD was signed on April 28, 1993.

The principal threats posed by hazardous substances present in subsurface media at the site are direct contact with contaminated soil and ingestion of contaminated groundwater by potential future residents. The ROD addressed the site’s principal threats with a remedy that included the following elements:

- Incineration of highly contaminated material present in the former Tar Mat Area and burial of the incinerator ash in a geotextile-lined, clay-covered cell identified as the Tar Mat Ash Disposal Area. This element of the remedy was completed in 1995.
- Consolidation of 7,000 cubic yards of low-level contaminated soil with material stabilized during pre-ROD removal actions in the waste cell. This element of the remedy was completed in 1995.
- Installation of a total fluids recovery and in situ bioremediation system to address deep subsurface soil and groundwater contamination. This element of the remedy, which was implemented in October 1996, is ongoing and is the primary subject of this report.

Engineering controls (fencing and electronic security) currently protect against direct contact with contaminated soil and groundwater by offsite residents.

The total fluids recovery system is made up of 21 recovery wells, two recovery trenches, and a process liquid treatment system (PLTS). The in situ bioremediation system uses PLTS effluent (treated water), augmented with oxygen, and injects it into the subsurface through a network of five trenches and seven wells. Through December 2015, the total fluids recovery system has operated for 19.3 years, recovering over 204,655 gallons of creosote (oil) and emulsion from 95.7 million gallons of treated fluids. The in situ bioremediation system has operated for a similar length of time, destroying on average, between 40 and 100 pounds per year of soluble polycyclic aromatic hydrocarbon (PAH) mass.

Remedial Action Progress

Groundwater and PLTS performance monitoring indicates that the fluids recovery system is continuing to draw contaminant mass from the subsurface. Approximately 1,000 gallons of free-phase and emulsified nonaqueous phase liquid (NAPL) were recovered in 2015 from a cleanout of the NAPL concentrator tank. The fluids recovery and in situ bioremediation systems were initially operated to promote NAPL recovery while hydraulically containing the dissolved-phase plume. This mode of operation was emphasized because NAPL recovery has historically accounted for 98 percent of the total contaminant mass removed from the shallow aquifer. Annual NAPL and emulsified oil recovery volumes have continued to decline, from a peak value of 22,800 gallons in 2005 to 1,000 gallons in 2015. The decrease is attributed to the change in pumping strategy in late 2014 from NAPL recovery to hydraulic containment, with only the recovery trenches (sumps S-1 to S-5, S-11, and S-12) and wells R-8, R-19, R-20, and R-21 now operated. This change was implemented because of the increased concentration of aquifer solids present in the wellfield influent; these aquifer solids are difficult to separate and manage with the current PLTS design.

Progress with Respect to Short-term Goals

Short-term remedial action goals for the site are assessed using defined performance-based contracting metrics (PBCM) that were first implemented in July 2001. The PBCMs have undergone periodic revisions to reflect the changing dynamics of the shallow aquifer remedial action. The last PBCM modification occurred in July 2011.

The PBCMs employed for the 2015 reporting period (*Fixed Rate Task Order 0001 - Work Plan Revision No.7* [CH2M, 2011b]) require maintaining a PLTS uptime of greater than 94 percent, maintaining an inward hydraulic gradient at 6 downgradient site boundary piezometer/monitor well pairs, and compliance with several quality assurance narrative criteria that include PLTS surface water (such as Creosote Branch Creek) discharge effluent limits, sampling and analysis schedules, flow meter calibration, and onsite operator safety.

Comparison of the monthly performance monitoring data with the PBCMs shows that a PLTS run time of greater than 94 percent was achieved for 10 of the 12 months during the 2015 reporting period. Achievement of the inward hydraulic gradient at the 6 well pairs, in 100 percent of the weekly measurement data sets, was achieved during 10 of the 12 calendar months. Relative to the quality assurance PBCMs, the meter calibration, sampling-and-analysis criteria, and onsite operator safety were achieved for all 12 months in 2015. The PLTS creek discharge effluent criteria were achieved during each of the four quarterly compliance monitoring events.

Progress with Respect to Long-term Goals

The primary long-term goal is to protect human health and the environment by reducing PAH concentrations in soil and groundwater to levels that restore groundwater as a future drinking water source. Year 2015 groundwater monitoring results indicate that, at 21 of 29 monitor wells sampled, total PAH concentrations, expressed in benzo(a)pyrene (BAP) equivalents or BAP toxicity equivalents (BAP TEQ), were less than the 0.2 microgram per liter remediation goal specified in the ROD. This compares to similar results for 22 of 29 wells sampled in 2014, and 22 of 29 wells sampled in 2013. The eight locations where the BAP TEQ remedial goal has not been achieved include: MW-4, MW-5, MW-6, SMW-2, SMW-9, SMW-11, SP-7, and SP-9. All of these wells lie within an area identified as the primary NAPL source zone.

Recommendations for Year 2016 Operations

Based on the data evaluation conducted for this report, the following recommendations are provided to guide Year 2016 operations:

- Maintain hydraulic containment of the shallow aquifer dissolved-phase plume through continuous operation of recovery trench sumps S-1 to S-5, S-11, and S-12, and recovery wells R-8, R-19, R-20, and R-21 (11 wells/trench sumps total). Weekly water level measurements indicate that an inward hydraulic gradient is achieved when the wellfield pumping rate is greater than 6 gallons per minute or 240,000 gallons per month.
- Continue to reinject all treated effluent to the shallow and deep aquifers to promote beneficial reuse of this water (for example, aquifer recharge).
- Replace the granular activated carbon (GAC) treatment vessels. These vessels are operating beyond their design life. Currently, only one of the four vessels are functioning.
- Continue to monitor active recovery wells and trench sumps for aquifer solids through periodic bucket tests to determine if rental of the vacuum box for NAPL collection and disposal can be discontinued.
- Perform jar testing to determine if chemical injection (ferric chloride, caustic, and sulfuric acid) additions can be discontinued.

Status of Fourth Five-Year Review Action Items

The fourth five-year review for the site was conducted in 2014, and a final report was issued in May 2015 (*Fourth Five-Year Review Report for American Creosote Works, Inc. (Winnfield Plant) Superfund Site Winnfield, Winn Parish, Louisiana* [EPA, 2015]). A summary of the action items identified in the final report and their expected resolution is provided in Table ES-1[1]. All of these issues either have already been addressed through the findings of the updated baseline risk assessment or will be addressed through implementation of remedies to be identified in future Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) source control and groundwater decision documents.

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[1] All tables and figures referenced in this document are provided at the end of the text section behind the respective divider.

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Acronyms and Abbreviations

µg/kg	microgram per kilogram
µg/L	microgram per liter
6MA	6-month moving average
ACW	American Creosote Works
amsl	above mean sea level
BAP	benzo(a)pyrene
BAP TEQ	benzo(a)pyrene toxicity equivalents
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFATS	Chemical Facility Anti-terrorism Standard
CFR	*Code of Federal Regulations*
COC	contaminant of concern
CPAH	carcinogenic (human) polycyclic aromatic hydrocarbon
DNAPL	dense nonaqueous phase liquid
DU	Decision Unit
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know
EQ	equalization
FS	feasibility study
ft/ft	foot per foot
ft/yr	feet per year
GAC	granular activated carbon
gal/day/ft^2	gallon per day per square foot
gpm	gallon per minute
LDEQ	Louisiana Department of Environmental Quality
LNAPL	light nonaqueous phase liquid
mg	milligram
mg/kg	milligram per kilogram
mg/L	milligram per liter
NAPL	nonaqueous phase liquid

No.	number
O&M	operations and maintenance
OWS	oil-water separator
PAH	polycyclic aromatic hydrocarbon
PBCM	performance-based contracting metric
PCP	pentachlorophenol
pH	negative log of the hydrogen (ion) concentration
PLTS	process liquid treatment system
PRG	preliminary remediation goal
PTD	Prairie Terrace deposits
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	record of decision
site	American Creosote Works Superfund Site
SVOC	semivolatile organic compound
TarGOST	tar-specific green optical scanning tool
TEF	toxicity equivalent factor
VOC	volatile organic compound

SECTION 1

Introduction

This report presents the 2015 remedial action operations summary for the American Creosote Works (ACW) Superfund Site (site) in Winnfield, Louisiana (Figure 1-1[2]). This report was prepared in accordance with Contract No. EP-W-06-021, *Fixed Rate Incentive Task Order Work Plan - Task Order No. 0001-RARA-06G3 for American Creosote Works, Inc.* (CH2M, 2006a).

1.1 Purpose

The purpose of this report is to summarize general system operation and performance monitoring data, collected between January 1 and December 31, 2015, with the overall objective of confirming that the deep subsurface soil and groundwater remedy operating within the site's Process Area Decision Unit (DU)[3] is performing as expected. The evaluations presented herein were used to identify potential operational modifications for accelerating cleanup progress while maintaining the overall protectiveness of the current remedy.

The report's format and content generally follow that described in the *[Operations and Maintenance] O&M Report Template for Groundwater Remedies - with Emphasis on Pump and Treat Systems* (U.S. Environmental Protection Agency [EPA], 2005).

1.2 Conceptual Site Model

The site is a former wood-treating facility that used creosote and pentachlorophenol (PCP)-based oil to treat wood products between 1901 and 1984. The facility (Comprehensive Environmental Response, Compensation, and Liability Information System [CERCLIS] No. LAD000239814) was placed on the National Priorities List in 1992 and has undergone extensive remediation since the Record of Decision (ROD) was signed on April 28, 1993 (EPA, 1993).

The principal threats posed by hazardous substances present at the site are direct contact with contaminated soil and ingestion of contaminated groundwater by future residents. The ROD addressed these threats with a remedy that included the following:

- Incineration of highly contaminated material present in the former Tar Mat Area and burial of the incinerator ash in a geotextile-lined, clay-covered cell, identified as the Tar Mat Ash Disposal Area (Figure 1-2). Prior to 2014, it was believed that the Tar Mat Ash Disposal Area was lined with a low permeability geotextile. Based on interpretation of historical air photos and construction specifications, it appears the liner was a non-woven material with sufficient permeability to permit upwelling of dense nonaqueous phase liquid (DNAPL), from the west face and bottom of the excavation, into the incinerator ash. This condition was addressed during construction of the Tar Mat Ash Disposal Area by installing a horizontal recovery trench that continues to recover creosote and creosote-contaminated groundwater from trench sumps S-11 and S-12.

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[2] Figures and tables are located at the end of this document behind the respective dividers.

[3] In the *Remedial Investigation Report Version 1.1, American Creosote Works, Winnfield Louisiana* (CH2M, 2015a) the site was divided into seven DUs, identified as the Process Area DU, the Non-Process Area DU, the Tar Mat Ash DU, the Northern DU, the Western CU, the Southern DU, and the Creek DU. This division was performed to assist with risk characterization. All of the remedial action conducted to date, and discussed in this document, have occurred in the Process Area DU.

- Consolidation of 7,000 cubic yards of low-level contaminated soil with material stabilized during pre-ROD removal actions in a waste cell (Figure 1-2). The waste cell is covered with 1 to 3 feet of clay and underlain with a plastic liner. The integrity of the underliner is unknown.
- Installation of a fluids recovery and in situ bioremediation system to address deep subsurface soil and groundwater contamination.

The incineration of highly contaminated soil and consolidation of low-level contaminated soil in the onsite waste cell was completed in 1995. In October 1996, the deep subsurface soil and groundwater component of the remedy was implemented. This portion of the remedy includes a total fluids recovery and in situ bioremediation system. Under contract to the U.S. Army Corps of Engineers, IT Corporation designed and constructed the system, and operated it through September 1999. CH2M has operated the system since October 1999.

1.2.1 Hydrogeologic Setting

The primary geologic strata underlying the site include, in descending order: fill material, the Prairie Terrace deposits (PTD), and the Cockfield Formation. The fill material is primarily made up of 1 to 3 feet of clay that was placed over a large portion of the site during remedial construction. In other portions of the site, which were disturbed by historical wood-treating activities, clayey-gravel fill extends to depths between 3 and 8 feet.

1.2.1.1 Prairie Terrace Deposits

The PTD, also referred to as the shallow aquifer, is made up of a clay, silt, and fine sand mixture that forms a semi-wedge beneath the site (Figure 1-3). The thickness of the PTD ranges from 20 to 37 feet, while the depth to groundwater typically ranges from 8 to 18 feet below ground surface (bgs). Under natural (non-pumping) conditions, groundwater flows radially outward from the southern end of the site to the west and north, where it enters Creosote Branch Creek, a groundwater flow boundary.

The shallow aquifer's horizontal hydraulic conductivity was estimated from slug tests conducted during the 1991 remedial investigation (RI) and from a pump test conducted during the 1993 expedited remedial design (CDM Federal Programs, 1993). The pump test results are more representative, because they interrogate a larger portion of the aquifer. During the pump test, well EXT10 was pumped while monitor well OB12 was used as an observation well. The drawdown portion of the pump test was conducted for 170 minutes at an average pumping rate of 0.3 gallon per minute (gpm), while the recovery portion required 1,250 minutes to complete. Evaluation of the water level data yielded a hydraulic conductivity value ranging from 1.2 to 6.7 gallons per day per square foot (gal/day/ft^2). The horizontal hydraulic conductivities estimated from this testing are comparable to the range of 0.5 to 1,000 gal/day/ft^2 reported for silty sands (Freeze and Cherry, 1979). The estimated groundwater flow velocity based on a non-pumping horizontal gradient of 0.007 foot per foot (ft/ft) is estimated to range from 1.7 to 7.7 feet per year (ft/yr) (Table 1-1).

1.2.1.2 Cockfield Formation

The Cockfield Formation, which lies beneath the PTD, is referred to informally as the deep aquifer. This unit is characterized as interbedded clay, silt, and sand with some lignite (organic material). In the central and northern portions of the site, the contact between the PTD and Cockfield Formation is marked by the presence of pebble gravel and a transition to a very dense, fine- to medium-grade sand with thin beds of lignite. At the southern end of the site, a thin bed of pink clay was observed at the contact between the PTD and Cockfield Formation. The Cockfield Formation outcrops at the southern end of the site, near monitor well MW-1A and the former firewater storage pond. The thickness of the Cockfield Formation is unknown, but it extends to depths of at least 65 feet bgs at monitor wells MW-1, MW-2, MW-3, and MW-7.

Groundwater occurs in the Cockfield Formation under confined artesian conditions. Under non-pumping conditions, groundwater flows radially outward from the south to the west and northeast. It is unknown if Creosote Branch Creek represents a groundwater flow boundary for the deep aquifer. Groundwater elevations in the Cockfield Formation are, on average, about 8 feet higher than in the overlying PTD. This difference results in an upward vertical hydraulic gradient. Given the apparent absence of a laterally contiguous silt or clay unit between the PTD and Cockfield Formation, and the presence of an upward vertical hydraulic gradient, groundwater is presumed to move freely from the Cockfield Formation to the overlying PTD. However, this condition was not validated during the March 2007 through September 2009 bromide tracer test (CH2M, 2007).

Aquifer testing, similar to that described for the shallow aquifer, was conducted during the 1993 remedial design investigation. This testing used deep aquifer test well EXT13 and observation well OB11 for a 0.3 gpm test conducted over a 480-minute test duration. The recovery phase of the testing was completed in 790 minutes. Evaluation of the water level data obtained from this test yielded hydraulic conductivity values ranging between 1.2 and 11.5 gal/day/ft^2 and estimated groundwater flow velocities of 0.4 to 18.3 ft/yr using a horizontal gradient of 0.01 ft/ft (Table 1-1).

1.2.2 Primary Contaminant Sources

Releases of creosote and PCP wood-treating oil during the facility's 80-year history resulted in extensive subsurface soil and groundwater contamination at the site. From information compiled during the 1991 to 1992 RI/feasibility study (FS), it was determined that wood-treating operations occurred in a process area located in the west-central portion of the site, near the boiler building and retorts.

A tank farm with no visible secondary containment was located near the process area just east of the boiler building. The earliest site photographs (1940 and 1947) provide visual evidence (soil staining and stressed vegetation) that wood-treating oil flowed across the ground surface, unimpeded, from the process area toward Creosote Branch Creek. A surface drainage pathway that discharged to Creosote Branch Creek also is visible on an aerial photograph from 1940.

Four unlined impoundments (shown in Figure 1-4) received liquid wood-treating-process wastes that reportedly contained water, tree sap, creosote, petroleum distillates, and PCP (CDM Federal Programs, 1992).

Between March 17 and August 31, 1989, EPA took an early removal action that resulted in the creation of a plastic-lined subsurface waste cell. According to EPA records, approximately 10,000 gallons of creosote and PCP wood-treating fluid, 51,000 gallons of contaminated water, and 56,000 gallons of sludge were consolidated, solidified with rice hulls and fly ash, and placed in the waste cell. The waste cell was expanded in 1997 to incorporate 6,800 cubic yards of low-level contaminated soil from the Tar Mat excavation. The material placed in the waste cell does not pose a current threat to human health and the environment but, because of its placement above the water table, it may pose a threat to groundwater through the leaching pathway. Following characterization of the waste cell material in 2003, EPA expanded the in situ bioremediation component to include four shallow infiltration trenches, identified as I-8 to I-11 on Figure 1-4, to address the material placed in the waste cell. Through the bioremediation process, treated water from the process liquid treatment system (PLTS) is amended with oxygen and nutrients and pumped to the trenches, where it gravity infiltrates into the waste cell to promote in situ biological treatment.

1.2.3 Secondary Contaminant Sources

Wood-treating oil that was historically released to the ground surface, and liquid waste that was placed in the unlined impoundments, infiltrated into the subsurface where it now resides as a: 1) sorbed phase bound to soil particles; 2) residual (immobile) phase bound by capillary forces within the soil pore space; and 3) free (mobile) phase perched on low permeability strata within the upper and lower PTD.

Soluble organic compounds leached from oil present in the upper (vadose zone soil) and lower PTD (saturated zone) have formed a dissolved phase plume within the shallow aquifer that, in the absence of remedial action, would flow to the north and discharge to Creosote Branch Creek. Pumping from recovery trench sumps S-1 to S-5 and wells R-19, R-20, and R-21 reduces the volume of groundwater and mass of contaminants that would otherwise discharge to the creek. The natural groundwater flux to the creek is estimated at about 500 gallons per day.[4] If the recovery system were shut down and the total polycyclic aromatic hydrocarbon (PAH) concentration rebounded to 75 milligrams per liter (mg/L) (the highest concentration present in the 2013 monitor well groundwater samples), contaminant mass flux to the creek would be about 142,000 milligrams or 0.3 pound per day.

Over extended periods, the oil present in the vadose zone and shallow aquifer begins to weather as the soluble fraction is gradually removed by infiltrating rainfall, by treated water discharged to the shallow (waste cell) infiltration trenches, and by shallow aquifer groundwater flow. As the degree of weathering increases, the oil's characteristics are changed in a way that is expected to lessen its mobility and potential to act as a significant groundwater contaminant source. While there is no way to estimate the degree of nonaqueous phase liquid (NAPL) weathering that has occurred at the ACW site, in 2012, synthetic precipitation leaching procedure testing of creosote-contaminated soil, which was collected from the vadose zone at depths between 10 and 19.7 feet, showed this material to have benzo(a)pyrene (BAP) toxicity equivalents (BAP TEQ) leachate concentrations of 0 microgram per liter (µg/L) to 0.427 µg/L (CH2M, 2013a) or about 2.5 times the current groundwater restoration based remedial goal. The BAP TEQ concentrations in the soil samples ranged from 50,499 micrograms per kilogram (µg/kg) to 214,266 µg/kg. Additional information on the potential for immobile and mobile NAPL to act as a secondary groundwater contaminant source is presented in *Feasibility Study Version 1.1* (CH2M, 2015b).

The presence and distribution of creosote-contaminated soil and groundwater beneath the ACW site was initially assessed during the 1992 RI. Following implementation of the groundwater remedy in October 1996, updated assessments were performed in 2008 and 2012 (using different technical approaches) to develop a more detailed understanding of the subsurface NAPL architecture. Additional information on these investigations is briefly summarized in the following subsections.

1.2.3.1 1992 Remedial Investigation

Based on the information collected through the 1992 RI, 253,000 cubic yards of creosote-contaminated soil, 24 million gallons of contaminated groundwater, and 1 million gallons of oil were estimated to be present at the site. The inferred distribution of light nonaqueous phase liquid (LNAPL) and DNAPL, and creosote-contaminated soil and groundwater at the conclusion of the RI is shown in Figures 1-5 and 1-6, respectively.

1.2.3.2 February 2008 Subsurface Soil Investigation

The 2008 subsurface soil investigation (*American Creosote Works Subsurface Investigation Report,* CH2M, 2008) included the drilling of 40 Geoprobe soil borings and collection of 220 soil samples for semivolatile organic compound (SVOC) laboratory analysis. The analytical results from this investigation were used to prepare cross-section and plan view maps showing PAH (expressed in BAP TEQ) distribution. Separate maps were developed for 5-foot-thick soil intervals, extending from a depth of 1 to 35 feet bgs. The maps for the 25-to-30-foot and 30-to-35-foot depth intervals did not detect BAP TEQ contaminated material at concentrations above the remedial goal.

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[4] Groundwater flux estimated using the following: volume (gals/day) = 0.02*(v * A), where: 0.02 = constant equal to (7.48 gallons/cubic foot * 1 year [365 days]); v = groundwater velocity of 3.3 ft/year, A = cross-sectional area of the aquifer between recovery trench sumps S-1 to S-5 of 7,700 square feet.

The 2008 investigation results showed that a majority of the residual and free-phase oil lies within the central portion of the site, an area currently defined as the NAPL source area (Figure 1-4). The results also showed that the oil lies within discontinuous lenses of fine- to medium-grained sand present above the base of the PTD. Significant amounts of dry, creosote-stained soil were also observed at depths of 1 to 8 feet bgs.

1.2.3.3 January/August 2012 TarGOST Investigation

In January 2012, the tar-specific green optical scanning tool (TarGOST) technology was used to develop more detailed information on the subsurface NAPL architecture at the ACW site. TarGOST continuously measures relative NAPL concentrations as an optical sensor is advanced into the subsurface using direct-push equipment. TarGOST logging was performed at most of the February 2008 geoprobe soil borings described in subsection 1.2.3.2 to allow for comparison of the TarGOST results with the 2008 visual NAPL mapping and laboratory analysis results. In August 2012, additional TarGOST logging was performed at the locations identified as GP-41 to GP-51 and GP-56 to define the outer boundaries of NAPL occurrences.

The TarGOST results were merged with the February 2008 laboratory analysis results to define the distribution of BAP TEQ in subsurface soil that exceeds the 3,000 µg/kg remedial goal for 5-foot-thick intervals from depths of 1 to 35 feet bgs (Figure 1-7). Additional information on the TarGOST investigation results is presented in the RI report (CH2M, 2015a) and the 2012 annual operations summary (CH2M, 2013b).

1.2.4 Contaminant Characteristics

The coal-tar derived creosote historically used at the site was a complex mixture containing nearly 300 different organic compounds. Approximately 85 percent of these compounds are classified as PAHs and 2 to 17 percent as phenols (Bedient et al., 1984). To improve penetration during the treatment process, creosote and PCP were mixed with a carrier oil, as evidenced by the benzene, toluene, ethylbenzene, and xylenes (BTEX) detected in soil and groundwater samples collected at the site.

Laboratory analysis of recovered oil samples taken in 1996 and 2012 (Table 1-2) indicate that naphthalene and phenanthrene account for a majority of the PAH content in the oil. These two compounds are also the most prevalent in site groundwater. Historically, these compounds have been detected in site groundwater at concentrations up to 304,000 and 176,000 µg/L, respectively. In 2015, the maximum detected concentrations for these two constituents in the monitor well groundwater samples was 35,000 µg/L (naphthalene) and 19,400 µg/L (phenanthrene), versus 41,000 µg/L (naphthalene) and 29,400 µg/L (phenanthrene) in 2014 (Table 1-2). The naphthalene concentration of 35,000 µg/L, observed in 2015, was the second highest detected in groundwater since 2007; for phenanthrene, the 19,400 µg/L concentration was similar to level measured in 2013. The concentration decrease observed in 2015 is attributed to the pumping strategy modification implemented in 2014 from aggressive NAPL recovery to hydraulic containment. The maximum detected PAH concentrations generally occur at monitor wells SMW-2, SMW-9, and MW-4.

The highest concentration of naphthalene detected in the 2015 PLTS influent samples was 733 µg/L. This concentration is lower than was observed for the December 2012 through December 2014 period. The lower influent naphthalene concentrations observed in 2015, as compared to previous years, likely corresponds with the shift to hydraulic containment pumping and the loss of high concentration flow streams from the interior recovery wells.

There are 16 different PAH compounds typically associated with creosote-based wood-treating sites (Table 1-2), 7 of which have been identified as probable human carcinogens, or carcinogenic polycyclic aromatic hydrocarbons (CPAH). The low molecular weight PAH compounds (less than 210 grams per mole) have relatively higher aqueous solubility and are more amenable to removal through groundwater extraction and in situ biotreatment. The high molecular weight PAH compounds (greater than 210 grams per mole) have much lower aqueous solubilities and are more difficult to remove and treat in situ.

1.2.5 Receptors

Currently, there are no complete human exposure pathways present within the Process Area DU. A layer of clean fill material, varying in thickness between 1 and 3 feet, was placed over the ACW site's former process area. This cover prevents direct contact with contaminated subsurface soil by remedial action workers. A perimeter fence and locking gate restrict access to the Process Area DU and a large portion of the Non-Process Area DU. An electronic surveillance system monitors the site entrance gate, building, and grounds when remedial action workers are not present onsite. There is no indication that shallow aquifer groundwater is being used in the immediate vicinity of the site. Drinking water for nearby residents is supplied by the City of Winnfield from deep water supply wells constructed in the Sparta aquifer. During the 1992 RI, sampling of the City's water supply Red Hill well, approximately 4,000 feet east of the site showed no evidence of site-related contaminants.

Ecological exposure pathways, specifically those associated with Creosote Branch Creek and other portions of the site were evaluated in the *Risk Assessment Addendum Report Version 1.1 American Creosote Works Site Feasibility Study* (CH2M, 2015c). The ecological risk evaluation determined that significant risks to ecological receptors are not present at the site, except within several small areas located in the Northern DU.

1.2.5.1 Agency for Toxic Substances and Disease Registry – September 2011 Assessment

In September 2011, the Louisiana Department of Health and Hospitals, in cooperation with the Agency for Toxic Substances and Disease Registry completed an assessment for the ACW site to determine whether current conditions pose a threat to public health. The assessment concluded:

> *…that the groundwater, PLTS effluent, surface water, and sediment at the American Creosote Works, Inc., site and in the portion of Creosote Branch Creek immediately adjacent to the site will not harm people's health. Under current site conditions, no routes of exposure exist between residual site contaminants in these media and the public. There is no connection between the site's groundwater and the recreational or municipal water sources for the community, so community members will not drink groundwater from the site or use it for any washing activities or recreational activities. Public access to the site is prohibited and limited by fencing and a security system. The creek adjacent to the site is not currently suitable for recreational purposes* (Louisiana Department of Health and Hospitals, 2011).

1.2.5.2 Comprehensive Environmental Response, Compensation, and Liability Act Baseline Risk Assessment Update – 2014

Under Task Order 0051, CH2M prepared an updated RI (CH2M, 2015a) that included an update to the 1992 baseline risk assessment. The updated risk assessment (CH2M, 2014a) and its companion document *Risk Assessment Addendum Report Version 1.1* (CH2M, 2014b) concluded that additional remedial action was required for: (1) Northern DU surface soil to address risks to terrestrial ecological receptors; (2) Non-Process Area DU surface soil to address risk to future industrial workers; and (3) Process Area DU surface and subsurface soil to address risk to future industrial workers.

Process Area and Non-Process Area DU shallow aquifer groundwater was also identified for further remedial action because the groundwater is in hydraulic communication with Creosote Branch Creek. Under the baseline (that is, no action) condition, contaminated groundwater discharge to the creek could result in surface water contaminant concentrations exceeding federal or state ambient water quality criteria or other protective concentrations.

Remedial action for environmental media present in the Western, Southern, Tar Mat, and Creek DUs did not exceed the upper bound of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) target human health risk range of 1×10^{-4} for carcinogenic constituents or hazard index of 1 for non-cancer constituents. The ecological risk assessment (CH2M, 2015c) concluded that the contaminants detected in surface soil and creek sediment did not pose an unacceptable risk to ecological receptors.

1.3 Current Remedy Goals and Conditions for Termination

Remedial action objectives[5] identified in the ROD (EPA, 1993) include the following:

- Prevent human exposure to contaminated groundwater present at concentrations above health-based standards, and restore groundwater quality to allow for future beneficial use[6].
- Remove the threat of potential exposure to future residents via direct contact with contaminated surface soils, Tar Mat ash, and NAPL.
- Reduce the potential for site contaminants to migrate into surface water or groundwater.

To achieve these objectives, the 1992 ROD established remediation goals (Table 1-3) for contaminants of concern (COC) in surface and subsurface soil and groundwater. A soil cover was also placed over large portions of the site during remedial construction to prevent direct contact with contaminated soil and leaching of contaminants from soil to groundwater and surface water.

Until site remediation goals are met, human health and the environment are protected from direct contact with contaminated soil and groundwater by a layer of clean vegetated soil maintained over contaminated areas; by perimeter fencing that prevents access to the site; and through control of onsite land and groundwater use. Operation of the total fluids pumping system protects the environment by hydraulically containing mobile NAPLs and the dissolved-phase plume; thereby, limiting offsite migration and entry to surface water.

1.4 Remedy Description

The fluids recovery system was initially made up of 18 recovery wells and 2 recovery trenches (north and east trench) to extract free-phase oil and groundwater. In August 2005, three new recovery wells (R-19, R-20, and R-21) were installed to close a hydraulic gap in the north recovery trench. In February 2006, a shallow infiltration trench gallery was constructed inside the waste cell footprint to promote in situ biological treatment and flushing of soluble contaminants from vadose zone soil to the recovery wells.

Extracted fluids from the recovery wells and trenches are pumped through an underground pipeline to the PLTS where free-phase and emulsified oil and dissolved-phase contaminants are separated from the groundwater. A portion of the treated water is amended with oxygen and returned to the shallow aquifer through four shallow infiltration trenches and seven injection wells, and to the deep aquifer through the deep injection trench. At PLTS flow rates greater than 8 gpm, some treated water may be discharged to Creosote Branch Creek or used for onsite irrigation. In 2013, the valve allowing treated water to be discharged to Creosote Branch Creek was closed to prevent any future discharge to the Creek.

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[5] The feasibility study (CH2M, 2015b) developed updated remedial action objectives and preliminary remediation goals for the site, based on current and projected land and groundwater uses, and the exposure pathways and receptors identified by the updated risk assessment. It is expected that the remedial action objectives and remediation goals in the 1993 ROD will be updated in a future CERCLA decision document.

[6] The ROD identifies a future drinking water beneficial use for shallow groundwater, because deep groundwater can be affected by saltwater intrusion.

The fluids recovery and PLTS typically operates 24 hours per day, 7 days a week. Periodic shutdowns may occur due to system alarms and to perform routine and non-routine maintenance.

1.4.1 Total Fluids Recovery System

The total fluids (oil and groundwater) recovery system (Figure 1-4) is made up of 21 recovery wells (R-1 to R-21), the 750-foot-long north recovery trench with 5 collection sumps (S-01 to S-05), and the 220-foot-long east recovery trench with 2 collection sumps (S-11 and S-12). The recovery wells and east recovery trench draw fluids from the shallow aquifer. The north recovery trench was installed in the deep aquifer and is presumed to draw fluids from both the shallow and deep aquifers.

Historically, output from the wellfield to the PLTS was set at rates that varied between 4 and 15 gpm. The flow rate is controlled by an electronic valve installed on the wellfield influent pipeline. Although the wellfield can sustain higher flow rates, reliable PLTS treatment has not been achieved above 15 gpm. Treatment system modifications made in 2009, which were necessary to address increasing amounts of emulsified oil entering the PLTS, required the flow rate to be reduced from 15 gpm in March 2010 to 8 gpm where it remained through December 2011. In 2012, the flow rate declined to a 4 to 6 gpm range as seven of the recovery wells were taken offline for a surfactant enhanced product recovery pilot test conducted under Task Order 0051.

The wellfield and PLTS flow rate averaged approximately 7.1 gpm for the 2015 reporting period, with a majority of the flow supplied by the two recovery trenches and wells R-8, R-19, R-20, and R-21, as the pumping strategy shifted from aggressive NAPL recovery to hydraulic containment. Modification of the pumping strategy was necessary to reduce entrainment of aquifer solids in the wellfield flow stream. The design of the recovery trench slots (drilled 0.25-inch diameter holes) has allowed fine-grained aquifer sediments to be drawn into the trench piping. Over the years, a significant inventory of aquifer solids has accumulated in the trench. In 2013, portions of the trench were redeveloped over several months to purge the sediment, but the redevelopment effort is unlikely to have removed sediment from more than a very short segment of the trench in the immediate vicinity of the vertical risers.

Total monthly fluid recovery rates in 2015 ranged from 188,200 gallons (October) to 292,700 gallons (May). The total volume of fluids pumped and treated in 2015, 3.1 million gallons, was higher than the 2.9 million gallons pumped and treated in 2014, and the 2.1 million gallons pumped and treated in 2013.

1.4.1.1 Individual Well Flows

Total fluid pumping rates at individual recovery wells and trench sumps were initially tracked between 1996 and 2001 using the cycle counters mounted on each pump's air supply line. The cycle counters proved to be unreliable (non-functioning), and the cycle count monitoring was discontinued. Well yields have since been estimated by manually counting the number of pump discharge cycles over a 3- or 5-minute period at each well, multiplying this count by 0.25 gallon per discharge cycle (IT Corporation, 1996), summing the flow rate for all wells, and then normalizing[7] the total wellfield flow rate using the instantaneous flow rate measured at the PLTS.

This approach has shown individual well pumping rates ranging from 0.03 gpm (R-21) to 0.66 gpm (R-5) at the recovery wells, and from 0.48 gpm (S-11) to 1.86 gpm (S-2) at the recovery trench sumps. While this approach is expected to provide a reasonable estimate of individual well-pumping rates, the estimate is representative for a very short time interval only and does not account for seasonal recharge or other mechanical factors that may influence long-term well yields. Based on historical observations,

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[7] The normalization step requires that individual well flow rates, estimated by the cycle count method, be reduced by a factor such that the sum of the individual well flows equals the flow rate measured by the PLTS wellfield influent meter.

approximately 27 percent of the total fluids pumped from the wellfield originates from the recovery wells, and 73 percent from the recovery trenches.

1.4.1.2 Pumping Strategy

Many elements of the site pumping strategy are influenced by how the system was designed and constructed, as well as the nature of groundwater flow between the shallow and deep aquifers. The large number of recovery wells and trenches, and their construction in both the contaminated shallow aquifer and the uncontaminated deep aquifer, requires a coordinated effort to optimize the wellfield's NAPL sweeping efficiency, while promoting a uniform distribution of oxygen amended water to stimulate in situ bioremediation.

As described in Chapter 3 of the *Site-Specific Plans - Field Operations Plan* (CH2M, 2006b), a Phase 1 and Phase 2 pumping plan was implemented in July 2001 to help establish an organized groundwater flow field within the shallow aquifer. The pumping plan consisted of alternately pumping from two different well groups to reduce the occurrence and size of groundwater flow stagnation zones that tend to form between opposing recovery wells. Stagnation zones can adversely affect remedy performance in the shallow aquifer, because the limited groundwater flow rates (and velocities) prevent the effective flushing of NAPL and dissolved-phase contaminants, as well as transport of in situ bioremediation nutrients.

Another element affecting the overall pumping strategy at the site was the performance-based contracting metrics (PBCM) used to administer site operations. Various metrics established for the site were raised incrementally as remedy improvements allowed for higher pumping and PLTS treatment rates. In 2001, when PBCMs were first introduced, the total monthly fluids metric was 440,000 gallons per month. The metric was raised to 500,000 gallons per month in 2005; 565,000 gallons per month in April 2006; and 630,135 gallons per month in December 2006. The upward modification to this metric required that a majority of the wells be pumped, resulting in a gradual phase-out of the Phase 1 and Phase 2 pumping strategy.

The remediation effort has advanced since PBCMs were first implemented at the site in 2001. As the mass of recoverable NAPL and size of the dissolved-phase plume have decreased, the need for aggressive PBCMs is no longer necessary. Pumping of low concentration wells places additional hydraulic and mechanical burden on the PLTS. In recognition of this condition, the PBCMs were modified in July 2011 to eliminate the volumetric PBCM. Additional information on the revised PBCMs is provided in Section 2.1.

As mentioned previously, the pumping strategy was modified in 2014 from aggressive NAPL recovery to hydraulic containment, which consists of pumping trench sumps S-1 to S-5, S-11, S-12, and recovery wells R-8, R-19, R-20, and R-21. All other wells have been turned off.

1.4.1.3 Wellfield Flow Control

The influent flow rate from the wellfield to the PLTS is regulated by an electronic control valve. It is unknown how changes in the valve setting affect individual well pumping rates. Given the manner in which the wellfield was designed, there is no apparent method for regulating individual well flow rates; a well is either turned on or off. All other factors being equal, pipeline hydraulics suggest that flow rates from wells located closer to the PLTS would tend to be higher because there is less head loss (static [elevation] + dynamic [friction]). Hydraulic competition may also occur where flows from different pipe branches converge.

Abrupt changes in the influent's chemical makeup (naphthalene concentration) are used to assess relative changes in the character of the wellfield flow entering the PLTS. Influent samples were collected for naphthalene analysis in July and September 2015. Naphthalene concentrations of 733 µg/L and 22 µg/L were detected in July and September, respectively (Figure 1-8). The decline in the influent naphthalene concentrations is attributed to the shutdown of the interior wells, many of which contain dissolved-phase PAH concentrations that are much higher than present in the hydraulic containment trench/well array.

1.4.2 Process Liquid Treatment System Description

The PLTS (Figure 1-9) includes the following treatment steps:

1. NAPL (oil) removal
2. Biological treatment
3. Sand and granular activated carbon (GAC) filtration
4. Discharge

Secondary treatment steps include NAPL concentration and storage, oily solids thickening, biosolids and sand filter solids dewatering, and process air emission filtration. In May 2014, the NAPL thickening process was modified to permit transfer of NAPL contaminated aquifer sediment from the concentrator tank to a vacuum box staged on the decontamination pad. Use of the vacuum box continued in 2015.

1.4.2.1 Nonaqueous Phase Liquid (Oil) Removal

The ferric chloride (coagulant) addition step, which improves emulsified oil removal, was implemented in April 2009. This step includes addition of ferric chloride at 250 mg/L for an 8-gpm PLTS treatment rate (1.5 gallons per day). The ferric chloride is pumped by a timer-controlled chemical metering pump from a 70-gallon double-walled storage tank to the acidification tank. Ferric chloride is a commonly used water treatment chemical that forms a more discrete and dense floc, promoting faster sedimentation, over alum. The ferric chloride hydrolysis products are more reactive and adsorptive to emulsified and semi-emulsified oil. Additionally, the sludge resulting from the use of ferric chloride is generally more dewaterable. Another characteristic of ferric chloride is its ability to form floc across a wide range of wastewater pH[8] conditions.

Following ferric chloride addition, sodium hydroxide is injected (0.74 gallon per day) by a chemical metering pump, programmed to maintain a pH of approximately 8.0, before the water enters the oil-water separator (OWS) (Figure 1-9). The addition of these two chemicals together facilitates breaking of emulsified oil, enhancing creosote removal in the OWS. As the water stream leaves the OWS, sulfuric acid (0.1 gallon per day) is added by a chemical metering pump controlled by an inline pH probe to maintain the pH in the 7 to 7.5 range prior to biological treatment.

Free-phase and emulsified oil removed in the OWS are pumped to the NAPL concentrator tank for additional oil-water gravity separation. Once this tank becomes full, the oil phase is drawn from the bottom of the tank and pumped to the NAPL storage tank. The water phase is drawn off the top of the tank and pumped to the equalization (EQ) tank (Figure 1-9). Any free-phase or emulsified oil not retained by the OWS is captured in the lamella clarifier and pumped to the sludge thickener tank for oil-water gravity separation. Similar to the NAPL concentrator tank, the oil from the sludge thickener tank is drawn from the bottom and pumped to the NAPL storage tank. Water is drawn off the top and pumped to the EQ tank.

All recovered oil collected in the NAPL storage tank has historically been transported to the Clean Harbors incineration facility in El Dorado, Arkansas. There was one offsite oil-emulsion shipment of 1,000 gallons in January 2015. These fluids were recovered from cleanout of the NAPL concentrator tank.

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[8] pH: A water quality indicator parameter that corresponds to the negative logarithm of the hydrogen ion concentration.

A process modification to the NAPL recovery system was made in 2014 in response to increasing aquifer sediment concentrations in the wellfield influent. NAPL and aquifer sediment that is recovered in the OWS is pumped to a vacuum box setup on the PLTS decontamination pad. The NAPL concentrator and NAPL storage tanks are not set up to pump the NAPL-sediment sludge.

CH2M and EPA have continued to evaluate reuse options for creosote recovered from remedial activities. A tentative agreement was reached with KMG in 2014, but this agreement was cancelled when KMG was acquired by Koppers on January 20, 2015.

1.4.2.2 Biological Treatment

The biological treatment step occurs in the bioaeration tank (Figure 1-9), which uses an extended aeration-activated sludge process to transform soluble organic constituents into cell biomass, carbon dioxide, and water. An array of submerged diffuse aerators maintains the dissolved oxygen concentration in the tank within a 0.5 to 2 mg/L range (IT Corporation, 1996). All biological treatment processes generate excess biomass that must be periodically removed (wasted) to maintain treatment efficiency. It is estimated that about 25 cubic yards of biomass are wasted every 12 to 18 months under current operating conditions. Under previous conditions, when all recovery wells were in operation and PLTS influent flow rates ranged from 8 to 12 gpm, biomass generation rates were higher (Table 1-4).

In February 2011, a PLTS process modification was made to divert waste biosolids and backwash water to an 18,000-gallon frac tank. Liquids and solids are separated using an Ecotube maintained, in a 30-cubic-yard roll-off box. The solids are retained within the Ecotube and the water pumped back to the PLTS EQ tank through the PLTS building floor trench. As the Ecotube fills, it eventually reaches its storage capacity, requiring replacement and offsite transport of the filled unit. Additional information on offsite waste disposal quantities for the 2015 reporting period is presented in Section 2.

1.4.2.3 Sand and GAC Filtration

Once the water stream leaves the bioaeration tank, it gravity flows to the sand lift tank where it is then pumped through a multimedia filter to remove residual bio-particulates. Following sand filtration, the treated water flows through four[9] GAC vessels manifolded in a series configuration. In December 2011, the GAC vessels were realigned from a parallel to a series configuration, as a pilot test, to determine if treatment efficiency could be improved. The findings of the pilot test, which were presented in the 2011 annual operations report were favorable; therefore, series operation has been maintained.

1.4.2.4 Discharge

Following the GAC treatment step, the water flows either to the oxidation tank for nutrient and oxygen addition and subsequent aquifer injection (Section 1.4.3), or to the effluent tank for discharge to Creosote Branch Creek. All treated flow is returned to the aquifer via the deep injection trench, 6 shallow injection wells, or 4 vadose zone infiltration trenches. In December 2013, the flow control valve to the creek discharge pipe was closed to prevent inadvertent discharge.

1.4.3 In Situ Bioremediation System Description

The in situ bioremediation system includes chemical amendment of the PLTS effluent that is diverted for reinjection (typically about 8 gpm), sand filter filtration to remove solids resulting from temporary effluent storage in the oxidation tank, and injection through a network of trenches and wells. Per the original design concept, the PLTS effluent is amended in the oxidation tank with hydrogen peroxide and

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[9] The PLTS was original configured with four GAC vessels. In 2014, one of the vessels failed, and in 2015, two other vessels failed. Currently, only one vessel is operating. When a vessel fails the interior water distribution piping and or media screens have corroded to a point such that GAC media is flushed from the vessel during the backwash cycle.

a buffered mixture of ammonium chloride and phosphate to promote microbial growth and aerobic biodegradation of PAHs in the subsurface.

1.4.3.1 Deep Aquifer – Injection Trench

The injection trench is similar in concept to the recovery trench, except that it is designed to inject treated water (PLTS effluent). The injection trench consists of five separate horizontal, perforated pipe sections (S-06 to S-10 on Figure 1-4), placed in a single linear trench. An air-sparging system was initially used to add oxygen to the water, but this system was replaced with a hydrogen peroxide addition in the PLTS oxidation tank shortly after the October 1996 startup. The injection trench is constructed in the deep aquifer.

1.4.3.2 Vadose Zone – Shallow Aquifer Infiltration Trenches

In February 2006, four shallow trenches (I-8 to I-11 on Figure 1-4) were installed to promote in situ bioremediation of low-level contaminated material placed in the onsite waste cell.

Injection water is pumped from the PLTS oxidation tank to the trenches through an underground pipe. The injection sumps maintain the water level in the trench at an elevation of 104 feet above mean sea level (amsl) through a float-type valve.

1.4.3.3 Shallow Aquifer – Injection Well System

The injection wells (I-1 to I-7 on Figure 1-4) are screened in the shallow aquifer. Injection water is delivered through an underground pipe to the wellhead. A float valve maintains the water level at an estimated elevation of 104 feet.

1.4.4 Other Remedy Components

Institutional controls are not currently used at the site. The ROD specifies institutional controls as a “to be considered” requirement. The ROD specifically states that EPA and the State of Louisiana would determine the need to file a deed notice advising of site hazards. The *First Five-Year Review for American Creosote Works* (CH2M, 2000) 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 groundwater use until the remediation goals are achieved.

The site is owned by the Winn Parish Police Jury, and access to the Process Area DU, the Tar Mat DU, and large portions of the Non-Process Area DU is restricted by a fence. An institutional control has not been put in place as recommended in the 1993 ROD; however, current site conditions meet the goal that an institutional control would achieve. If site conditions change, then implementation of an institutional control should be considered.

1.5 Interaction with Public and/or Agencies

Periodic conference calls were held with EPA and system operations described in EPA monthly progress reports. Louisiana Department of Environmental Quality (LDEQ) receives periodic updates on site operations through telephone calls with EPA, review of site-related reports, and periodic site visits.

The following report and site-specific plan updates was prepared and distributed in 2015 under Task Order No. 0001: A*merican Creosote Works Year 2014 Annual Operations Summary* (CH2M, 2015d).

1.6 Fourth Five-Year Review

The fourth five-year review for the site was conducted in 2014, and a final report was issued in May 2015 (EPA, 2015). A summary of the action items identified in the final report and their expected resolution is provided in Table ES-1. All of these issues have been addressed either through the findings of the updated baseline risk assessment or through implementation of a new remedy to be identified in a future CERCLA decision document(s).

1.7 Hazardous Waste Reporting

In accordance with 40 *Code of Federal Regulations* (CFR), Part 262.40, Subpart D, an annual hazardous waste report was filed with the LDEQ on January 7, 2016 (Appendix A, A-1).

In November 2013, a CH2M Environmental Manager conducted an environmental audit of the ACW site's operations and facilities. During the audit, nine 55-gallon drums of process treatment chemicals, which are used in the PLTS, were identified. The presence of these chemicals prompted an evaluation to determine the applicability of the Emergency Planning and Community Right-to-Know (EPCRA) and the Chemical Facility Anti-terrorism Standards (CFATS) reporting obligations. Some of these treatment chemicals (specifically sulfuric acid and hydrogen peroxide) are considered hazardous substances under EPCRA and chemicals of interest under CFATS. The evaluation findings, which are documented in the *American Creosote Works Superfund Site – November 2013 Environmental Audit Emergency Planning and Community Right-to-Know and Chemical Facility Anti-Terrorism Standards* (CH2M, 2014c), resulted in modifying current site practices to decrease the concentration of hydrogen peroxide and the volume of sulfuric acid managed onsite.

EPCRA Tier II Reporting for the ACW site was first conducted in 2014, for the 2013 filing year. This reporting was done in compliance with Louisiana Revised Statutes 30:2361-30:2380; Louisiana Administrative Code, Title 33, Part V, Subpart 2, Chapter 101; 40 CFR 68; and 40 CFR 355. For the calendar year 2015, the EPCRA Tier II Reporting was submitted on February 17, 2016 (Appendix A, A-2).

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SECTION 2

Operations Summary

Through December 2015, the in situ bioremediation and fluids recovery system has operated for 19.3 years, recovering an estimated 1.9 million pounds of contaminant mass[10] from 95.7 million gallons of total fluids pumped and treated (Table 2-1). For the January 1 through December 31, 2015 reporting period, the system recovered 9,600 pounds of contaminant mass from 3.1 million gallons of NAPL and groundwater treated in the PLTS, and returned 3.1 million gallons of treated water to the shallow and deep aquifers. Offsite hazardous waste shipments in 2015 included the following: (1) 100 pounds of contaminated filter media, (2) 25 cubic yards of biosolids (3) 450 pounds of contaminated debris, and (4) 1,000 gallons of creosote-emulsion from the NAPL concentrator tank.

2.1 System Downtime

Routine and non-routine downtime are associated with wellfield, PLTS, and in situ bioremediation system operations. Routine downtime results from scheduled equipment maintenance, repair, or replacement. Non-routine downtime is associated with unplanned maintenance, repair, equipment failure, or adverse weather. In July 2011, the PBCMs for the ACW remedy were modified (Section 3.1) to include a run-time metric that measures routine and non-routine downtime and identifies their cause.

Based on narrative information compiled for the January through December 2015 reporting period, 25 days of total non-routine downtime were incurred as described in Section 2.1.2.

2.1.1 Routine

Routine downtime was not incurred in 2015. Routine downtime occurs in conjunction with PLTS media changes, which was not performed in 2015. A majority of other routine maintenance and repair is performed while the wellfield and PLTS system are operating; therefore, routine downtime for these activities is often not required. These activities typically include the following:

- Backwashing of the GAC and sand filters
- Replacement/repair of extraction well pneumatic pumps (ongoing as needed)
- Well inspection and pump status (daily)
- Servicing and maintenance of bioaeration tank air blowers (weekly)
- Grounds keeping (weekly)
- Servicing of PLTS fluid transfer pumps (biweekly)
- Servicing of the primary and backup air compressors (monthly)

2.1.2 Non-routine

Non-routine downtime, totaling approximately 25 days, was incurred during the 2015 reporting period as follows:

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[10] As shown in Table 2-1, a majority of the contaminant mass is attributable to recovered oil. The mass calculation uses an estimated oil-specific gravity of 1.08 for the 1996 to 2006 timeframe, and measured values of 1.03 for 2007 to 2011, and 1.07 for 2012 and 2013. Specific gravity values at any given time may vary; therefore, the mass estimate might not reflect an absolute value. The dissolved-phase mass recovered is based on an estimated total SVOC concentration of 50 mg/L for the 1996 to 2006 timeframe, and measured values of 90 mg/L for the 2007 to 2011 period, and 54.3 mg/L for 2012 to 2013.

- January 2015 (2.3 days). The PLTS was shut down due to: (1) flooding inside the PLTS building attributed to failure of the floor trench level sensor; (2) overheating of the primary compressor; and (3) restart failure following an external power outage.
- March 2015 (8.3 days). The PLTS was shut down due to issues with the receipt and payment of the City water bill. City water is required for backwashing of the GAC vessels.
- April 2015 (3.8 days). The PLTS failed to restart following an external power failure attributed to a thunderstorm. The PLTS was also shut down to repair the oxidation tank transfer pipeline.
- October 2015 (6 days). The PLTS was shut down due to: (1) failure of two of the three remaining GAC vessels resulting in media loss and carryover elsewhere within the PLTS; (2) oxidation tank high liquid level due to injection sand filter plugging; (3) biosystem aeration blower fan belt break; (4) GAC media blockage in transfer lines, oxidation tank transfer pump, and injection sand filter; (5) compressed air leak at well R-5; and (6) oxidation tank transfer pump diaphragm break.
- November 2015 (2 days). The PLTS was shut down due to: (1) primary compressor failure, and (2) sand filter transfer pump failure and repair.

Other short-duration downtime events totaling 2.6 days were also incurred during the 2015 reporting period. These events were attributed to a range of conditions including external power outages, failure of the primary air compressor, and fluid transfer pump and piping mechanical failures.

2.2 Operations Data

This section summarizes monthly fluid recovery and injection rates and the results of influent naphthalene testing. Influent naphthalene testing has been performed primarily to assess the effectiveness of the shallow infiltration trenches in flushing residual oil from vadose zone soil within the waste cell footprint.

2.2.1 Recovery Trench and Extraction Well Pumping Rates

Total fluids recovery is a measure of the volume of all fluids (oil and water) pumped from the recovery (trench and well) network. This parameter is measured using the PLTS influent totalizing meter, mounted between the EQ tank and the acidification tank. The influent meter uses acoustic technology to measure fluid density and velocity in the pipe, and is more accurate than the PLTS effluent and injection trench meters. A subcontractor calibrates all meters annually. Calibration checks were performed on all flowmeters on June 26, 2015. The Onsite Operator records the meter readings in the daily operating log and transfers the month-end reading to a monthly reporting tool.

Total monthly fluid volumes pumped in 2015 ranged from a low of 188,200 gallons (October 2015) to a high of 292,700 gallons (May 2015). The 6-month moving average (6MA) fluids recovery rate continued to trend up, from 207,500 gallons in December 2014 to 274,500 gallons in September 2015 declining to 253,500 gallons in December 2015 (Figure 2-1).

The total volume of fluids pumped in 2015 was 3.1 million gallons (Table 2-1). This volume corresponds to an average flow rate of 7.1 gpm based on a PLTS run time of 7,204 hours. The average annual year 2015 flow rate of 7.1 gpm was greater than the 5.9 gpm recorded for 2014 and the 6.2 gpm flow rate recorded for 2013.

2.2.2 Injection Rates

Treated water from the PLTS is returned to the deep aquifer injection trench, the shallow aquifer infiltration trenches, the shallow aquifer injection wells, and the irrigation sprinklers. Discharge to Creosote Branch Creek no longer occurs. The PLTS effluent tank creek discharge valve was closed in December 2013. All treated water flow for the 2015 reporting period was returned to the deep aquifer injection trench, shallow infiltration trenches, and the injection wells. The 6MA injection rate tracked the 6MA total fluids pumping rate in 2015 (Figure 2-1).

2.2.3 PLTS Influent Characterization

As a result of the presence of free-phase creosote, comprehensive laboratory analysis of the PLTS influent is not routinely performed. Beginning in April 2006, periodic sampling of the PLTS influent was implemented to identify potential changes associated with shallow infiltration trench operations. Using naphthalene as an indicator, the 2015 analysis results (Figure 1-8) show the 6MA naphthalene concentration rising steadily, from 2,034 µg/L in July 2012 to 23,595 µg/L in February 2014. This increase likely corresponds with decreased wellfield flow rates (loss of dilution from low concentration wells R-5, R-17, and R-18) and normal temporal changes in the influent composition. The 6MA naphthalene concentration subsequently decreased after February 2014, declining to 22 µg/L as of September 2015. This decrease is attributed to modification of the pumping strategy from aggressive NAPL recovery to hydraulic containment. Many of the recovery wells with high NAPL and/or dissolved-phase PAH concentrations were shut down as a result of the pumping modification.

2.2.3.1 Recovery Well Testing

Recovery well sampling and analysis was not conducted in 2015.

2.2.4 PLTS Effluent Monitoring

PLTS treatment effectiveness is evaluated through quarterly testing of effluent samples and comparison of the results with the effluent limits identified in the O&M manual (IT Corporation, 1996). The effluent limits are applicable when the PLTS effluent is discharged to the creek. Although the effluent limits are not specifically applicable to aquifer reinjection, as allowed under Section 3020 of the Resource Conservation and Recovery Act (RCRA), achieving the effluent limits is a PBCM. Therefore, PLTS operations and media changeout decisions are made based on whether the effluent limits are being met. Process control samples are also collected on an as-needed basis, to either verify treatment performance or to troubleshoot specific issues. All effluent samples are collected from the PLTS effluent tank or downstream of the injection flow sand filter; samples are then analyzed by a Tier IV laboratory for SVOCs, BTEX, metals (arsenic, chromium, zinc), and general chemistry parameters.

Quarterly PLTS effluent compliance sampling and analysis performed in March, June, September, and December 2015 showed that the creek discharge limits were met for all SVOC, volatile organic compound (VOC), and general chemistry parameters (Tables 2-2, 2-3, and 2-4).

Overall, these results indicate satisfactory PLTS treatment performance.

2.2.5 Stormwater Runoff Sampling

Stormwater sampling is typically performed at the three locations, identified as the South Ditch, West Ditch, and East Ditch on Figure 2-2, to determine if site-related constituents are present in stormwater runoff. Stormwater sampling was not performed in 2015.

2.3 Remedial Action Costs

Monthly O&M costs are compiled and reported with the EPA Task Order Monthly Progress Report. The cost information shows O&M costs for the January to December 2015 period varying from $19,200 to $70,200 per month, with a total annual cost of $434,100 versus $607,500 in 2014, and $723,300 in 2013. Of the $434,100 in O&M costs incurred in 2015, 52 percent were attributable to labor, 34 percent to subcontracting, 13 percent to equipment, and less than 1 percent to travel. Of the $148,500 in subcontracting costs incurred in 2015, approximately $29,600 was associated with sludge disposal (performed in January 2015); and $21,400 for air dryer replacement. The remaining subcontract costs were associated with roll-off and vacuum box rental, tractor rental, quarterly PLTS process sample laboratory analysis, air dryer maintenance/repair, electrician, and other remediation waste management and disposal.

Utility costs include natural gas, electricity, and sewer/water. The total and average cost for each in 2015 included:

- Natural gas usage – Usage was 1,208 cubic feet, at a total annual cost of $1,466 and average monthly cost of $122. A majority of the natural gas use occurs between the months of December and March.
- Electricity usage – Usage was 295,718 kilowatts-hours, at a total annual cost of $22,355 and average monthly cost of $1,863. This rate of usage is approximately equal to 25 single-family homes (11,500 kilowatt-hours per year [U.S. Energy Information Administration, 2012]). Monthly electricity costs range between $1,454 and $2,396. Year 2015 electricity costs of $22,355 were lower than the $29,221 incurred in 2014. The lower cost most likely resulted from lower air compressor demand due to decreased wellfield pumping.
- Sewer/water – The total annual cost in 2015 was $1,958.75, with an average monthly cost of $163.23.

In general, O&M costs on a cost-per-gallon-treated average remained relatively stable at about $0.06 per gallon between January 2002 and March 2010. After March 2010, the 6MA total fluids recovery rate began to trend down for a number of reasons identified on Figure 2-3. This, in turn, caused the O&M cost per gallon to trend steadily upward, where it reached a peak value of $0.51 per gallon in October 2013. In 2015, the 6MA O&M cost decreased from $0.33 per gallon in January to $0.08 per gallon in November, and increased to $0.10 per gallon in December.

2.4 Problems Encountered with System Operation

The presence of aquifer solids in the PLTS influent stream persisted during the 2015 reporting period. With the shutdown of the interior recovery wells the amount of solids entering the PLTS has decreased. The presence of aquifer solids requires that all NAPL be transferred from the OWS to the NAPL concentrator tank and then to a rented vacuum box for offsite incineration. Onsite operations staff will continue to monitor aquifer solid concentrations in the wellfield influent to determine if the vacuum box is still needed.

With two of the three remaining active GAC vessels failing during the 2015 reporting period, there is just one usable GAC vessel in operation. Replacing the GAC treatment vessels during the 2016 reporting period is planned.

2.5 System Modifications

No system modifications were made in 2015. The shift in pumping strategy from NAPL recovery to hydraulic containment, and the continued use of the vacuum box to manage and dispose of NAPL-sediment sludge in 2014 continued in 2015. In hydraulic containment mode, the following recovery wells and trench sumps are operated:

- Recovery wells: R-8, R-19, R-20, and R-21
- Trench sumps: S-1 to S-5, S-11, and S-12

All other interior recovery wells were turned off the week of October 8, 2014.

SECTION 3

Subsurface Performance Summary

Both short- and long-term remedial action performance monitoring programs have been implemented at the site. Short-term remedy performance is tracked using the monthly PBCMs. Long-term remedy performance is tracked by comparing semiannual groundwater monitoring results with the remediation goals specified in the ROD. Additional information on remedy performance relative to short-and long-term goals is described in the following subsections.

3.1 Short-term Performance-based Metric Performance

The upper-bound PBCMs in effect for the January through December 2015 reporting period included the following:

- Maintain a PLTS run time greater than 94 percent.
- Maintain an inward hydraulic gradient at all six piezometer and monitor well pairs located at the northern (downgradient) and eastern perimeter of the Process Area DU.
- Achieve quality assurance metrics for flowmeter readings and periodic meter calibration, compliance with wellfield and PLTS sampling and analysis schedules (as described in the most recent field operations plan), compliance with PLTS effluent limits for discharge to Creosote Branch Creek, and no lost-time accidents for onsite operations staff.

The primary tool used for documenting progress with respect to the PBCMs is a Microsoft Excel-based monthly reporting tool, which is included with the Task Order Monthly Progress Report. Additional information on development of the PBCMs is provided in *Fixed Rate Incentive Task Order Work Plan - Task Order No. 0001-RARA-06G3, Modification No. 27, for American Creosote Works, Inc.* (CH2M, 2011b).

3.1.1 System Performance Relative to Run Time PBCM

The PLTS achieved a run time of greater than 94 percent for 9 of the 12 months during the 2015 reporting period (Figure 3-1). PLTS run times of 73.2 percent, 93.9 percent, and 80.7 percent occurred during the months of March, April, and October 2015, respectively. During these three months, additional PLTS downtime occurred due to non-availability of City water for GAC backwashing, failure of the PLTS to restart following a thunderstorm, and failure of two of the three remaining GAC vessels.

3.1.2 System Performance Relative to Hydraulic Gradient PBCM

To assess the effectiveness of the north and east recovery trenches in controlling dissolved plume migration, weekly water level measurements are performed at six well pairs located on the downgradient (north) side of the north and east recovery trenches. The well pairs include the following:

- MW-2A and SP-6 (Pair 1)
- SP-7 and SP-8 (Pair 2)
- SP-10 and SP-11 (Pair 3)
- SMW-3 and SP-12 (Pair 4)
- SP-5 and trench sump S-12 (Pair 5)
- SP-1 and trench sump SP-11 (Pair 6)

Water level monitoring of deep aquifer monitor wells relative to this metric has not been performed, because dissolved-phase contaminants have not been detected in deep aquifer groundwater at concentrations above remedial goals.

Manual depth-to-water measurements are recorded in the operating log; then the measurements are transferred to the monthly reporting tool, which calculates the groundwater elevation at each well and makes the inward gradient “yes” or “no” determination based on comparison of groundwater elevations between each of the two wells in the six well pairs.

The hydraulic gradient PBCM, which requires an inward gradient at each of the 6 well pairs, was achieved for 100 percent of the measurement events performed in 10 of the 12 months. The inward gradient PBCM was not met in March and October 2015. In March 2015, depth-to-water measurements were not performed at all five well pair locations the week of March 6th because the recovery wells and PLTS were temporarily shut down because GAC backwash water was not available. In October 2015, the depth-to-water measurements were not performed at all five well pair locations the week of October 23rd because the recovery wells and PLTS were shut down due to GAC vessel failure.

As shown on Figures 3-2A, 3-2B, and 3-2C, the groundwater elevation differences between individual wells that make up a well pair vary widely from several hundredths of a foot to greater than 10 feet. The hydraulic containment metric requires that groundwater elevations at the wells marked by the green lines on Figures 3-2A, 3-2B, and 3-2C be higher than the wells marked by the red lines.

3.1.3 Narrative Metrics

Narrative PBCMs include the following:

- Annual calibration of meters used for fluid measurements
- Performing all wellfield and PLTS sampling and analyses as described in the current field operations plan
- Maintaining a no lost-time accident status
- Achieving PLTS creek discharge effluent limits

Onsite operations staff makes a yes or no determination for the first three metrics and record this in the monthly reporting tool. Annual meter calibration was performed on June 26, 2015. The PLTS effluent limits determination is made by comparing the quarterly PLTS effluent laboratory analysis results with the effluent limits shown in Tables 2-2 to 2-4.

A “yes” determination for all four narrative PBCMs was achieved for each of the 12 months during the 2015 reporting period.

3.2 Subsurface Monitoring Program

The subsurface performance monitoring program includes the following:

- Semiannual water level measurements at targeted monitor well locations.
- Semiannual groundwater sampling for SVOCs at targeted monitor well locations in the shallow aquifer, deep aquifer, and in Creosote Branch Creek surface water. These events occur during the months of April and October.

During the 2015 reporting period, water level measurements and SVOC sampling was performed for the April (spring) event the week of April 13. The October 2015 event was cancelled per EPA request.

The current sampling and analysis schedule is summarized in Table 3-1. Shallow aquifer monitor well locations are shown on Figure 3-3A, and deep aquifer monitor well locations shown on Figure 3-3B. The two surface water sample locations, SW-1 and SW-21, are located opposite and slightly downstream of the shallow and deep aquifer monitor well pair SMW-2/DMW-2.

3.2.1 Groundwater Elevation and Flow

3.2.1.1 Monitoring Network Description

To track remedial action progress at the site, a network of piezometers and monitor wells[11] was installed by the U.S. Army Corp of Engineers between 1995 and 1998. This network initially included five 1-inch-diameter shallow aquifer piezometers (SP-1 to SP-5), five 1-inch-diameter deep aquifer piezometers (DP-1 to DP-5), five 2-inch-diameter shallow aquifer monitor wells (SMW-1 to SMW-5), and five deep aquifer monitor wells (DMW-1 to DMW-5). These monitor wells were installed to complement six existing shallow aquifer wells (MW-1A, MW-2A, MW-3A, MW-4, MW-5, and MW-6) and three deep aquifer wells (MW-1, MW-2, and MW-3) constructed during the 1992 RI. A fourth deep aquifer RI well, MW-7, installed north of Creosote Branch Creek, was destroyed when the area was cleared and regraded in 2002.

Based on EPA direction, the shallow aquifer monitoring network was expanded in March 2003 to add seven new piezometers (SP-6 to SP-12) and six new shallow aquifer monitor wells (SMW-6 to SMW-11). In April 2004, monitor wells SMW-12 and SMW-13 were installed on the north side of Creosote Branch Creek, and in August 2005, monitor wells SMW-14 and SMW-15 (Figure 3-3A) were installed on the south and north sides of Creosote Branch Creek, respectively, to provide expanded coverage along the creek.

3.2.1.2 Shallow Aquifer

Water level measurements collected during the April 2015 groundwater monitoring event were used to prepare a groundwater elevation contour and flow map. At the time of the water level measurements, the wellfield pumping rate was approximately 6.2 gpm.

The April 2015 (Figure 3-4) map shows a general south-to-north groundwater flow pattern, with elevations declining from approximately 110 feet amsl near the deep injection trench to approximately 100 feet amsl near the north recovery trench. The highest groundwater elevation occurs in the vicinity of the deep injection trench, at monitor well SMW-7.

Groundwater elevation depressions occur in the vicinity of the East Recovery Trench at sumps S-11 and S-12, and in the vicinity of the North Recovery Trench at sumps S-1, S-2, and S-3. As observed during previous semiannual groundwater monitoring events, groundwater flow patterns are influenced predominantly by the north and east recovery trenches with some mounding evident north of the injection trench in the vicinity of monitor well SMW-7.

3.2.1.3 Deep Aquifer

Water level measurements were also performed at deep aquifer monitor wells and piezometers during the April 2015 monitoring event to confirm groundwater flow patterns observed during previous monitoring events. Groundwater flow patterns in the deep aquifer are influenced by injection of treated water in the deep injection trench and pumping of water from the deep recovery trench, both of which lie about 12.5 feet and 4 feet, respectively, below the deep aquifer's top boundary (Figure 1-3).

During the April 2015 monitoring event, groundwater elevations in the deep aquifer monitor wells ranged from 103.59 (DMW-3) to 112.02 (MW-2) feet amsl. Contouring of the deep aquifer groundwater elevation data for the April 2015 (Figure 3-5) event shows a divergent flow pattern that extends out from an apparent groundwater elevation divide bisecting the Process Area DU. The divide may originate

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[11] The primary difference between piezometers and monitor wells, other than the diameter, is the screen length. Piezometers installed prior to March 2003 have 2-foot-long screens, and monitor wells have 10-foot-long screens. All piezometers and monitor wells that were installed beginning in March 2003 are 2 inches in diameter with 10-foot-long screen intervals.

at the deep injection trench or at the former firewater storage pond. This pond, which has no obvious source of recharge other than direct precipitation, is believed to have been excavated into the top of the Cockfield Formation (deep aquifer), which outcrops along the southern boundary of the site.

Groundwater elevations observed at wells DMW-1 and DMW-3 indicate that pumping from trench sumps S-01 and S-05 has a localized effect on deep aquifer groundwater flow patterns in this area. These two sumps draw water from portions of the trench that are screened at depths 4 to 5 feet higher than the DMW-1 and DMW-3 screen intervals. Monitor wells MW-2 and DMW-2, which are screened at depths more than 10 feet below the trench, show no apparent influence from recovery trench pumping.

3.2.1.4 Shallow Aquifer – Deep Aquifer Vertical Hydraulic Gradients

To assess the direction of vertical groundwater flow between the shallow and deep aquifers, groundwater elevations for several shallow-deep aquifer well pairs were used to calculate the direction and magnitude of the vertical hydraulic gradient between the two aquifers. The vertical gradient is important in determining if there is potential for downward dissolved-phase contaminant transport from the shallow to the deep aquifer. The vertical gradient is also important in assessing the transport of dissolved-phase contaminants present in treated water injected into the deep trench.

Comparison of groundwater elevations between the well pairs (Table 3-2) indicates an upward vertical gradient at 3 of the 8 well pairs. Water levels were not measured at the other five well pairs; therefore, the vertical hydraulic gradient could not be determined. During the April 2015 monitoring event, standing water surrounding several wells (MW-1, MW-1A, SMW-4, DMW-4, and SMW-5) prevented field staff from collecting water level measurements. Additionally, measurements were not performed at piezometers DP-1, SP-2, DP-2, SP-3, and DP-3 because they were covered with vegetation.

The presence of an upward gradient at well pairs MW-2A/MW-2 and MW-3A/MW-3 is consistent with previous observations. At well pair SP4/DP4 the vertical gradient has historically been downward. This well pair is located just east of the PLTS building and less likely to be influenced by pumping from the recovery trenches or wellfield interior. The upward vertical gradient observed at SP4/DP4 may be representative of the natural gradient present outside the zone of injection/pumping influence.

3.2.2 Shallow Aquifer Groundwater Quality

This section summarizes laboratory analysis results from testing of groundwater samples collected at shallow aquifer monitor wells and piezometers in April 2015. Groundwater samples were analyzed for SVOCs by EPA Houston Laboratory or a contract laboratory, using methods comparable to EPA methods SW8270C and SW8270C-SIMS.

The primary COCs identified in the ROD include PAHs, PCP, and benzene. PAHs and PCP are associated with residual wood-treating solutions released to soil and groundwater at the site. Benzene is attributed to the diesel used to dissolve PCP, and potentially the carrier oil used in creosote formulation.

3.2.2.1 Total PAH Results in BAP TEQ

The ROD specifies a total PAH remediation goal of 0.2 µg/L, expressed in BAP TEQ, for site groundwater. The BAP TEQ concentration corresponds to the summed concentration for the seven[12] carcinogenic PAH constituents, multiplied by their corresponding toxicity equivalency factor (TEF). The TEF accounts for varying degrees of toxicity exhibited by each compound. The TEFs used for this report (Table 3-3) are the same as used in the risk assessment update, completed under Task Order 0051, and represent the most current published values. In performing the calculation, a concentration of zero is used when a

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[12] Benzo(g,h,i)perylene is also identified as a carcinogenic PAH. However, because its TEF is zero, it is not included in the BAP equivalent determination.

carcinogenic PAH constituent is not detected in a sample. An example of a BAP TEQ calculation is shown in Table 3-4. The concentrations of individual PAH constituents used in the BAP TEQ calculation are presented in Table 3-5A.

The April 2015 groundwater sampling results showed the following:

- BAP TEQ concentrations above the 0.2 µg/L remediation goal were present at 8 of 29 monitor well locations, versus 7 of 29 wells sampled in 2014, and 7 of 29 wells sampled in 2013.
- The eight wells with BAP TEQ concentrations above the 0.2 µg/L remediation goal in 2015 included MW-4, MW-5, MW-6, SMW-2, SMW-9, SMW-11, SP-07, and SP-9 (Figure 3-6). Monitor wells MW-4, SMW-2, SP-07, and SP-9 are located at the far north (downgradient) end of the Process Area DU, in an area where the heaviest NAPL concentrations have been observed. Monitor wells MW-5, SMW-9, and SMW-11 are located in the central portion of the Process Area DU, opposite recovery wells R-5, R-16, and R-17. Monitor well MW-6 is located at the southern end of the Process Area DU, near the primary PCP source area. All eight wells lie within the recognized NAPL source area (Figure 3-6).
- The highest observed BAP TEQ concentration of 2,153 µg/L was present at MW-4. BAP TEQ concentrations observed at MW-4 in years past included 225 µg/L (2014) and 1,570 µg/L (2013). BAP TEQ concentrations detected at other well locations sampled in 2015 ranged from 0 to 1,452 µg/L. The highest observed BAP TEQ concentration reported in years past included 1,870 µg/L at SMW-02 in 2014, and 1,570 µg/L at MW-4 in 2013.
- BAP TEQ constituents were not detected at the three wells (SMW-12, SMW-13, and SMW-15) located on the north side of Creosote Branch Creek. This is the sixth consecutive year that BAP TEQ concentrations have remained below the remediation goal at all three locations. In the last 7 years, BAP TEQ concentrations above the 0.2 µg/L remediation goal have been detected at only one location, SMW-15, where a concentration of 0.3 µg/L was present in December 2009.

Many of the constituents represented in the BAP TEQ concentration are sparingly soluble in groundwater, with single component solubilities ranging from 0.0022 to 9.4 µg/L. Groundwater samples with BAP TEQ concentrations greater than 5 µg/L are presumed to indicate the presence of NAPL in the immediate vicinity of the well.

With the pumping strategy shift from NAPL recovery to hydraulic containment in October 2014, dissolved-phase PAH concentrations at monitor wells located within the interior portion of the Process Area DU may rise. The shutdown of the recovery wells in this area will result in a lower horizontal hydraulic gradient and greater contact times between groundwater and residual/pooled NAPL. This, in turn, could lead to higher dissolved-phase PAH concentrations. Additional discussion on the potential for BAP TEQ and total PAH concentration rebound within the interior portion of the Process Area DU is presented in Section 3.4.2.

3.2.2.2 Total PAH Results

A total PAH concentration was also calculated for the April 2015 sampling results, even though no remediation goal for this parameter is specified in the ROD. The total PAH concentration includes constituents, such as naphthalene and phenanthrene, which are not reflected in the BAP TEQ concentration, but were present in shallow aquifer groundwater at concentrations up to 35,000 µg/L (naphthalene) and 19,400 µg/L (phenanthrene) in 2015. The total PAH concentration corresponds to the summed concentration for the 16 PAH compounds listed in Table 3-4. PAH compounds that were not detected are included in the total PAH concentration at a value equal to one-half the reporting limit. The concentrations of individual PAH constituents used in the total PAH calculation, and the resulting total PAH concentration, are presented in Table 3-5A.

The April 2015 groundwater sampling results indicate the following:

- Total PAH concentrations ranged from 1.15 µg/L to 76,500 µg/L in 2015, versus 0.62 J µg/L to 95,800 J µg/L in 2014, and 0.85 µg/L to 74,800 µg/L in 2013. Over the past several years, the upper bound of the total PAH concentration range has risen steadily, from 14,900 µg/L in 2010 to 76,500 µg/L in 2015. This increase is consistent with a decline in wellfield pumping from a 6MA of 615,000 gallons in April 2010 to 265,000 gallons in December 2015. As the overall wellfield pumping rate has declined, dissolved-phase PAH concentrations in shallow aquifer groundwater have risen, a condition potentially attributed to a lower horizontal hydraulic gradient and greater groundwater-NAPL contact times.
- The highest total PAH concentration observed in 2015 was 76,500 µg/L, which occurred at MW-4. The highest observed total PAH concentrations observed in previous years was at 95,900 µg/L at SMW-9 in 2014 and 74,800 µg/L at MW-04 in 2013.
- Total PAH concentrations greater than 1,000 µg/L were present in samples taken from 10 of 29 monitor wells in 2015. These wells included MW-3A, MW-4, MW-5, MW-6, SMW-2, SMW-6, SMW-9, SMW-11, SP-9, and TP-1. All of these wells lie within or close to the NAPL source area boundary.
- A majority of the total PAH concentration is attributed to naphthalene and phenanthrene. At MW-04, where the highest total PAH concentration was detected, naphthalene accounted for 19 percent or 14,300 µg/L of the total PAH concentration and phenanthrene 25 percent or 19,400 µg/L of the total PAH concentration in the April 2015 sample.

In the groundwater samples collected from the three monitor wells (SMW-12, SMW-13, and SMW-15) located on the northern side of Creosote Branch Creek, total PAH concentrations ranged from 1.15 µg/L to 1.46 µg/L, which are similar to slightly higher than observed over the past 3 years. PAH occurrences in groundwater on the northern side of the creek may be attributed to leaching of low-level contaminated soil detected in Northern DU subsurface soil as described in the *Remedial Investigation Report Version 1.1* (CH2M, 2015a).

3.2.2.3 Pentachlorophenol Results

PCP was detected in 10 of the 26 samples collected in April 2015, at concentrations between 0.16 J µg/L and 5,960 µg/L (see Table 3-6 and Figure 3-7). The highest PCP concentration was present at MW-06. PCP concentrations greater than the 1 µg/L federal maximum contaminant level were present at monitor wells SMW7, SMW-9, SMW-11, SP-01, SP-11, MW-6, and MW-3A.

Except for SP-11, the remaining wells are located on the southern portion of the site, where PCP-NAPL is known to occur. Well SP-11 is located in the northeastern corner of the site, just downgradient of recovery trench sumps S-3 and S-4. A PCP concentration of 1.5 µg/L was detected at SP-11 in April 2015. PCP was detected at SP-11 at concentrations between 1.3 µg/L and 37 µg/L in samples collected in 2013 and 2014.

3.2.2.4 VOC Results

VOC testing is performed on selected samples collected during the October event. Because the October 2015 event was not performed, no VOC analysis results are available for 2015.

3.2.2.5 2015 Feasibility Study Contaminants of Concern

Based on the conclusions of an updated human health and ecological risk assessment, a feasibility study was prepared under Task Order 0051. The feasibility study developed an updated list of COCs and preliminary remediation goals (PRG). Many of these COCs are analyzed for in the semiannual groundwater samples, but the results are not compiled or evaluated because these constituents were not identified as COCs in the 1993 ROD or they are not significant contributors to overall site risk.

To assess the presence and distribution of the constituents identified as COCs in the feasibility study, the groundwater database was queried for these COCs and the information compiled for comparison to their respective PRG (Table 3-6.) It should be noted that there is some overlap between the information presented in Table 3-6 with that presented in Table 3-5A and Table 3-5B, so this discussion focuses only on those constituents not previously mentioned as follows:

- **1,1-biphenyl.** This constituent is present in many of the same wells where PAHs are detected. Concentrations detected in the April 2015 samples ranged from 8 µg/L to 1,170 µg/L, with the highest observed concentration detected at SMW-02. The concentration of 1,1-biphenyl detected at SMW-2 in 2015 was similar to the 1,370 µg/L detected in 2014 and higher than the 354 µg/L measured in 2013. Concentrations above the PRG of 14 µg/L were detected at 9 of 28 shallow aquifer well locations.
- **1-methylnaphthalene.** This constituent, which has a PRG of 2.1 µg/L was not reported by the laboratory.
- **2-methylnaphthalene.** This constituent is also present in many of the same wells where PAHs are detected. Concentrations detected in the April 2015 samples ranged from 2.5 µg/L to 6,770 µg/L, with the highest observed concentration detected at SMW-2. The concentration of 2-methylnaphthalene detected at SMW-2 in 2015 was similar to the 7,240 µg/L observed in 2014 and higher than the 2,590 µg/L measured in 2013. Concentrations above the PRG of 63 µg/L were detected at 8 of 28 shallow aquifer well locations.
- **3&4 – methylphenol.** This constituent is present in many of the same wells where PAHs are detected. Concentrations detected in the April 2015 samples ranged from 4.2 µg/L to 4,600 µg/L with the highest observed concentration detected at MW-6. Concentrations above the PRG of 272 µg/L, were detected at 2 of 28 shallow aquifer well locations.
- **Dibenzofuran.** This constituent is present in many of the same wells where PAHs are detected. Concentrations detected in the April 2015 samples ranged from 1.1 µg/L to 3,260 µg/L, with the highest observed concentration detected at SMW-02. Concentrations above the PRG of 94 µg/L were detected at 8 of 28 shallow aquifer well locations.

3.2.2.6 DNAPL Occurrence

DNAPL thickness and occurrence measurements were not performed at the monitor wells or recovery wells in 2015.

3.2.3 Deep Aquifer Groundwater Quality

Deep aquifer groundwater quality monitoring was performed at five locations in April 2015. Historically, sampling was performed at one well only (DMW-2). Beginning in 2009, the scope of the deep aquifer groundwater monitoring was expanded to determine if the injection of treated water, which may contain PAHs at concentrations above the PLTS creek discharge limits, into the deep injection trench affected deep aquifer groundwater quality.

BAP TEQ constituents were not detected during the April 2015 event (Table 3-7). BAP TEQ concentrations greater than the 0.2-µg/L remediation goal were not present at any of the five wells sampled in 2015.

Total PAH concentrations (Table 3-7B) in 2015 ranged from 1.39 µg/L to 10.6 µg/L, versus 0.79 µg/L to 3.54 µg/L in 2014, and less than 0.8 µg/L to 2.62 µg/L in 2013. The highest observed total PAH concentration of 10.7 µg/L occurred at DMW-2 and this concentration was the highest detected since routine monitoring was implemented in 2009. Naphthalene at 7.3 µg/L accounted for a majority of the total PAH concentration. PCP was not detected at DMW-2 (Table 3-6) above the 0.2 µg/L detection limit.

3.2.4 Creosote Branch Creek Surface Water

Surface water samples were collected at two stations, identified as SW-1 and SW-21. Station SW-1 is the upstream or background location while SW-21 is downstream opposite shallow aquifer and deep aquifer monitor well pair SMW-2/DMW-2. BAP TEQ constituents were not detected in the April 2015 samples (Table 3-8A) collected at both locations.

Total PAH concentrations ranged from less than 0.87 µg/L to 1.42 µg/L (Table 3-8B), with naphthalene (0.4 µg/L) and acenaphthene (0.16 µg/L) accounting for most of the total PAH concentration. The total PAH concentration present in the 2015 sample collected at the downstream location SW-21 was similar to the background concentration at SW-01 (Table 3-8B). The concentrations of all detected PAH constituent concentrations were less than their respective PLTS effluent limit.

PCP concentrations (Table 3-8B) in 2015 ranged from less than 0.20 µg/L to 0.66 µg/L, with the highest observed concentration detected at location SMW-21.

3.3 In Situ Bioremediation Performance

Nutrient and supplemental oxygen via hydrogen peroxide addition to the injection water was discontinued in early 2015. Previous monitoring and evaluation of oxygen injection rates against PAH oxygen demand has shown that the in situ bioremediation component of the remedy does not result in significant contaminant mass treatment relative to NAPL recovery and dissolved phase groundwater treatment. In general, in situ bioremediation results in less than 100 pounds per year of PAHs treated per year. Relative to the 9,600 pounds of contaminant mass recovered and treated by the PLTS in 2015, this amount accounts for less than 1 percent of the total.

3.4 Progress with Respect to ROD Remedial Goals

Remedial action performance monitoring indicates that the remedy continues to draw large amounts of contaminant mass from the subsurface with 9,600 pounds removed and treated in 2015.

As described in the RI report (CH2M, 2015a), DNAPL recovery rates are influenced by groundwater pumping rates and the volume of DNAPL remaining (Figure 3-8). With the shift to a hydraulic containment pumping strategy in October 2014, future DNAPL recovery rates are expected to decline and will be more incidental than by design.

3.4.1 Progress with Respect to Short-term Goals

Short-term remedial action goals established for the site are reflected in achievement of the PBCMs, with the primary metrics including PLTS run time, hydraulic containment of the dissolved-phase plume, and compliance with PLTS creek discharge effluent limits. Comparison of performance monitoring data with the PBCMs (Table 3-9) indicates increased progress over 2014, primarily because: pumping in hydraulic containment mode has increased PLTS uptime with the monthly average rising from 89.6 percent in 2014 to 94.7 percent in 2015. The hydraulic gradient PBCM was achieved for 10 of the 12 months; and the PLTS creek discharge effluent limits were achieved for all 12 months.

Much of the wellfield and PLTS equipment is at the end of or has surpassed its design life. Subsurface chemical and physical conditions at the site represent an especially harsh environment that exerts above-normal wear and tear on mechanical equipment. Maintaining uptime rates in 2016 and beyond will likely require the commitment of additional resources beyond what has been experienced historically. However, the shift to a hydraulic containment pumping strategy should reduce overall loading to the PLTS and result in improved treatment performance despite the loss of two of the four GAC vessels.

3.4.2 Progress with Respect to Long-term Goals

The primary long-term goals for the site are aligned with the remedial action objectives described in the ROD (EPA, 1993). They include:

- Prevent human exposure to contaminated groundwater at concentrations above health-based standards, and restore groundwater quality to allow for future beneficial use[13].
- Remove the threat of potential exposure to future residents through direct contact with contaminated surface soils, Tar Mat ash, and NAPLs.
- Reduce the potential for site contaminants to migrate into surface water or groundwater.

Remedial action objectives are being achieved through a combination of engineering controls and active measures designed to prevent exposure and reduce contaminant concentrations in groundwater. Engineering controls include maintenance of a protective soil cover (over areas of known contamination), perimeter fencing, and electronic surveillance to prevent unauthorized access to the Process Area DU, where the highest levels of contamination are present. Active measures include O&M of an in situ bioremediation and fluids recovery system that is continually reducing the toxicity, mobility, and volume of contaminants present at the site, while preventing or reducing contaminant entry to Creosote Branch Creek.

As shown on Figure 3-9A, assessing remedial action progress relative to the 0.2-µg/L BAP TEQ remediation goal at individual monitor wells is difficult because concentrations are variable, especially in the NAPL source area. When viewed in aggregate, BAP TEQ concentrations at the interior monitor well group are trending upward, with the four-event moving average concentration rising from 2.5 µg/L to 66.6 µg/L between October 2012 and April 2015. Much of this increase can be attributed to BAP TEQ concentrations at well SMW-9, which steadily increased from 3 µg/L in 2012 to 850 µg/L in 2014, and declining to 41.9 µg/L in 2015. BAP TEQ concentrations increased at MW-4 from 225 µg/L in 2014 to 2,153 µg/L in 2015.

The total PAH concentration for the interior monitor well group also increased from 2,811 µg/L to 9,921 µg/L between October 2012 and April 2015. In terms of the number of monitor wells with BAP TEQ concentrations declining below the ROD standard, and the magnitude of BAP TEQ and total PAH concentration reductions achieved, the 2015 monitoring results are consistent with what would be expected from a hydraulic containment pumping strategy.

At perimeter monitor wells (Figure 3-9B), BAP TEQ concentration trends are also variable, but do not show the same range of variability as the interior well locations. The four-event moving average BAP TEQ and total PAH concentrations in the perimeter monitor well group continued to trend upward in 2015 with the aggregate BAP TEQ rising from 113 µg/L to 186 µg/L between October 2014 and April 2015 and the total PAH concentration rising from 7,700 µg/L to 10,700 µg/L during this same period.

With respect to restoring groundwater to allow for future beneficial use, this objective has been achieved within a large portion of the Process Area DU. However, as the mass of easily recoverable NAPL is depleted, efforts to promote more aggressive flushing and enhanced solubilization of residual (less recoverable) NAPL will be required. Given the extensive distribution and characteristics of the NAPL present, achievement of the 0.2 µg/L BAP TEQ remediation goal throughout the shallow aquifer is not expected to be technically practicable with the current remedy.

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[13] The ROD identifies a future drinking water beneficial use for shallow groundwater, because deep groundwater may be impacted by saltwater intrusion.

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SECTION 4

Conclusions and Recommendations

Based on accomplishments that have been observed this past year, along with evaluation of remedial action progress with respect to short- and long-term goals, CH2M recommends that Year 2016 operations remain focused on maintaining the inward hydraulic gradient on the north and east margins of the dissolved-phase plume. Efforts at aggressive NAPL recovery have been discontinued, such that routine O&M costs can be minimized, until a new remedy is selected and implemented for the site.

4.1 Wellfield Operations

The primary objectives for wellfield operation in 2016 include the following:

- Maintain hydraulic containment of the shallow aquifer dissolved-phase plume through continuous operation of recovery trench sumps S-1 to S-5, and S-11 and S-12, and recovery wells R-8, R-19, R-20, and R-21 (11 wells/trench sumps total). Weekly water level measurements indicate that an inward hydraulic gradient is achieved when the wellfield pumping rate is greater than 5.5 gpm (240,000 gallons per month).
- Continue to reinject all treated effluent to the shallow and deep aquifers because of recent PLTS performance.

4.2 PLTS Operations

The wellfield flow reduction and lower total PAH concentrations present in the influent enabled the PLTS effluent limits consistently in 2015 with an annual average uptime of 94.7 percent. However, with only one usable GAC vessel available, the ability to consistently achieve the PLTS effluent limits while maintaining a high level of uptime will become more challenging. Additionally, failure of the fourth vessel is likely imminent. Therefore, replacement of the GAC vessels in 2016 should proceed.

4.3 Subsurface Monitoring Program

The groundwater monitoring program was updated in 2013 and 2015 (to include reporting of 1-methylnaphthalene) and no modifications are recommended for 2016. Additionally, one round of sampling for PAH natural attenuation parameters will be performed at 13 monitor well locations during the April 2016 semiannual event. The natural attenuation parameters include: nitrate, sulfate, methane, alkalinity, dissolved iron and dissolved manganese.

CH2M will consider the April 2016 monitoring events as a rebound test that might provide an indication of the dissolved-phase concentrations that would persist in the absence of remedial action.

4.4 Five-Year Review Action Items

Two of the nine five-year review action items have been addressed. The remaining action items will be addressed through a future CERCLA decision document, which is anticipated to be prepared in 2016.

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SECTION 5

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Tables

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Table ES-1. Status of Fourth Five-Year Review Action Items

American Creosote Works, Winnfield, Louisiana

Issue	Affects Current Protectiveness?	Affects Future Protectiveness?	Status
The ROD did not identify PCP, ethylbenzene or toluene as groundwater COCs. Those contaminants are consistently detected in shallow groundwater samples above their respective MCLs.	No	Yes	*The Feasibility Study Version 1.1 for the American Creosote Works Site* (CH2M, 2016) has developed preliminary remedial goals for each identified contaminant of concern. Final cleanup levels for COCs in groundwater will be defined in a future CERCLA groundwater decision document.
Groundwater use restrictions are not in place to restrict shallow groundwater use in areas where groundwater contaminants exceed MCLs.	No	Yes	Groundwater use restrictions will be a component of the selected alternative to be implemented in a future CERCLA groundwater decision document.
The current remedy is not effectively addressing remaining site contamination and much of the well field and PLTS equipment is nearing the end of its design life or has surpassed it.	No	Yes	*The Feasibility Study Version 1.1 for the American Creosote Works Site* (CH2M, 2015) developed and evaluated an array of source control remedial action alternatives. A preferred remedial action alternative that addresses NAPL will be implemented in a CERCLA source control decision document. Groundwater will be addressed in a separate CERCLA groundwater decision document.
The 2014 remedial investigation findings verify the presence of site-related soil contaminant concentrations greater than EPA's acceptable risk range located outside the previously established site boundary	No	Yes	The preferred remedial action alternative to be implemented under the CERCLA source control decision document includes elements that address site-related contamination present outside areas with engineering controls.
Land use controls are not in place to prevent digging or disruption of the capped areas covering contaminated subsurface soil at the Process Area, Non-Process Area or Tar Mat DUs.	No	Yes	The preferred remedial action alternative to be implemented under the CERCLA source control decision document includes elements to treat all soil contamination exceeding the upper bound of the CERCLA risk range.
A screening level vapor intrusion evaluation identified unacceptable human health risks associated with future residential and industrial indoor land use. In addition, current exposure to onsite workers in the PLTS and PLTS support buildings have not been addressed.	Yes	Yes	The *Risk Assessment Version 1.1 for American Creosote Works* (CH2M, 2015) determined that vapor intrusion risk did not exceed the upper bound of the CERCLA risk range.
Under a residential scenario, soils outside of the previously-established site boundary (within the DU areas) are contaminated with 2,3,7,8-TCDD TEQ and BAP TEQ that could pose an unacceptable human health cancer risk and noncancer hazard.	Yes	Yes	The preferred remedial action alternative to be implemented under the CERCLA source control decision document includes elements to restrict future site use to industrial and to treat all dioxin contaminated soil exceeding the industrial land used based cleanup level.
Under an industrial land use scenario, soils that are not capped at the Process and Non-Process DUs are contaminated with 2,3,7,8-TCDD TEQ and BAP TEQ that could pose an unacceptable human health cancer risk and noncancer hazard	Yes	Yes	The preferred remedial action alternative to be implemented under the CERCLA source control decision document includes elements to treat all dioxin contaminated soil exceeding the industrial land used based cleanup level.
Site-related soil COCs are posing risks for both lower and upper level trophic receptors at the Process Area and Non-Process Area DUs. In addition, site-related COCs in Creosote Branch Creek surface water and sediment are posing risks to ecological receptors.	Yes	Yes	The *Risk Assessment Version 1.1 for American Creosote Works* (CH2M, 2015) did not identify risk exceeding ecological thresholds in the Process Area, Non-Process Area, and Creek DUs. Remedial actions to be implemented under the CERCLA source control decision document will address ecological risk exceeding the defined thresholds in the Northern DU.

Notes:

BAP TEQ = benzo(a)pyrene toxicity equivalents
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC = contaminant of concern
DU = decision unit
MCL = maximum contaminant level
NAPL = nonaqueous phase liquid
PCP = pentachlorophenol
PLTS = process liquid treatment system
ROD = record of decision
TCDD = tetrachlordibenozo-p-dioxin
TEQ = toxicity equivalents

Table 1-1. Horizontal Groundwater Flow Velocities - Non Pumping Conditions

American Creosote Works, Winnfield, Louisiana

Well	Hydraulic Conductivity[a]		Horizontal Gradient	Effective Porosity		Estimated Well Yield[b]
Number	gal/day*ft^2	ft/day	(ft/ft)	(dimensionless)	Velocity (ft/yr)	(gpm/ft drawdown)
Shallow Aquifer – 1991 Remedial Investigation/Feasibility Study						
MW-2A	0.3	0.03	0.007	0.3	0.3	Not estimated
MW-8	1.9	0.25	0.007	0.3	2.1	
MW-3A	4.0	0.53	0.007	0.3	4.5	
Shallow Aquifer - 1993 Remedial Design						
EXT10	1.2	0.2	0.007	0.3	1.7	0.008
EXT10	6.7	0.9	0.007	0.3	7.7	0.04
Shallow Aquifer - 2008 Subsurface Soil Investigation [c]						
MW-1A	1.3	0.18		Not Calculated[d]		Not estimated
MW-8	1.3	0.17				
SMW-4	0.2	0.027				
Deep Aquifer – 1991 Remedial Investigation/Feasibility Study						
MW-3	0.3	0.03	0.01	0.3	0.4	Not estimated
MW-7	3.5	0.47	0.01	0.3	5.7	
Deep Aquifer - 1993 Remedial Design						
EXT13	1.2	0.03	0.01	0.3	0.4	Not estimated
EXT13	11.5	1.5	0.01	0.3	18.3	
Deep Aquifer - 2008 Subsurface Soil Investigation [c]						
MW-1A	0.2	0.025		Not Calculated[d]		Not estimated
DM-2	0.6	0.081				
DM-4	0.7	0.089				

Notes:

[a] Reference: Draft Design Analysis for draft 90 percent design submittal (CDM, 1993)

[b] Q = Ts/1500 (Appendix 16.D, Groundwater and Wells, Driscoll, 1986)

Where Q = estimated pumping rate (gpm)

T = hydraulic conductivity (gals/day*ft^2)*10 ft (saturated thickness in feet)

s = unit drawdown of 1 foot

[c] Values presented are average for slug/bail tests conducted at each well

[d] Horizontal gradient and groundwater flow velocity not calculated because aquifer influenced by fluids extraction and/or injection activities

gal/day*ft^2 = gallons per day per square foot

ft/day = feet per day

ft/ft = feet/foot

ft/yr = feet per year

gpm/t = gallons per minute per foot

Table 1-2. Recovered Creosote (NAPL) Characteristics

American Creosote Works, Winnfield, Louisiana

Constituent	1996 NAPL Concentration (mg/kg)	2012 NAPL Concentration (mg/kg)	Maximum Observed Concentration in Site Groundwater (µg/L)											
			2006-Wells	2007-Wells	2008-Wells	2009-Wells	2009-Influent	2010-Wells	2011-Influent	2011-Wells	2012-Wells	2013-Wells	2014-Wells	2015-Wells
Low Molecular Weight Polycyclic Aromatic Hydrocarbons														
Acenaphthene	21,000	21,700	85,600	62,300	1,800	3,850	8,201	675	13,600	1,220	865	5,460	11,000	6,320
Acenaphthylene	970	1,340	4,800 U	3,140	280	206	395	99	1,680	281	103	313	963 U	334
Anthracene	5,400	8,580	32,500	18,600	1,100	1,080	2,820	107	5,140	657	181	2,810	4,310	2,650
Fluoranthene	22,000	28,700	113,000	85,700	4,500	6,620	9,830	569	16,800	1,500	598	9,430	13,100	10,600
Fluorene	14,000	21,600	87,700	69,900	2,200	3,180	9,520	573	13,600	1,980	601	5,590	11,200	6,710
Naphthalene	70,000	87,600	290,000	304,000	23,000	18,400	30,800	12,600	32,200	21,800	12,300	19,800	41,000	35,000
Phenanthrene	57,000	64,800	214,000	176,000	7,900	9,550	19,400	768	37,700	4,260	1,190	18,100	29,400	19,400
Pyrene	15,000	18,500	55,900	54,300	2,700	7,670	4,360	391	9,660	1,190	473	5,790	13,900	6,480
High Molecular Weight - Carcinogenic Polycyclic Aromatic Hydrocarbons														
Benzo (a) Anthracene	3,900	5,340	20,500	18,500	900	1,300	1,740	88.4	3,120	507	103	1,890	2,430	2,400
Benzo (a) Pyrene	420	2,450	11,800	9,880	430 LJ	575 J	748	48.8	1,550	353	69	1,200	1,450 J	1,450
Benzo (b) Fluoranthene	2,300	3,650	13,700	11,300	660	665 J	1.05	60.8	1,840	313	60	1,230	1,910 J	1,440
Benzo (ghi) Perylene	510	686	5,400 U	2,670	190 LJ	142	254	17.4	531 J	167	50 U	432	1,090	523
Benzo (k) Fluoranthene	1,300	1,720	8,920 J	8,010	250 LJ	610 J	440	36.1	744 J	221	50 U	915	963 U	1,120
Chrysene	3,800	5,230	19,500	15,400	760	1,440	1,470	80.5	2,340	440	95	1,800	2,330 J	2,020
Dibenzo (a,h) Anthracene	260	225	5,800 U	1,090	60 LJ	62 J	79.7	7.3	318 J	100 U	50 U	400	963 U	256
Indeno (123-cd) Pyrene	490	876	5,000 U	3,070	180 LJ	127 J	253	17.1	649 J	151	50 U	445	1,050	494
Others														
Bis (2-ethylhexyl) Phthalate	100	1,900	Not Tracked	Not Tracked	Not Tracked	Not Tracked	100 U	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	963 U	Not Tracked
2-Methylnaphthalene	14,000	22,800	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	10,800	Not Tracked	Not Tracked	Not Tracked	11,900	1,970
Benzene	Not Measured	33 U	362	330	327	271	20 U	496	Not Tested	430	620	458 J	398 J	Not Tracked
Dibenzofuran	11,000	16,000	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	8,410	3,260
Pentachlorophenol	1,100	219	285	360	110 J	144	500 U	184	761 U	115	87.3 J	286	4,880	5,960
Metals														
Arsenic	2.9	2	Not Monitored	Not Monitored	Not Monitored	Not Monitored	2.9 B	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Aluminum	28.7	16.7 J	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Calcium	571	64.2 J	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Chromium	1.6	1.1	Not Monitored	Not Monitored	Not Monitored	Not Monitored	1.9 U	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Copper	6.3	6	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Iron	1,700	744	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Lead	1.4	0.4 J	Not Monitored	Not Monitored	Not Monitored	Not Monitored	2.6 B	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Manganese	17	2.6	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
pH	8.0 Standard Units	Not Analyzed	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked	Not Tracked
Selenium	0.77	0.52 J	Not Monitored	Not Monitored	Not Monitored	Not Monitored	3.2 U	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Vanadium	6.8	7.1	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Zinc	39.3	37.7	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Ignitability	Negative	Not Analyzed	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Reactivity	None	Not Analyzed	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Specific Gravity	1.0 – 1.2 (1.03[a])	1.07	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
BTU/lb	8,000 – 12,000	Not Analyzed	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored
Flash Point	> 200 °F	Not Analyzed	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored	Not Monitored

Notes:

[a] Recovered oil testing performed in November 2007 revealed a specific gravity of 1.03.

\> = greater than

µg/L = micrograms per liter

°F = degrees Fahrenheit

B = Indicates analyte found in associated method blank.

BTU/lb = British thermal unit per pound

J = The analyte was positively identified; the result is estimated

L = reported concentration biased low

NAPL = nonaqueous phase liquid

U = The analyte was analyzed for, but not detected.

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Table 1-3. Site Remediation Goals

American Creosote Works, Winnfield, Louisiana

Constituent	Soil (µg/kg) Surface (0-2 ft)	Soil (µg/kg) Subsurface (> 2 ft)	Groundwater (µg/L)
2,3,7,8-TCDD[a]	< 10 (1)	NA	NA
PAHs[b]	3,000	3,000	0.2
Pentachlorophenol	50,000	50,000	1[c]
Benzene	Not Specified	Not Specified	5

Notes:

[a] The remediation goal for surface soil containing 2,3,7,8-TCDD requires that 12 inches of clean soil be maintained over areas with 2,3,7,8 TCDD concentrations between 1 and 10 µg/kg.

[b] The remediation goal for PAHs is based on a total PAH concentration expressed in benzo(a)pyrene toxicity equivalents.

[c] Although a remediation standard for pentachlorophenol in groundwater was not specified in the 1992 Record of Decision (EPA, 1992), it is assumed a concentration of 1 µg/L (equal to the Federal Maximum Contaminant Level) is required to allow for future drinking water use.

< = less than
> = greater than
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
ft = feet
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
TCDD = tetrachlordibenozo-p-dioxin

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Table 1-4. Estimated Biosolids and Backwash Water Generation Volumes

American Creosote Works, Winnfield, Louisiana

Process Stream	Event Frequency	Volume per Event (gallon)	Annual Volume (gallon)	Solids Concentration (mg/L)	Annual Mass (pounds)
Waste Activated Sludge (2010)	Bi-monthly	2,500	15,000	50,000 (5 percent)	6,300 (dry weight)
Waste Activated Sludge (2012)				2550 (0.25 percent)	320 (wet weight)
Backwash Water					
- PLTS Sand Filter	1-2 per week	1 x 1000	50,000 - 100,000	1,100	460
- GAC Filter	1-2 per week	4 x 750	160,000 - 320,000	100	130
- Injection Sand Filter	2 per week	1 x 750	80,000	100	65

Notes:
GAC = granular activated carbon
mg/L = milligram(s) per liter
PTLS = process liquid treatment system

Table 2-1. Annual Operations Summary

American Creosote Works, Winnfield, Louisiana

Year Ending	Total Fluids Extracted (Gallons)	NAPL Recovered (Gallons)	NAPL Sludge Recovered (Pounds)	Well Groups Operated	Mass Removed (pounds)		
					Dissolved Phase	NAPL	Total
12/31/1996	1,361,627	55	0	All	567[a]	496[b]	1,062
12/31/1997	6,492,439	7,170	0	All	2,703[a]	64,599[b]	67,302
12/31/1998	5,300,351	12,296	0	All	2,207[a]	110,782[b]	112,989
12/31/1999	4,645,998	17,646	0	All	1,934[a]	158,984[b]	160,918
12/31/2000	3,777,980	12,240	0	All	1,573[a]	110,278[b]	111,851
12/31/2001	4,569,607	17,371	0	Phase I	1,903[a]	156,510[b]	158,413
12/31/2002	6,151,447	20,232	0	Phase II/Phase I	2,561[a]	182,280[b]	184,841
12/31/2003	6,183,188	22,374	0	Phase I – Modified	2,574[a]	201,578[b]	204,152
12/31/2004	6,009,036	21,353	0	Phase I – Modified	2,502[a]	192,388[b]	194,890
12/31/2005	6,642,697	22,824	0	Phase I – Modified	2,766[a]	205,632[b]	208,398
12/31/2006	7,670,902	19,764	0	Phase I – Modified	3,194[a]	178,063[b]	181,257
12/31/2007	7,455,330	6,047	0	Phase I – Modified	5,587[c]	51,966[d]	57,553
12/31/2008	4,341,566	3,918	0	All	3,254[c]	33,663[d]	36,917
12/31/2009	5,746,688	7,297	0	All	4,307[c]	62,700[d]	67,007
12/31/2010	5,078,842	5,292	0	NAPL and Low Conc.	3,806[c]	45,471[d]	49,277
12/31/2011	3,518,864	396	0	NAPL and Low Conc.	2,637	3,403	6,040
12/31/2012	2,756,043	4,752	0	NAPL and Low Conc.	1,246	42,397	43,643
12/31/2013	2,060,705	1,865	0	NAPL and Low Conc.	932	16,638	17,569
12/31/2014	2,884,564	763	22,717[e]	NAPL/Low Conc. Hydraulic Containment	1,304	6,809	8,113
12/31/2015	3,065,034	1000[f]	0	Low Conc. Hydraulic Containment	1,386	8,240	9,626
Totals	**95,712,908**	**203,655**	**22,717**		**48,943**	**1,836,056**	**1,881,818**

Notes:

[a] Based on an influent total Volatile Organic Compound + Semivolatile Organic Compound dissolved concentration of 50 mg/L.

[b] Based on oil specific gravity of 1.08. Historical testing has shown a range of 1.0 to 1.2.

[c] Based on influent total Volatile Organic Compound + Semivolatile Volatile Organic Compound concentration of 90 mg/L measured in March 2010.

[d] Based on oil specific gravity of 1.03 measured in November 2007.

[e] Mass of NAPL present in sludge is not included in the Total Mass Removed

[f] 1000 gallons of NAPL pumped from NAPL Concentrator Tank during a cleanout

Conc. = concentration

mg/L = milligram(s) per liter

Table 2-2. PLTS Final Effluent Semivolatile Organic Compound Analysis Results for 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Chemical Group	Parameter	CAS_NO	Units	Effluent Limt	12/28/2015		9/29/2015		6/23/2015		3/23/2015		12/16/2014		9/17/2014		6/25/2014		6/5/2014		4/14/2014		4/2/2014		3/6/2014		2/5/2014		12/17/2013		11/26/2013		9/25/2013		6/27/2013		3/27/2013	
SVOC	1,2,4-Trichlorobenzene	120-82-1	µg/L	794	1.5	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	--		1.1	U	4.3	U	1.3	U	5.2	U
SVOC	1,2-Dichlorobenzene	95-50-1	µg/L	794	1.6	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.4	U	1.5	U	6.2	U
SVOC	1,2-Diphenylhydrazine	122-66-7	µg/L	100	1.5	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	--		1.4	U	1.3	U	1.4	U	1.3	U	1.3	U	1.4	U	5.4	U	1.2	U	4.6	U
SVOC	1,3-Dichlorobenzene	541-73-1	µg/L	380	1.6	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.4	U	1.4	U	6.2	U
SVOC	1,4-Dichlorobenzene	106-46-7	µg/L	380	1.5	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.4	U	1.3	U	5.1	U
SVOC	2,4,5-Trichlorophenol	95-95-4	µg/L	NS	--		--		--		--		--		--		--		1.0	U	1.0	U	1.0	U	--		1.0	U	--		0.99	U	--		2.1	=	--	
SVOC	2,4,6-Trichlorophenol	88-06-2	µg/L	100	1.5	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.5	U	1.4	U	5.8	U
SVOC	2,4-Dichlorophenol	120-83-2	µg/L	100	1.6	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.5	U	2.6	=	4.8	U
SVOC	2,4-Dimethylphenol	105-67-9	µg/L	36	1.9	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	**979**	**=**	**181**	**=**	**720**	**=**
SVOC	2,4-Dinitrophenol	51-28-5	µg/L	123	1.4	U	10	U	10	U	11	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10.0	U	10	U	40	U	10	U	40	U
SVOC	2,4-Dinitrotoluene	121-14-2	µg/L	100	1.5	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	4.1	U	2	U	7.9	U
SVOC	2,6-Dinitrotoluene	606-20-2	µg/L	100	1.6	U	1	U	1	U	1.1	U	1.0	U	1.0	U	1.0	U	1.0	U	1.1	U	1.0	U	1.0	U	1.0	U	1.0	U	1	U	4.1	U	1.4	U	5.7	U
SVOC	2-Chloronaphthalene	91-58-7	µg/L	NS	1.9	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	5.3	U	1.4	U	5.5	U
SVOC	2-Chlorophenol	95-57-8	µg/L	100	1.5	U	0.97	U	0.97	U	1	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.98	U	3.9	U	1.2	U	4.7	U
SVOC	2-Nitrophenol	88-75-5	µg/L	1231	1.6	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.2	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.5	U	1.2	U	4.8	U
SVOC	3,3'-Dichlorobenzidine	91-94-1	µg/L	100	1.1	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	5.3	U	2	U	8.0	U
SVOC	4,6-Dinitro-2-Methylphenol	534-52-1	µg/L	NS	--		--		--		--		5.6	U	5.6	U	5.6	U	5.6	U	5.8	U	5.6	U	5.7	U	5.6	U	--		--		--		--		--	
SVOC	4-Bromophenyl phenyl ether	101-55-3	µg/L	NS	1.6	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	4.8	U	1.4	U	5.5	U
SVOC	4-Chloro-3-methylphenol	59-50-7	µg/L	NS	--		--		--		--		--		--		--		1.2	U	1.2	U	1.2	U	--		1.2	U	--		1.2	U	--		1.2	U	--	
SVOC	4-Chloroaniline	106-47-8	µg/L	NS	--		--		--		--		--		--		--		1.1	U	1.1	U	1.1	U	--		1.1	U	--		1.1	U	--		1.3	U	--	
SVOC	4-Chlorophenyl phenyl ether	7005-72-3	µg/L	100	1.7	U	1.3	U	1.3	U	1.4	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	5.1	U	1.6	U	6.3	U
SVOC	4-Nitrophenol	100-02-7	µg/L	576	1.3	U	7.2	U	7.2	U	7.6	U	7.2	U	7.2	U	7.2	U	7.2	U	7.5	U	7.2	U	7.3	U	7.2	U	7.2	U	7.3	U	29	U	7.2	U	29	U
SVOC	Acenaphthene	83-32-9	µg/L	47	1.6	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.3	U	1.2	U	1.3	J	1.2	U	1.2	U	1.2	U	**658**	**=**	**97.3**	**=**	**246**	**=**
SVOC	Acenaphthylene	208-96-8	µg/L	47	1.7	U	1.2	U	1.2	U	2.5	=	1.4	J	1.2	U	18.4	=	23.0	=	1.3	J	3.2	J	1.2	U	1.2	U	4.0	=	1.2	U	28.6	=	8.9	=	12.7	=
SVOC	Anthracene	120-12-7	µg/L	47	1.3	U	1.4	U	1.4	U	2	=	1.4	U	1.4	U	11.3	=	11.5	=	2.0	J	1.6	J	1.4	U	1.4	U	1.5	=	1.4	U	**251**	**=**	**53.1**	**=**	41	=
SVOC	Benzidine	92-87-5	µg/L	100	7.4	U	9.9	U	9.9	U	10	U	9.9	U	9.9	U	9.9	U	--		10.0	U	9.9	U	10.0	U	9.9	U	9.9	U	10	U	40	U	6.4	U	26	U
SVOC	Benzo (a) Anthracene	56-55-3	µg/L	47	1.1	U	1.5	U	1.5	U	1.9	=	1.5	U	1.5	U	4.1	J	9.6	=	1.6	U	1.8	J	1.5	U	1.5	U	3.6	=	1.5	U	**218**	**=**	**60.6**	**=**	17.4	=
SVOC	Benzo (a) Pyrene	50-32-8	µg/L	48	5	=	1.4	U	1.4	U	6.3	=	3.5	J	1.5	J	17.8	=	**91.8**	**=**	4.5	J	12.0	=	1.4	U	1.4	U	21.4	=	1.4	U	**107**	**=**	39.6	=	8.0	=
SVOC	Benzo (b) Fluoranthene	205-99-2	µg/L	100	5.3	=	1.2	U	1.2	U	7.6	=	3.7	J	1.5	J	37.2	=	**105.0**	**=**	5.8	=	16.0	=	1.2	U	1.2	U	29.8	=	1.2	U	**161**	**=**	54.7	=	10.9	=
SVOC	Benzo (g,h,i) Perylene	191-24-2	µg/L	100	4.3	=	1.5	U	1.5	U	3.5	=	2.9	J	1.5	U	38.0	=	69.6	=	2.0	J	5.6	=	1.5	U	1.5	U	7.9	=	1.5	U	43.2	=	15.5	=	8	U
SVOC	Benzo (k) Fluoranthene	207-08-9	µg/L	47	1.1	U	1.5	U	1.5	U	2.6	=	1.5	U	1.5	U	8.8	=	23.6	=	1.8	J	4.3	J	1.6	U	1.5	U	11.0	=	1.6	U	**58.9**	**=**	23.5	=	8	U
SVOC	Bis(2-chloroethoxy)methane	111-91-1	µg/L	NS	1.7	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	4.7	U	1.2	U	4.9	U
SVOC	Bis(2-Chloroethyl)Ether	111-44-4	µg/L	100	1.8	U	0.96	U	0.96	U	1	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.97	U	3.8	U	1.6	U	6.5	U
SVOC	Bis(2-chloroisopropyl)ether	108-60-1	µg/L	794	1.8	U	0.91	U	0.91	U	0.95	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.9	U	0.92	U	3.8	U	1.5	U	6.3	U
SVOC	Bis(2-Ethylhexyl)phthalate	117-81-7	µg/L	258		U	1.5	U	1.5	U	1.6	U	1.5	U	1.5	U	1.5	U	3.3	J	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	5.9	U	5.8	=	7.2	U
SVOC	Butyl benzyl phthalate	85-68-7	µg/L	NS	1.2	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	0.89	U	5.1	U	1.6	U	6.3	U
SVOC	Chrysene	218-01-9	µg/L	47	1.2	U	1.6	U	1.6	U	1.7	U	1.6	U	1.6	U	11.8	=	26.1	=	3.4	J	6.6	=	1.6	U	1.6	U	9.5	=	1.6	U	**211**	**=**	**62.2**	**=**	16.9	=
SVOC	Di-n-Butylphthalate	84-74-2	µg/L	43	4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	4.8	J	1.4	U	1.4	U	1.4	U	5.4	U	1.7	U	6.8	U
SVOC	Di-n-Octylphthalate	117-84-0	µg/L	100	4	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	5.9	U	1.5	U	6.0	U
SVOC	Dibenzo(a,h)anthracene	53-70-3	µg/L	100	4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	8.1	=	15.6	=	1.4	U	1.4	U	1.4	U	1.4	U	2.0	=	1.4	U	11.3	J	3.7	=	7.6	U
SVOC	Diethylphthalate	84-66-2	µg/L	113	4.3	U	1.4	U	1.4	U	1.5	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	5.6	U	1.5	U	6.1	U
SVOC	Dimethyl phthalate	131-11-3	µg/L	47	4.3	U	1.4	U	1.4	U	1.5	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	5.6	U	1.5	U	5.9	U
SVOC	Fluoranthene	206-44-0	µg/L	54	1.3	U	1.4	U	1.4	U	2.3	=	1.4	U	1.4	U	3.3	J	7.5	=	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	**1070**	**=**	**285**	**=**	**104**	**=**
SVOC	Fluorene	86-73-7	µg/L	47	1.6	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.3	U	1.2	U	1.3	U	1.2	U	1.2	U	1.3	U	**611**	**=**	**55.6**	**=**	**177**	**=**
SVOC	Hexachlorobenzene	118-74-1	µg/L	NS	--		--		--		--		--		--		--		1.6	U	1.6	U	1.6	U	--		1.6	U	--		1.6	U	--		1.2	U	--	
SVOC	Hexachlorobutadiene	87-68-3	µg/L	NS	--		--		--		--		--		--		--		1.2	U	1.3	U	1.2	U	--		1.2	U	--		1.2	U	--		1.5	U	--	
SVOC	Hexachlorocyclopentadiene	77-47-4	µg/L	100	1.1	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	4.9	U	2.4	U	9.7	U
SVOC	Hexachloroethane	67-72-1	µg/L	794	1.9	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U	5.1	U	1.2	U	4.8	U
SVOC	Indeno (1,2,3-cd) pyrene	193-39-5	µg/L	100	4.6	=	1.1	U	1.1	U	4.1	=	3.3	J	1.1	J	40.4	=	81.8	=	2.3	J	6.4	=	1.1	U	1.1	U	9.6	=	1.1	U	50.1	=	17.2	=	6.6	U
SVOC	Isophorone	78-59-1	µg/L	NS	1.8	U	1.2	U	1.2	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	4.8	U	1.2	U	4.7	U
SVOC	N-Nitrosodi-n-propylamine	621-64-7	µg/L	100	1.8	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	4.4	U	1.7	U	6.6	U
SVOC	N-Nitrosodimethylamine	62-75-9	µg/L	NS	1.3	U	1	U	1	U	1.1	U	1.0	U	1.0	U	1.0	U	--		1.1	U	1.0	U	1.1	U	1.0	U	1.0	U	1.1	U	4.2	U	1	U	4.2	U
SVOC	N-Nitrosodiphenylamine	86-30-6	µg/L	100	2.6	U	1.4	U	1.4	U	1.5	U	1.4	U	1.4	U	1.4	U	1.4	U	1.5	U	1.4	U	1.4	U	1.4	U	1.4	U	1.4	U	5.7	U	1.1	U	4.4	U
SVOC	Naphthalene	91-20-3	µg/L	47	1.6	U	1	0	1	U	1.1	U	1.0	U	1.0	U	1.0	U	1.0	U	1.1	U	1.0	U	9.1	=	1.0	U	1.0	U	3.3		4.2	U	2.1	=	22.6	=
SVOC	Nitrobenzene	98-95-3	µg/L	6402	1.7	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	4.6	U	1.2	U	4.6	U
SVOC	Pentachlorophenol	87-86-5	µg/L	100	1	U	10	U	10	U	11	U	10.0	U	13.7	J	37.1	=	86.4	=	**154.0**	**=**	69.1	=	10.0	U	10.0	U	10.0	U	10	U	69.8	J	17.5	=	**261**	**=**

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Table 2-2. PLTS Final Effluent Semivolatile Organic Compound Analysis Results for 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Chemical Group	Parameter	CAS_NO	Units	Effluent Limt	12/28/2015		9/29/2015		6/23/2015		3/23/2015		12/16/2014		9/17/2014		6/25/2014		6/5/2014		4/14/2014		4/2/2014		3/6/2014		2/5/2014		12/17/2013		11/26/2013		9/25/2013		6/27/2013		3/27/2013	
SVOC	Phenanthrene	85-01-8	µg/L	47	1.4	U	1.5	U	1.5	U	1.6	U	1.5	U	1.5	U	1.5	U	1.5	J	1.6	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	**1860**	**=**	**288**	**=**	**259**	**=**
SVOC	Phenol	108-95-2	µg/L	26	1.2	U	1.5	U	1.5	U	1.6	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U	--		1.5	U	**48.9**	=
SVOC	Pyrene	129-00-0	µg/L	48	1.2	U	1.4	U	1.4	U	1.7	=	1.4	U	1.4	U	18.0	=	6.2	=	1.5	U	1.4	U	1.5	U	1.4	U	1.4	U	1.5	U	**768**	**=**	**186**	**=**	**65.6**	**=**
SVOC	Phenols - total	108-95-2	µg/L	26	20	J	34	J	35	J	16	U	16	U	16	U	16	UJ	--		--		--		16	U	--		57	=	NT		**1900**	**=**	--		**1900**	**=**

Notes:

***Sample collected at an increased flow rate of 12 gpm. Once it was determined that the effluent could not be met at that level, the flow rate was return to 8 gpm.

Bold font show constituents detected above PLTS effluent limit.

-- not reported

= analyte detected

CAS = Chemical Abstracts Service

gpm = gallons per minute

J = The analyte was positively identified; the result is estimated.

µg/L = microgram per liter

NS = not specified

NT = not tested

PLTS = process liquid treatment system

SVOC = semivolatile organic compound

U = The analyte was analyzed for, but not detected.

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Table 2-3. PLTS Final Effluent Volatile Organic Compound Analysis Results for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Parameter	Benzene		Ethylbenzene		Toluene		Xylenes, Total	
Units	µg/L		µg/L		µg/L		µg/L	
Effluent Limt	134		380		74		Not Specified	
12/28/2015	0.47	U	0.46	U	0.49	U	1.2	U
9/29/2015	0.34	U	0.34	U	0.33	U	0.87	U
6/23/2015	0.34	U	0.34	U	0.33	U	0.87	U
3/23/2015	0.34	U	0.34	U	0.33	U	0.87	U
12/16/2014	0.34	U	0.32	U	0.33	U	0.87	U
9/17/2014	0.34	U	0.32	U	0.33	U	0.87	U
6/25/2014	0.34	U	0.32	U	0.33	U	0.87	U
3/6/2014	0.34	U	0.32	U	0.33	U	0.87	U
9/25/2013	1	=	0.83	=	1.6	=	6.2	=
6/27/2013	NT		NT		NT		NT	
3/27/2013	1.6	=	1.3	=	2.7	=	8.2	=

Notes:

= constituent detected

µg/L = microgram per liter

J = The analyte was positively identified; the result is estimated

NT = not tested

U = The analyte was analyzed for, but not detected

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Table 2-4. PLTS Final Effluent General Chemistry Analysis Results for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Chemical Group	Parameter	CAS_No.	Units	Effluent Limits	12/28/2015		9/29/2015		6/23/2015		3/23/2015		12/16/2014		9/17/2014		6/25/2014		3/6/2014	
Conventional	Ammonia	7664-41-7	mg/L	NS	NT		NT		NS		NT		0.01	U	0.15	=	2.6	=	0.7	=
Conventional	Biochemical Oxygen Demand (BOD5)	BOD5	mg/L	20	1	U	1	U	1	U	2.2	=	1	U	4.8	=	6	U	1	U
Conventional	Chemical Oxygen Demand	COD	mg/L	70	19.5	J	7.8	J	14.7	J	19.1	J	34	=	21.6	=	**84.6**	**=**	9.9	J
Conventional	Laboratory Free Chlorine	LFC	mg/L	NS	NT		NT		NT		NT		NT		NT		NT		NT	
Conventional	Nitrate-Nitrogen	NO3N	mg/L	Report	0.41	J	0.5		0.4	J	0.55	=	743	=	15	=	45.8	J	0.65	=
Conventional	Nitrogen, Ammonia (as N)	NH3N	mg/L	Report	0.01	U	0.01	U	0.01	U	0.01	U	NT		NT		NT		NT	
Conventional	pH (Laboratory)	PH	SU	6.0 to 8.5	8	=	7.95		7.53		7.54		8.06	J	7.9	=	7.12	J	7.66	J
Conventional	Phosphorus (as Phosphate)	7723-14-0	mg/L	NS	NT		NT		NT		NT		NT		NT		NT		NT	
Conventional	Phosphorus, Ortho-Phosphate	PORTHO	mg/L	Report	0.14	=	0.4		0.25		0.21	=	0.36	=	0.49	=	0.19	=	0.75	=
Conventional	Specific Conductance (Laboratory)	COND	µmhos/cm	Report	911	=	954		820		842	=	1050	=	915	=	1460	=	730	=
Conventional	Total Dissolved Solids	TDS	mg/L	2000	585	=	539		595		526	=	819	=	481	=	1110	=	352	=
Conventional	Total Organic Carbon	TOC	mg/L	Report	3.5		3.7		7.5		7.2	=	3.4	=	7.1	=	12.5	=	1.9	=
Conventional	Total Suspended Solids	TSS	mg/L	45	2.4	=	3.1		1	U	4	=	4.7	=	6.3	=	26	=	1	U
Conventional	Turbidity	TURB	NTU	50	3.2	=	5.9		0.97	J	6.6	=	18.5	=	3.7	=	44.7	=	1.1	=
METAL	Arsenic	7440-38-2	mg/L[a]	50	0.0024	U	0.0024	U	0.0026	U	0.0026	U	0.0027	U	0.0026	U	0.0077	U	0.0045	U
METAL	Chromium	7440-47-3	mg/L	500	0.00096	U	0.00096	U	0.00049	J	0.00042	J	0.00045	J	0.00036	U	0.0021	J	0.00036	U
METAL	Zinc	7440-66-6	mg/L	150	0.0211	=	0.0208		0.0075	J	0.0133	J	0.0093	J	0.0103	J	0.0492	=	0.0098	J
Hydrocarbon	Oil and Grease	OILGREASE	mg/L	15	0.83	U	0.83	U	0.59	U	0.53	U	0.48	U	0.53	U	2.4	=	0.53	U

Notes:

[a] units are mg/L for post August 2011 samples and µg/L for all samples collected in Aug 2011 and earlier.

Bold faced values show constituents detected above PLTS effluent limit

= constituent detected

B = blank contamination

CAS = chemical abstracts number

µmhos/cm = microohms per centimeter

J = The analyte was positively identified; the result is estimated

mg/L = milligram per liter

NS = not specified

NT = no testing required

NTU = nephelometric turbidity units

pH = A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

The pH scale commonly in use ranges from 0 to 14.

SU = standard units

U = The analyte was analyzed for, but not detected

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Table 2-4. PLTS Final Effluent General Chemistry Analysis Results for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Chemical Group	Parameter	CAS_No.	Units	Effluent Limits	12/17/2013		9/25/2013		6/27/2013		3/27/2013	
Conventional	Ammonia	7664-41-7	mg/L	NS	NT		0.01	U	NT		NT	
Conventional	Biochemical Oxygen Demand (BOD5)	BOD5	mg/L	20	11.3		**29.3**		NT		**36.2**	
Conventional	Chemical Oxygen Demand	COD	mg/L	70	**88.8**	**=**	**201**	=	NT		**105**	**=**
Conventional	Laboratory Free Chlorine	LFC	mg/L	NS	NT	=	NT	=	NT		NT	
Conventional	Nitrate-Nitrogen	NO3N	mg/L	Report	12.9	=	0.26	U	NT		0.56	=
Conventional	Nitrogen, Ammonia (as N)	NH3N	mg/L	Report	27.7	=	NT	=	NT		0.16	=
Conventional	pH (Laboratory)	PH	SU	6.0 to 8.5	7.68	=	7.43	=	NT		7.73	=
Conventional	Phosphorus (as Phosphate)	7723-14-0	mg/L	NS	NT	=	NT	=	NT		NT	=
Conventional	Phosphorus, Ortho-Phosphate	PORTHO	mg/L	Report	0.1	U	0.015	J	NT		0.04	=
Conventional	Specific Conductance (Laboratory)	COND	µmhos/cm	Report	1430	=	658	=	NT		1780	=
Conventional	Total Dissolved Solids	TDS	mg/L	2000	782	=	425	=	NT		1160	=
Conventional	Total Organic Carbon	TOC	mg/L	Report	13.9	=	28.5	=	NT		34.8	=
Conventional	Total Suspended Solids	TSS	mg/L	45	26	=	26	=	NT		11.3	=
Conventional	Turbidity	TURB	NTU	50	**189**	**=**	**58.5**	=	NT		13.6	=
METAL	Arsenic	7440-38-2	mg/L[a]	50	0.0013	J	0.0028	J	NT		0.0026	J
METAL	Chromium	7440-47-3	mg/L	500	0.0075	J	0.0011	J	NT		0.00081	J
METAL	Zinc	7440-66-6	mg/L	150	0.014	J	0.0311	=	NT		0.007	J
Hydrocarbon	Oil and Grease	OILGREASE	mg/L	15	0.53	U	9.9	=	NT		3.3	=

Notes:

[a] units are mg/L for post August 2011 samples and µg/L for all samples collected in Aug 2011 and earlier.

Bold faced values show constituents detected above PLTS effluent limit

= constituent detected

B = blank contamination

CAS = chemical abstracts number

µmhos/cm = microohms per centimeter

J = The analyte was positively identified; the result is estimated

mg/L = milligram per liter

NS = not specified

NT = no testing required

NTU = nephelometric turbidity units

pH = A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

The pH scale commonly in use ranges from 0 to 14.

SU = standard units

U = The analyte was analyzed for, but not detected

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Table 3-1. Year 2015 Groundwater Monitoring Schedule

American Creosote Works, Winnfield, Louisiana

		April		
Well Identification	**Semiannual Water Level**	**SW8270 SVOC**	**SW8270-SIMS PAH**	**SW8270-SIM PCP**
Shallow Aquifer Monitor Wells				
MW-1A		Not Sampled		
MW-2A	X	X	X	X
MW-3A	X	X		X
MW-4	X	X		
MW-5	X	X		
MW-6	X	X		X
MW-8	X	X		X
SMW-1	X	X	X	X
SMW-2	X	X		X
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	X
SMW-11	X	X		X
SMW-12	X	X	X	X
SMW-13	X	X	X	X
SMW-14	X	X	X	X
SMW-15	X	X	X	X
TP-01	X	X		X
Shallow Aquifer Piezometers				
SP1	X	X		X
SP2		Not Sampled		
SP3		Not Sampled		
SP4	X	X	X	X
SP5	X	X	X	X
SP6	X			
SP7	X	X		X
SP8	X	X		X
SP9	X	X		X
SP10	X	X		X
SP11	X	X		X
SP12	X	X	X	X

Table 3-1. Year 2015 Groundwater Monitoring Schedule

American Creosote Works, Winnfield, Louisiana

		April		
Well Identification	**Semiannual Water Level**	**SW8270 SVOC**	**SW8270-SIMS PAH**	**SW8270-SIM PCP**
Shallow Aquifer Monitor Wells				
White Tube		Not sampled		
PZ-8		Not sampled		
MW0B-11		Not sampled		
Deep Aquifer Monitor Wells				
MW-1		Not sampled		
MW-2	X	X	X	
MW-3	X	X	X	
DMW-1	X	X	X	
DMW-2	X	X	X	X
DMW-3	X	X	X	
DMW-4		Not sampled		
Deep Aquifer Piezometers				
DP1		Not sampled		
DP2		Not sampled		
DP3		Not sampled		
DP4	X			
DP5		Not sampled		
Surface Water				
SW-1			X	X
SW-21			X	X
QA/QC Samples				
Equipment Blank (one per event if non-dedicated bailers used)				
Travel Blank (one per event)				
MS/MSD (3 per event)		X, X, X		
Field Duplicate (four per event)		X, X	X	X
Total	**38**	**34**	**24**	**34**

Notes:
MS/MSD = matrix spike/matrix spike duplicate
PAH = polycyclic aromatic hydrocarbon
PCP = pentachlorophenol
QA/QC = quality assurance/quality control
SIMS = selective ion monitoring
SVOC = semivolitale organic compond
VOC = volatile organic compound

Table 3-2. Shallow – Deep Aquifer Groundwater Elevation and Vertical Gradient Comparison

American Creosote Works, Winnfield, Louisiana

Well		Mid-Point Screen Depth (ft)	Groundwater Elevation (ft)									
Shallow	**Deep**		**Jun-10**	**Oct-10**	**Apr-11**	**Oct-11**	**Apr-12**	**Oct-12**	**Apr-13**	**Nov-13**	**Apr-14**	**Oct-14**
MW-1A		19	117.39	116.5	116.07	116.73	117.54	116.35	117.43	NM	NM	NM
	MW-1	52.5	120.63	119.72	119.01	116.92	120.37	119.32	120.25	NM	NM	NM
MW-2A		14	98.25	94.41	96.59	99.87	103.83	101.45	104.7	102.12	104.11	98.22
	MW-2	57.5	110.69	108.4	108.07	110.28	111.14	109.68	111.55	110.9	111.8	109.95
MW-3A		12.5	109.7	106.84	105.16	105.56	108.25	105.44	106.45	104.8	108.05	107.34
	MW-3	57.5	110.5	108.41	107.55	110.01	110.9	110.48	111.34	109.95	111.62	109.99
SP-1		17	106.1	NM	NM	NM	107.41	104.03	106.7	107.86	NM	107.9
	DP-1	66	110.69	108.71	107.97	109.95	110.91	109.35	111.11	108.51	110.2	NM
SP-2		16	NM	104.21	NM	NM	NM	NM	NM	NM	NM	NM
	DP-2	35.5	NM	105.72	NM	NM	NM	NM	NM	NM	NM	NM
SP-3		16	111	NM	107.46	NM	110.43	NM	109.84	108.6	NM	107.5
	DP-3	51	NM	NM	NM	NM	111.84	NM	108.21	NM	112.09	NM
SP-4		16	109.22	106.19	108.83	110.49	110.69	108.54	109.73	110.09	110.89	107.49
	DP-4	39.4	103.86	NM	NM	103.25	NM	NM	106.43	101.95	107.15	NM
SP-5		16	99.8	96.57	95.7	99.02	100.93	97.42	102.92	98.86	103.71	97.92
	DP-5	54	NM	106.89	106.08	NM	110.69	107.35	110.75	NM	NM	NM

Well		Mid-Point Screen Depth (ft)	Vertical Gradient (ft/ft) (+) Down or (-) Up									
Shallow	**Deep**		**Jun-10**	**Oct-10**	**Apr-11**	**Oct-11**	**Apr-12**	**Oct-12**	**Apr-13**	**Nov-13**	**Apr-14**	**Oct-14**
MW-1A		19	-0.10	-0.10	-0.09	-0.01	-0.08	-0.09	-0.08	NC	NC	NC
	MW-1	52.5										
MW-2A		14	-0.29	-0.32	-0.26	-0.24	-0.17	-0.19	-0.16	-0.20	-0.18	-0.27
	MW-2	57.5										
MW-3A		12.5	-0.02	-0.03	-0.05	-0.10	-0.06	-0.11	-0.11	-0.11	-0.08	-0.06
	MW-3	57.5										
SP-1		17	-0.09	NC	NC	NC	-0.07	-0.11	-0.09	-0.01	NC	NC
	DP-1	66										
SP-2		16	NC	-0.08	NC	NC	NC	NC	NC	NC	NC	NC
	DP-2	35.5										

Table 3-2. Shallow – Deep Aquifer Groundwater Elevation and Vertical Gradient Comparison

American Creosote Works, Winnfield, Louisiana

Well		Mid-Point Screen Depth (ft)	Groundwater Elevation (ft)									
Shallow	Deep		Jun-10	Oct-10	Apr-11	Oct-11	Apr-12	Oct-12	Apr-13	Nov-13	Apr-14	Oct-14
SP-3		16	NC	NC	NC	NC	-0.04	NC	0.05	NC	NC	NC
	DP-3	51										
SP-4		16	0.23	NC	NC	0.31	NC	NC	0.14	0.35	0.16	NC
	DP-4	39.4										
SP-5		16	NC	-0.27	-0.27	NC	-0.07	-0.11	-0.21	NC	NC	NC
	DP-5	54										

Notes:

A negative sign indicates an upward vertical gradient and a positive sign a downward vertical gradient.

ft = feet

NC = not calculated

NM = not measured

Table 3-3. TEFs used for 1992 Baseline Risk Assessment, 2011 Risk Assessment Update, and Year 2015 Annual Report

American Creosote Works, Winnfield, Louisiana

	Baseline Risk Assessment TEF				
Carcinogenic PAH	Region VI Interim Policy[a]	Table 4-4[b]	Updated Risk Assessment TEF [c]	Year 2015 Annual Report TEF [d]	Factor of Change
Benzo(a)Pyrene	1	1	1	1	-
Dibenzo(a,h)Anthracene	1	1	1	1	-
Benzo(a)Anthracene	0.1	0.01	0.1	0.1	10
Benzo(b)Fluoranthene	0.1	1	0.1	0.1	-10
Benzo(g,h,i)Perylene	0	0.01	0	0	-100
Benzo(k)Fluoranthene	0.1	0.01	0.01	0.01	-
Chrysene	0.01	0.01	0.001	0.001	-10
Indeno(1,2,3-cd)Pyrene	0.1	0.01	0.1	0.1	10

Notes:

[a] From page 7-3 of RI/FS Report (CDM, 1992) per Region VI Interim Policy.

[b] From Table 4-4, page 4-43 of ACW Risk Assessment (CDM, 1992)

[c] Risk Assessment Version 1.1 American Creosote Works Feasibility Study Winnfield, Louisiana, 2013

[d] From Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (EPA,1993)

PAH = polycyclic aromatic hydrocarbon

TEF = toxicity equivalent factor

Table 3-4. PAH Compounds and Example Total PAH and BAP TEQ Concentration Calculation

American Creosote Works, Winnfield, Louisiana

Compound[a]	TEF	Concentration (µg/L)	TEF * Conc.	Compound	TEF	Concentration (µg/L)	TEF * Conc.
Acenaphthene	0	10	0	Chrysene	0.001	100	0.1
Acenaphthylene	0	10	0	Dibenzo(a,h)anthracene	1	5 U	0
Anthracene	0	10	0	Fluoranthene	0	10	0
Benzo(a)Anthracene	0.1	20	2	Fluorene	0	10	0
Benzo(a)Pyrene	1	50	50	Indeno(1,2,3-cd)Pyrene	0.1	40	4
Benzo(b)Fluoranthene	0.1	20	2	Naphthalene	0	10	0
Benzo(g,h,i)Perylene	0	10	0	Phenanthrene	0	10	0
Benzo(k)Fluoranthene (a)	0.01	5 U	0	Pyrene	0	10	0
	Subtotal Total PAH (µg/L)	**132.5**			**Subtotal Total PAH (µg/L)**	**192.5**	
		Subtotal PAH in BAP TEQ (µg/L)	**54**			**Subtotal BAP TEQ (µg/L)**	**4.1**
					Total PAH	**325 (µg/L)**	
					Total PAH in BAP TEQ	**58.1 (µg/L)**	

Notes:

[a] Two other recognized PAH compounds benzo(c)pyrene and benzo(j)fluoranthene were not analyzed.

Shaded cells identify carcinogenic PAH compounds.

Compounds with nondetect (U qualifier) results are assigned a concentration of zero for the BAP TEQ calculation.

BAP = benzo(a)pyrene

U = not detected

µg/L = microgram per liter

PAH = polycyclic aromatic hydrocarbon

SIMS = selective ion monitoring

TEF = toxicity equivalent factor

TEQ = toxicity equivalent quotient

* = multiplication symbol

Table 3-5A. Shallow Aquifer Groundwater PAH Concentrations in BAP TEQ for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) Anthracene		Indeno (1,2,3-cd) Pyrene		BAP TEQ	
		Remedial Goal	µg/L															**0.2**	
MW-02A	MW2A-1504	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-02A	MW2A-1410	07-Oct-14	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0	U
MW-02A	MW2A-1404	14-Apr-14	µg/L	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0	U
MW-02A	MW2A-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	UJ	0.1	U	0.1	U	0.1	U	0	U
MW-02A	MW2A-1304	15-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-03A	MW3A-1504	15-Apr-15	µg/L	10	U	1	U	10	U	10	U	10	U	10	U	10	U	0	U
MW-03A	MW3A-1504-FD	15-Apr-15	µg/L	10	U	1	U	10	U	10	U	10	U	10	U	10	U	0	U
MW-03A	MW3A-1410	09-Oct-14	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
MW-03A	MW3A-1410-FD	09-Oct-14	µg/L	2.1	U	0.2	=	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	**0.2**	=
MW-03A	MW3A-1410-HS	09-Oct-14	µg/L	2	U	0.3	=	2	U	2	U	2	U	2	U	2	U	**0.3**	=
MW-03A	MW3A-1404	15-Apr-14	µg/L	4	U	0.4	U	4	U	4	U	4	U	4	U	4	U	0	U
MW-03A	MW3A-1404-FD	15-Apr-14	µg/L	4	U	0.4	U	4	U	4	U	4	U	4	U	4	U	0	U
MW-03A	MW3A-1304	15-Apr-13	µg/L	10	U	1	U	10	U	10	U	10	U	10	U	10	U	0	U
MW-04	MW4-1504	16-Apr-15	µg/L	2400	=	1450	=	1440	=	1120	=	2020	=	256	=	494	=	**2153**	=
MW-04	MW4-1404	16-Apr-14	µg/L	275	=	170	=	185	=	143	=	248	=	40	U	68.7	=	**225**	=
MW-04	MW4-1304	15-Apr-13	µg/L	1890	=	1200	=	1230	=	915	=	1800	=	400	U	445	=	**1570**	**=**
MW-05	MW5-1504	16-Apr-15	µg/L	40	U	8.8	=	40	U	40	U	40	U	40	U	40	U	**8.8**	=
MW-05	MW5-1404	16-Apr-14	µg/L	40	U	4	U	40	U	40	U	40	U	40	U	40	U	0	U
MW-05	MW5-1304	15-Apr-13	µg/L	25.4	=	14	=	20	U	20	U	24.9	=	20	U	20	U	**16.6**	**=**
MW-06	MW6-1504	15-Apr-15	µg/L	549	=	195	=	224	=	151	=	497	=	40	U	48.3	=	**279**	=
MW-06	MW6-1404	16-Apr-14	µg/L	151	=	50	=	51.4	=	49.9	=	135	=	40	U	40	U	**70.9**	=
MW-06	MW6-1304	17-Apr-13	µg/L	85.6	=	15.8	=	20	U	20	U	20	U	20	U	20	U	**24.4**	**=**
MW-08	MW8-1504	14-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
MW-08	MW8-1404	14-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
MW-08	MW8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1504	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1504-FD	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1410	08-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1410-FD	08-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1404	15-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1404-FD	15-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-01	SMW1-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-02	SMW2-1504	15-Apr-15	µg/L	1450	=	992	=	755	=	699	=	1290	=	195	=	360	=	**1452**	**=**
SMW-02	SMW2-1410	07-Oct-14	µg/L	2080	J	1450	J	1520	J	955	J	1860	J	200	UJ	484	J	**1870**	**J**
SMW-02	SMW2-1404	14-Apr-14	µg/L	21.2	=	16.4	=	20	U	20	U	20	U	20	U	20	U	**18.5**	=
SMW-02	SMW2-1311	12-Nov-13	µg/L	372	=	260	=	234	=	193	=	338	=	43.2	=	95.3	=	**376**	**=**
SMW-02	SMW2-1304	15-Apr-13	µg/L	20	U	9.8	=	20	U	20	U	20	U	20	U	20	U	**9.8**	**=**
SMW-03	SMW3-1504	16-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-03	SMW3-1410	08-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-03	SMW3-1404	16-Apr-14	µg/L	0.1	U	0.1	U	0.034	LJ	0.1	U	0.037	LJ	0.1	U	0.1	U	0.00344	LJ

Table 3-5A. Shallow Aquifer Groundwater PAH Concentrations in BAP TEQ for 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) Anthracene		Indeno (1,2,3-cd) Pyrene		BAP TEQ	
SMW-03	SMW3-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-03	SMW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-06	SMW6-1504	16-Apr-15	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U
SMW-06	SMW6	17-Apr-14	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U
SMW-06	SMW6-1304	16-Apr-13	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U
SMW-07	SMW7-1504	15-Apr-15	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SMW-07	SMW7-1404	15-Apr-14	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SMW-07	SMW7-1304	16-Apr-13	µg/L	0.24	=	0.1	U	0.1	U	0.1	U	0.18	=	0.1	U	0.1	U	0.0242	=
SMW-08	SMW8-1504	14-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SMW-08	SMW8-1404	17-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SMW-08	SMW8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-09	SMW9-1504	16-Apr-15	µg/L	86.8	=	33.1	=	40	U	40	U	70.4	=	40	U	40	U	**41.9**	**=**
SMW-09	SMW9-1410	07-Oct-14	µg/L	1780	J	589	J	759	J	541	J	1600	J	200	UJ	200	UJ	**850**	**J**
SMW-09	SMW9-1311	12-Nov-13	µg/L	291	=	102	=	112	=	104	=	273	=	100	U	100	U	**144**	**=**
SMW-09	SMW9-1304	16-Apr-13	µg/L	61.4	=	20.7	=	21.3	=	26.9	=	53.7	=	20	U	20	U	**29.3**	**=**
SMW-10	SMW10-1504	15-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SMW-10	SMW10-1404	16-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SMW-10	SMW10-1304	16-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-11	SMW11-1504	15-Apr-15	µg/L	10	U	2.7	=	10	U	10	U	10	U	10	U	10	U	**2.7**	=
SMW-11	SMW11-1504-FD	15-Apr-15	µg/L	20	U	3.4	=	20	U	20	U	20	U	20	U	20	U	**3.4**	=
SMW-11	SMW11-1410	08-Oct-14	µg/L	10	U	2.2	=	10	U	10	U	10	U	10	U	10	U	**2.2**	=
SMW-11	SMW11-1404	15-Apr-14	µg/L	8	U	1.7	=	8	U	8	U	8	U	8	U	8	U	**1.7**	=
SMW-11	SMW11-1404-FD	15-Apr-14	µg/L	8	U	1.2	=	8	U	8	U	8	U	8	U	8	U	**1.2**	=
SMW-11	SMW11-1311	12-Nov-13	µg/L	4	U	1.4	=	4	U	4	U	4	U	4	U	4	U	**1.4**	**=**
SMW-11	SMW11-1304	15-Apr-13	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U
SMW-12	SMW12-1504	13-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-12	SMW12-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-12	SMW12-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-13	SMW13-1504	13-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-13	SMW-13-1410	22-Oct-14	µg/L	0.024	U	0.029	U	0.029	J	0.043	U	0.033	U	0.031	U	0.023	U	0.0029	J
SMW-13	SMW13-1410	09-Oct-14	µg/L	0.1	UJv	0.1	UJv	0.1	UJv	0.1	UJv	0.1	UJv	0.1	UJv	0.1	UJv	0.000	UJv
SMW-13	SMW13-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.000	U
SMW-13	SMW13-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-14	SMW14-1504	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-14	SMW14-1404	14-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-14	SMW14-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.000	U
SMW-15	SMW15-1504	13-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-15	SMW15-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SMW-15	SMW15-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.000	U
SP-01	SP1-1504	15-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SP-01	SP1-1504-FD	15-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SP-01	SP1-1404	17-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U

Table 3-5A. Shallow Aquifer Groundwater PAH Concentrations in BAP TEQ for 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) Anthracene		Indeno (1,2,3-cd) Pyrene		BAP TEQ	
SP-01	SP1-1404-FD	17-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SP-01	SP1-1304	16-Apr-13	µg/L	0.53	=	0.1	U	0.31	=	0.2	=	0.43	=	0.1	U	0.14	=	0.1	=
SP-04	SP4-1504	16-Apr-15	µg/L	0.076	LJ	0.1	U	0.084	LJ	0.059	LJ	0.078	LJ	0.1	U	0.1	U	0.017	LJ
SP-04	SP4-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.037	LJ	0.1	U	0.1	U	0.000037	LJ
SP-04	SP4-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-05	SP5-1504	16-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-05	SP5-1404	16-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-05	SP5-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-07	SP7-1504	14-Apr-15	µg/L	2.1	U	0.3	=	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	**0.3**	=
SP-07	SP7-1410	08-Oct-14	µg/L	2	U	0.3	=	2	U	2	U	2	U	2	U	2	U	**0.3**	=
SP-07	SP7-1410-HS	08-Oct-14	µg/L	7.5	=	11.3	=	9.1	=	7	=	7.3	=	2.1	U	4.4	=	**13.5**	=
SP-07	SP7-1404	15-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SP-07	SP7-1311	12-Nov-13	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SP-07	SP7-1304	17-Apr-13	µg/L	0.15	=	0.1	U	0.1	U	0.1	U	0.11	=	0.1	U	0.1	U	0.02	=
SP-08	SP8-1504	14-Apr-15	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SP-08	SP8-1410	07-Oct-14	µg/L	2	UJ	0.2	UJ	2	UJ	2	UJ	2	UJ	2	UJ	2	UJ	0	UJ
SP-08	SP8-1404	15-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SP-08	SP8-1311	13-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-08	SP8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-09	SP9-1504	14-Apr-15	µg/L	20	U	2.9	=	20	U	20	U	20	U	20	U	20	U	**2.9**	=
SP-09	SP9-1410	08-Oct-14	µg/L	10	U	1.8	=	10	U	10	U	10	U	10	U	10	U	**1.8**	=
SP-09	SP9-1404	14-Apr-14	µg/L	8	U	3.9	=	8	U	8	U	8	U	8	U	8	U	**3.9**	=
SP-09	SP9-1311	12-Nov-13	µg/L	4.4	=	2.7	=	4.2	=	4	U	4.5	=	4	U	4	U	**3.56**	**=**
SP-09	SP9-1304	15-Apr-13	µg/L	10	U	2.7	=	10	U	10	U	10	U	10	U	10	U	**2.7**	**=**
SP-10	SP10-1504	14-Apr-15	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SP-10	SP10-1410	08-Oct-14	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SP-10	SP10-1410-HS	08-Oct-14	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SP-10	SP10-1404	16-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SP-10	SP10-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-10	SP10-1304	16-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-11	SP11-1504	14-Apr-15	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SP-11	SP11-1410	08-Oct-14	µg/L	2	U	0.2	U	2	U	2	U	2	U	2	U	2	U	0	U
SP-11	SP11-1410-FD	08-Oct-14	µg/L	2.1	U	0.2	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	0	U
SP-11	SP11-1404	16-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	0	U
SP-11	SP11-1311	12-Nov-13	µg/L	0.18	=	0.1	U	0.1	U	0.1	U	0.16	=	0.1	U	0.1	U	0.0182	=
SP-11	SP11-1304	16-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-12	SP12-1504	16-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-12	SP12-1410	09-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-12	SP12-1404	16-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-12	SP12-1311	13-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SP-12	SP12-1304	16-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
TP-01	TP01-1504	14-Apr-15	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U

Table 3-5A. Shallow Aquifer Groundwater PAH Concentrations in BAP TEQ for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) Anthracene		Indeno (1,2,3-cd) Pyrene		BAP TEQ	
TP-01	TP01-1404	14-Apr-14	µg/L	8	U	0.8	U	8	U	8	U	8	U	8	U	8	U	0	U
TP-01	TP01-1304	15-Apr-13	µg/L	20	U	2	U	20	U	20	U	20	U	20	U	20	U	0	U

Notes:

µg/L = microgram per liter

= - analyte detected

BaP = benzo(a)pyrene

HS = hydrasleeve sample

J = The analyte was positively identified; the result is estimated.

L = The analyte was positively identified, but the associated numerical value may be biased low.

TEF = toxicity equivalent factor

U = The analyte was analyzed for, but not detected.

Table 3-5B. Shallow Aquifer Groundwater Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
MW-02A	MW2A-1504	17-Apr-15	µg/L	150	=	2.2	=	8.8	=	0.1	U	0.37	=	55	=	73	=	15	Jv	0.21	=	305	Jv
MW-02A	MW2A-1410	07-Oct-14	µg/L	120	=	2.5	=	6.7	=	0.5	U	0.5	U	39	=	240	=	2.2	=	0.5	U	413	=
MW-02A	MW2A-1404	14-Apr-14	µg/L	130	=	1.4	=	3.1	LJ	0.2	U	0.65	=	48	=	54	=	19	=	0.28	=	257	=
MW-02A	MW2A-1311	12-Nov-13	µg/L	25	=	0.23	J	0.19	=	0.1	U	0.19	=	7.5	=	0.51	J	0.44	=	0.11	J	34.6	=
MW-02A	MW2A-1304	15-Apr-13	µg/L	42	=	0.46	=	0.61	=	0.1	U	0.29	=	14	=	5.3	=	2.1	=	0.14	=	65.3	=
MW-03A	MW3A-1504	15-Apr-15	µg/L	198	=	6.6	=	9	=	10	U	5.2	=	95.2	=	2440	=	69.1	=	3.1	=	2862	=
MW-03A	MW3A-1504-FD	15-Apr-15	µg/L	210	=	7.1	=	9	=	10	U	4.8	=	101	=	2420	=	74.9	=	2.7	=	2865	=
MW-03A	MW3A-1410	09-Oct-14	µg/L	187	=	6.6	=	10.3	=	2.1	U	9.3	=	105	=	1210	=	81.9	=	5.1	=	1620	=
MW-03A	MW3A-1410-FD	09-Oct-14	µg/L	178	=	6.3	=	9.6	=	2.1	U	9.3	=	98.4	=	1220	=	75.7	=	4.4	=	1610	=
MW-03A	MW3A-1410-HS	09-Oct-14	µg/L	30.7	=	1.3	=	5.2	=	2	U	8.5	=	18.2	=	192	=	16	=	5.6	=	285	=
MW-03A	MW3A-1404	15-Apr-14	µg/L	142	=	3.4	=	6.2	=	4	U	3.2	=	70	=	1370	=	53.5	=	1.8	=	1660	=
MW-03A	MW3A-1404-FD	15-Apr-14	µg/L	140	=	3.6	=	6.7	=	4	U	3.6	=	66.6	=	1300	=	51.3	=	2	=	1590	=
MW-03A	MW3A-1304	15-Apr-13	µg/L	254	=	7	=	9	=	10	U	6.3	=	120	=	1940	=	99	=	3.5	=	2470	=
MW-04	MW4-1504	16-Apr-15	µg/L	6320	=	334	=	2650	=	523	=	10600	=	6710	=	14300	=	19400	=	6480	=	76497	=
MW-04	MW4-1404	16-Apr-14	µg/L	1100	=	60.9	=	357	=	73.2	=	1390	=	1070	=	7720	=	2930	=	1080	=	16900	=
MW-04	MW4-1304	15-Apr-13	µg/L	5460	=	313	=	2810	=	432	=	9430	=	5590	=	19200	=	18100	=	5790	=	74800	=
MW-05	MW5-1504	16-Apr-15	µg/L	327	=	13.8	=	33	=	40	U	52.6	=	208	=	11400	=	250	=	34.8	=	12468	=
MW-05	MW5-1404	16-Apr-14	µg/L	307	=	12.7	=	16.4	=	40	U	14.1	=	183	=	11900	=	164	=	10	U	12700	=
MW-05	MW5-1304	15-Apr-13	µg/L	356	=	15	=	69.3	=	20	U	155	=	251	=	11800	=	444	=	109	=	13300	=
MW-06	MW6-1504	15-Apr-15	µg/L	2780	=	89.2	=	882	=	42.4	=	3780	=	2400	=	14700	=	8190	=	1780	=	36328	=
MW-06	MW6-1404	16-Apr-14	µg/L	1180	=	35.1	=	280	=	40	U	1020	=	888	=	9810	=	2610	=	767	=	17100	=
MW-06	MW6-1304	17-Apr-13	µg/L	440	=	17.4	=	91.7	=	20	U	278	=	279	=	5630	=	630	=	182	=	7710	=
MW-08	MW8-1504	14-Apr-15	µg/L	0.5	U	0.5	U	0.5	U	2.1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	9.45	U
MW-08	MW8-1404	14-Apr-14	µg/L	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	40	U
MW-08	MW8-1304	17-Apr-13	µg/L	0.17	=	0.1	U	0.1	U	0.1	U	0.1	U	0.16	=	0.12	=	0.14	=	0.1	U	1.19	=
SMW-01	SMW1-1504	17-Apr-15	µg/L	0.32	=	0.1	U	0.47	=	0.1	U	0.1	U	0.2	=	0.96	=	0.28	=	0.1	U	2.78	=
SMW-01	SMW1-1504-FD	17-Apr-15	µg/L	0.26	=	0.1	U	0.25	=	0.1	U	0.1	U	0.17	=	0.78	=	0.2	=	0.1	U	2.21	=
SMW-01	SMW1-1410	08-Oct-14	µg/L	0.25	=	0.1	U	0.32	=	0.1	U	0.1	U	0.1	U	0.1	U	0.21	=	0.1	U	1.43	=

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Table 3-5B. Shallow Aquifer Groundwater Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
SMW-01	SMW1-1410-FD	08-Oct-14	µg/L	0.28	=	0.1	U	0.4	=	0.1	U	0.1	U	0.1	U	0.1	U	0.28	=	0.1	U	1.61	=
SMW-01	SMW1-1404	15-Apr-14	µg/L	0.42	=	0.1	U	0.48	=	0.1	U	0.1	U	0.28	=	0.22	=	0.21	=	0.1	U	2.16	=
SMW-01	SMW1-1404-FD	15-Apr-14	µg/L	0.44	=	0.033	LJ	0.54	=	0.1	U	0.1	U	0.3	=	0.23	=	0.23	=	0.1	U	2.27	=
SMW-01	SMW1-1311	12-Nov-13	µg/L	0.6	=	0.1	U	0.1	U	0.1	UJ	0.1	U	0.31	=	0.095	LJ	0.25	=	0.1	U	1.86	=
SMW-01	SMW1-1304	17-Apr-13	µg/L	0.19	=	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.94	=
SMW-02	SMW2-1504	15-Apr-15	µg/L	4300	=	687	=	2290	=	388	=	5580	=	4610	=	35000	=	12100	=	3250	=	73946	=
SMW-02	SMW2-1410	07-Oct-14	µg/L	5440	J	839	J	2590	J	452	J	7110	J	6210	J	38500	J	15600	J	5560	J	90800	J
SMW-02	SMW2-1404	14-Apr-14	µg/L	328	=	57.9	=	52.6	=	20	U	101	=	238	=	14600	=	349	=	67.3	=	15900	=
SMW-02	SMW2-1311	12-Nov-13	µg/L	1400	=	208	=	617	=	82.3	=	1730	=	1440	=	19800	=	3460	=	1270	=	31500	=
SMW-02	SMW2-1304	15-Apr-13	µg/L	313	=	71.9	=	43.5	=	20	U	65.9	=	214	=	13000	=	268	=	50.2	=	14100	=
SMW-03	SMW3-1504	16-Apr-15	µg/L	0.18	=	0.1	U	0.59	=	0.1	U	0.1	U	0.077	LJ	0.14	=	0.55	=	0.1	U	2.09	LJ
SMW-03	SMW3-1410	08-Oct-14	µg/L	0.37	J^	0.1	U	0.19	J^	0.1	U	0.1	U	0.56	J^	0.098	LJ	0.42	J^	0.083	LJ	2.22	LJ
SMW-03	SMW3-1404	16-Apr-14	µg/L	0.26	=	0.037	LJ	0.073	LJ	0.1	U	0.2	=	0.19	=	0.1	=	0.14	=	0.38	=	1.75	=
SMW-03	SMW3-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	UJ	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.8	U
SMW-03	SMW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.8	U
SMW-06	SMW6-1504	16-Apr-15	µg/L	291	=	5	U	9.8	=	20	U	18.8	=	84.6	=	3580	=	90	=	10.7	=	4158	=
SMW-06	SMW6	17-Apr-14	µg/L	334	=	5	U	6.4	=	20	U	14.2	=	82.2	=	5090	=	84.3	=	10.3	=	5690	=
SMW-06	SMW6-1304	16-Apr-13	µg/L	239	=	5	U	5	U	20	U	8.4	=	63.4	=	3690	=	53.2	=	5	U	4130	=

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Table 3-5B. Shallow Aquifer Groundwater Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
SMW-07	SMW7-1504	15-Apr-15	µg/L	99.7	=	4.2	=	17	=	2	U	5.9	=	58.4	=	2.6	=	1.2	=	2.3	=	198	=
SMW-07	SMW7-1404	15-Apr-14	µg/L	56.8	=	1.3	=	5.4	=	2.1	U	1.7	=	25.5	=	5.1	=	1	=	1.2	=	105	=
SMW-07	SMW7-1304	16-Apr-13	µg/L	100	=	2.7	=	12	=	0.1	=	9	=	62	=	3.1	=	1.5	=	3.9	=	195	=
SMW-08	SMW8-1504	14-Apr-15	µg/L	39.5	=	0.5	U	0.8	=	2.1	U	0.8	=	2.9	=	0.5	U	0.5	U	0.8	=	53	=
SMW-08	SMW8-1404	17-Apr-14	µg/L	36	=	0.78	LJ	1.3	LJ	5	U	0.61	LJ	2.3	LJ	5	U	5	U	0.59	LJ	66.6	LJ
SMW-08	SMW8-1304	17-Apr-13	µg/L	42	=	0.23	=	0.49	=	0.1	U	0.73	=	3.5	=	0.1	U	0.13	=	0.55	=	48.1	=
SMW-09	SMW9-1504	16-Apr-15	µg/L	872	=	29.9	=	94.3	=	40	U	529	=	533	=	9880	=	1180	=	298	=	13706	=
SMW-09	SMW9-1410	07-Oct-14	µg/L	9050	J	247	J	1460	J	200	UJ	9470	J	7120	J	34100	J	21600	J	7230	J	95800	J
SMW-09	SMW9-1311	12-Nov-13	µg/L	1970	=	53.8	=	348	=	100	U	1860	=	1420	=	12400	=	4280	=	1260	=	24600	=
SMW-09	SMW9-1304	16-Apr-13	µg/L	799	=	20.2	=	71.2	=	20	U	429	=	440	=	6620	=	954	=	339	=	9890	=
SMW-10	SMW10-1504	15-Apr-15	µg/L	17	=	0.5	U	0.5	U	2.1	U	1.2	=	6.7	=	6	=	1.3	=	0.6	=	40.8	=
SMW-10	SMW10-1404	16-Apr-14	µg/L	17	=	5	U	0.75	LJ	5	U	1.3	LJ	5	LJ	4.4	LJ	0.5	LJ	0.68	LJ	52.1	LJ
SMW-10	SMW10-1304	16-Apr-13	µg/L	10	=	0.13	=	0.35	=	0.1	U	0.65	=	2.4	=	2.5	=	0.6	=	0.32	=	17.4	=
SMW-11	SMW11-1504	15-Apr-15	µg/L	276	=	8.3	=	25.9	=	10	U	41.3	=	198	=	3040	=	253	=	17.2	=	3897	=
SMW-11	SMW11-1504-FD	15-Apr-15	µg/L	262	=	7.5	=	23.7	=	20	U	36.5	=	182	=	2940	=	247	=	18.4	=	3790	=
SMW-11	SMW11-1410	08-Oct-14	µg/L	202	=	5.1	=	17.6	=	10	U	35.9	=	154	=	2160	=	195	=	22.4	=	2830	=
SMW-11	SMW11-1404	15-Apr-14	µg/L	257	=	6.6	=	21.8	=	8	U	36.2	=	186	=	2880	=	248	=	19.9	=	3690	=
SMW-11	SMW11-1404-FD	15-Apr-14	µg/L	251	=	6.2	=	20	=	8	U	32.1	=	184	=	3080	=	251	=	20.4	=	3870	=

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Table 3-5B. Shallow Aquifer Groundwater Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
SMW-11	SMW11-1311	12-Nov-13	µg/L	293	=	7.7	=	24.6	=	4	U	39.3	=	201	=	3860	=	270	=	27.1	=	4740	=
SMW-11	SMW11-1304	15-Apr-13	µg/L	277	=	8.5	=	24.5	=	20	U	32.5	=	190	=	3630	=	243	=	21.5	=	4500	=
SMW-12	SMW12-1504	13-Apr-15	µg/L	0.16	=	0.1	U	0.1	U	0.1	U	0.1	U	0.15	=	0.45	=	0.1	=	0.1	U	1.46	=
SMW-12	SMW12-1404	17-Apr-14	µg/L	0.049	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.044	LJ	0.06	LJ	0.1	U	0.1	U	0.803	LJ
SMW-12	SMW12-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.8	U
SMW-13	SMW13-1504	13-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.28	=	0.17	=	0.1	U	1.15	=
SMW-13	SMW-13-1410	22-Oct-14	µg/L	0.051	J	0.024	U	0.025	U	0.033	U	0.082	J	0.062	J	0.1	U	0.15	J	0.059	J	0.616	J
SMW-13	SMW13-1410	09-Oct-14	µg/L	0.1	U	0.1	U	0.58	=	0.1	UJv	0.1	UJv	0.38	=	0.11	=	0.085	LJ	0.1	UJv	1.76	=
SMW-13	SMW13-1404	17-Apr-14	µg/L	0.064	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.073	LJ	0.09	LJ	0.097	LJ	0.1	U	0.924	LJ
SMW-13	SMW13-1304	18-Apr-13	µg/L	0.2	=	0.1	U	0.1	U	0.1	U	0.1	U	0.2	=	0.23	=	0.15	=	0.1	U	1.38	=
SMW-14	SMW14-1504	17-Apr-15	µg/L	19	Jv	0.34	=	1.3	LJv	0.1	U	0.1	U	5.5	=	5.8	Jv	0.1	U	0.1	U	32.5	LJv
SMW-14	SMW14-1404	14-Apr-14	µg/L	12	=	0.3	=	0.65	=	0.1	U	0.1	U	3.2	=	5.7	=	0.22	=	0.1	U	22.6	=
SMW-14	SMW14-1304	17-Apr-13	µg/L	3.6	=	0.1	U	0.1	U	0.1	U	0.1	U	0.47	=	0.16	=	0.1	U	0.1	U	4.88	=
SMW-15	SMW15-1504	13-Apr-15	µg/L	0.085	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.088	LJ	0.42	=	0.13	=	0.1	U	1.32	LJ
SMW-15	SMW15-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.16	=	0.1	U	0.1	U	0.91	=
SMW-15	SMW15-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.8	U

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Table 3-5B. Shallow Aquifer Groundwater Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
SP-01	SP1-1504	15-Apr-15	µg/L	0.6	=	0.5	U	0.5	U	2.1	U	0.5	U	0.6	=	0.5	U	0.6	=	0.5	U	10.5	=
SP-01	SP1-1504-FD	15-Apr-15	µg/L	0.5	=	0.5	U	0.5	U	2.1	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	9.7	=
SP-01	SP1-1404	17-Apr-14	µg/L	0.52	LJ	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	38	LJ
SP-01	SP1-1404-FD	17-Apr-14	µg/L	0.46	LJ	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	38	LJ
SP-01	SP1-1304	16-Apr-13	µg/L	16	=	0.92	=	0.33	=	0.2	=	2.8	=	0.11	=	0.1	U	0.18	=	3.4	=	25.7	=
SP-04	SP4-1504	16-Apr-15	µg/L	0.29	=	0.1	U	0.63	=	0.1	U	0.21	=	0.27	=	0.85	=	0.51	=	0.16	=	3.47	LJ
SP-04	SP4-1404	17-Apr-14	µg/L	0.3	=	0.047	LJ	0.45	=	0.1	U	0.11	=	0.23	=	0.97	=	0.34	=	0.082	LJ	2.92	=
SP-04	SP4-1304	17-Apr-13	µg/L	0.14	=	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.89	=
SP-05	SP5-1504	16-Apr-15	µg/L	0.11	=	0.1	U	0.09	LJ	0.1	U	0.091	LJ	0.15	=	0.2	=	0.24	=	0.1	=	1.43	LJ
SP-05	SP5-1404	16-Apr-14	µg/L	0.088	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.1	=	0.067	LJ	0.11	=	0.1	U	0.965	LJ
SP-05	SP5-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.8	U
SP-07	SP7-1504	14-Apr-15	µg/L	39.4	=	0.7	=	0.6	=	2.1	U	0.9	=	9.4	=	3.4	=	1.3	=	0.7	=	64	=
SP-07	SP7-1410	08-Oct-14	µg/L	26	=	0.5	U	0.5	=	2	U	1.2	=	7.5	=	3.1	=	1	=	1.1	=	48	=
SP-07	SP7-1410-HS	08-Oct-14	µg/L	35.3	=	4.4	=	2.4	=	4.8	J	10.2	=	10.7	=	0.6	=	5.9	=	11.5	=	133	J
SP-07	SP7-1404	15-Apr-14	µg/L	32	=	0.51	LJ	0.92	LJ	5	U	0.75	LJ	8.3	=	0.44	LJ	1.2	LJ	0.6	LJ	64.7	LJ
SP-07	SP7-1311	12-Nov-13	µg/L	21.7	=	0.5	U	0.6	=	2	U	1.5	=	9.3	=	0.8	=	2.2	=	1.2	=	44.7	=
SP-07	SP7-1304	17-Apr-13	µg/L	17	=	0.24	=	0.81	=	0.1	U	1.9	=	8.7	=	0.4	=	6.3	=	0.85	=	36.8	=
SP-08	SP8-1504	14-Apr-15	µg/L	34.6	=	0.5	=	0.7	=	2	U	0.5	U	10.1	=	1.2	=	0.5	U	0.5	U	55	=
SP-08	SP8-1410	07-Oct-14	µg/L	37.8	J	0.5	J	0.6	J	2	UJ	0.5	UJ	11.1	J	0.5	UJ	0.5	UJ	0.5	UJ	58.1	J
SP-08	SP8-1404	15-Apr-14	µg/L	41	=	0.85	LJ	0.89	LJ	5	U	5	U	7	=	5	U	0.58	LJ	5	U	77.8	LJ
SP-08	SP8-1311	13-Nov-13	µg/L	25	=	0.26	=	0.21	=	0.1	UJ	0.086	LJ	5	=	0.13	=	0.51	=	0.1	U	31.6	=
SP-08	SP8-1304	17-Apr-13	µg/L	14	=	0.1	U	0.18	=	0.1	U	0.1	U	2.5	=	0.17	=	0.12	=	0.1	U	17.5	=
SP-09	SP9-1504	14-Apr-15	µg/L	193	=	5	U	12.6	=	20	U	26.2	=	132	=	2410	=	122	=	15.7	=	2987	=
SP-09	SP9-1410	08-Oct-14	µg/L	148	=	3.4	=	8.9	=	10	U	19.4	=	108	=	2090	=	93.8	=	13.1	=	2520	=
SP-09	SP9-1404	14-Apr-14	µg/L	170	=	3.1	=	12.4	=	8	U	28.6	=	115	=	2830	=	125	=	19.2	=	3340	=
SP-09	SP9-1311	12-Nov-13	µg/L	220	=	3.5	J	11.1	J	4	U	31.9	=	153	=	2900	=	168	=	20.4	=	3530	=
SP-09	SP9-1304	15-Apr-13	µg/L	197	=	3.5	J	14.4	=	10	U	27.8	=	124	=	3900	=	138	=	19.6	=	4460	=
SP-10	SP10-1504	14-Apr-15	µg/L	52	=	1.5	=	3.9	=	2	U	0.5	U	4.2	=	0.5	U	0.5	U	0.5	U	69.7	=
SP-10	SP10-1410	08-Oct-14	µg/L	23.5	=	0.7	=	1.8	=	2	U	0.5	U	2.4	=	0.5	U	0.5	U	0.5	U	36.5	=
SP-10	SP10-1410-HS	08-Oct-14	µg/L	26.5	=	0.7	=	1.6	=	2.1	U	0.5	U	2.8	=	0.5	U	0.5	U	0.5	U	40.1	=
SP-10	SP10-1404	16-Apr-14	µg/L	22	=	1	LJ	3.9	LJ	5	U	5	U	1.9	LJ	5	U	5	U	0.52	LJ	56.8	LJ
SP-10	SP10-1311	12-Nov-13	µg/L	8.7	=	0.19	=	0.67	=	0.084	LJ	0.2	=	0.87	=	0.18	=	0.18	=	0.25	=	11.7	=
SP-10	SP10-1304	16-Apr-13	µg/L	6.7	=	0.19	=	1.8	=	0.1	U	0.18	=	1	=	0.1	U	0.1	U	0.18	=	10.6	=
SP-11	SP11-1504	14-Apr-15	µg/L	27.9	=	0.7	=	1.4	=	2.1	U	3.9	=	3.5	=	0.5	U	0.5	U	2.9	=	48.2	=
SP-11	SP11-1410	08-Oct-14	µg/L	21.2	=	0.6	=	1.1	=	2	U	5.5	=	4.3	=	0.5	U	0.6	=	3.8	=	44.5	=
SP-11	SP11-1410-FD	08-Oct-14	µg/L	23.7	=	0.6	=	1	=	2.1	U	4.8	=	4.4	=	0.5	U	0.6	=	3.8	=	46.6	=
SP-11	SP11-1404	16-Apr-14	µg/L	32	=	5	U	1.9	LJ	5	U	3.3	LJ	4.3	LJ	0.49	LJ	0.72	LJ	2.4	LJ	67.6	LJ
SP-11	SP11-1311	12-Nov-13	µg/L	17	=	0.36	=	0.51	=	0.1	UJ	3.6	=	3.1	=	0.3	=	0.46	=	2.6	=	28.6	=
SP-11	SP11-1304	16-Apr-13	µg/L	0.1	U	0.1	U	0.34	=	0.1	U	0.54	=	0.56	=	0.1	U	0.1	U	0.42	=	2.46	=
SP-12	SP12-1504	16-Apr-15	µg/L	0.14	=	0.094	LJ	0.47	=	0.1	U	0.1	U	0.17	=	0.21	=	0.25	=	0.1	U	1.83	LJ
SP-12	SP12-1410	09-Oct-14	µg/L	0.14	=	0.098	LJ	1.2	=	0.1	U	0.1	U	0.13	=	0.078	LJ	0.31	=	0.1	U	2.46	=
SP-12	SP12-1404	16-Apr-14	µg/L	0.19	=	0.035	LJ	0.11	=	0.1	U	0.1	U	0.23	=	0.059	LJ	0.25	=	0.1	U	1.37	LJ
SP-12	SP12-1311	13-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	UJ	0.1	U	0.1	U	0.095	LJ	0.1	U	0.1	U	0.845	LJ
SP-12	SP12-1304	16-Apr-13	µg/L	0.32	=	0.1	U	0.1	U	0.1	U	0.1	U	0.31	=	1.4	=	0.26	=	0.1	U	2.89	=
TP-01	TP01-1504	14-Apr-15	µg/L	344	=	5	U	17.2	=	20	U	17.7	=	192	=	3610	=	182	=	9.8	=	4446	=
TP-01	TP01-1404	14-Apr-14	µg/L	233	=	5.1	=	11.7	=	8	U	9	=	144	=	2430	=	113	=	4.4	=	2980	=
TP-01	TP01-1304	15-Apr-13	µg/L	258	=	6	=	14.7	=	20	U	12.6	=	168	=	3360	=	140	=	7.3	=	4040	=

Notes:

µg/L = microgram per liter
= - analyte detected
BaP = benzo(a)pyrene
HS = hydrasleeve sample
J = The analyte was positively identified; the result is estimated.
L = The analyte was positively identified, but the associated numerical value may be biased low.

TEF = toxicity equivalent factor
U = The analyte was analyzed for, but not detected.

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Table 3-6. Shallow Aquifer Groundwater Summary for Feasibility Study COCs 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	1,1-biphenyl	Q	1-Methyl-	Q	2-Methyl-	Q	3&4-	Q	Acenaphthene	Q	Acenaph-	Q	Anthracene	Q	BAP	Q	Benzene	Q	Benzo(a)	Q	Benzo(a)p	Q
MW-02A	MW2A-1504	17-Apr-15	µg/L	**8**	=	NT		5	UJv	**4.2**	LJ	**150**	=	**2.2**	=	**8.8**	=	0	U	NT		0.1	U	0.1	U
MW-02A	MW2A-1410	7-Oct-14	µg/L	5	U	NT		5	U	NT		**120**	=	**2.5**	=	**6.7**	=	0	U	**10.9**	J	0.5	U	0.5	U
MW-02A	MW2A-1404	14-Apr-14	µg/L	**12**	=	NT		5	U	NT		**130**	=	**1.4**	=	**3.1**	LJ	0	U	NT		0.2	U	0.2	U
MW-02A	MW2A-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		**25**	=	**0.23**	J	**0.19**	=	0	U	**2.1**	=	0.1	U	0.1	U
MW-02A	MW2A-1304	15-Apr-13	µg/L	5	U	NT		5	U	NT		**42**	=	**0.46**	=	**0.61**	=	0	U	NT		0.1	U	0.1	U
MW-03A	MW3A-1504	15-Apr-15	µg/L	**30.8**	=	NT		**102**	=	**17.5**	=	**198**	=	**6.6**	=	**9**	=	0	U	NT		10	U	1	U
MW-03A	MW3A-1504-FD	15-Apr-15	µg/L	**32.9**	=	NT		**112**	=	**19.6**	=	**210**	=	**7.1**	=	**9**	=	0	U	NT		10	U	1	U
MW-03A	MW3A-1410	9-Oct-14	µg/L	**32**	=	NT		**49.8**	=	NT		**187**	=	**6.6**	=	**10.3**	=	0	U	NT		2.1	U	0.2	U
MW-03A	MW3A-1410-FD	9-Oct-14	µg/L	**30.5**	=	NT		**48.6**	=	NT		**178**	=	**6.3**	=	**9.6**	=	**0.2**	=	NT		2.1	U	**0.2**	=
MW-03A	MW3A-1410-HS	9-Oct-14	µg/L	**2.7**	=	NT		**11.3**	=	NT		**30.7**	=	**1.3**	=	**5.2**	=	**0.3**	=	NT		2	U	**0.3**	=
MW-03A	MW3A-1404	15-Apr-14	µg/L	**19.4**	=	NT		**46.1**	=	NT		**142**	=	**3.4**	=	**6.2**	=	0	U	NT		4	U	0.4	U
MW-03A	MW3A-1404-FD	15-Apr-14	µg/L	**21**	=	NT		**41.8**	=	NT		**140**	=	**3.6**	=	**6.7**	=	0	U	NT		4	U	0.4	U
MW-03A	MW3A-1304	15-Apr-13	µg/L	**41.6**	=	NT		**41.8**	=	NT		**254**	=	**7**	=	**9**	=	0	U	NT		10	U	1	U
MW-03A	MW3A-1304-FD	15-Apr-13	µg/L	**41**	=	NT		**41.6**	=	NT		**262**	=	**6.9**	=	**8.7**	=	0	U	NT		10	U	1	U
MW-06	MW6-1504	15-Apr-15	µg/L	**460**	=	NT		**1970**	=	**4600**	=	**2780**	=	**89.2**	=	**882**	=	**279**	=	NT		**549**	=	**195**	=
MW-06	MW6-1404	16-Apr-14	µg/L	**188**	=	NT		**855**	=	NT		**1180**	=	**35.1**	=	**280**	=	**70.9**	=	NT		**151**	=	**50**	=
MW-06	MW6-1304	17-Apr-13	µg/L	**67.3**	=	NT		**385**	=	NT		**440**	=	**17.4**	=	**91.7**	=	**24.4**	=	NT		**85.6**	=	**15.8**	=
MW-08	MW8-1504	14-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	0.5	U	0.5	U	0.5	U	0	U	NT		2.1	U	0.2	U
MW-08	MW8-1404	14-Apr-14	µg/L	5	U	NT		5	U	NT		5	U	5	U	5	U	0	U	NT		5	U	5	U
MW-08	MW8-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**0.17**	=	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1504	17-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.32**	=	0.1	U	**0.47**	=	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1504-FD	17-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.26**	=	0.1	U	**0.25**	=	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1410	8-Oct-14	µg/L	5	U	NT		5	U	NT		**0.25**	=	0.1	U	**0.32**	=	0	U	1	U	0.1	U	0.1	U
SMW-01	SMW1-1410-FD	8-Oct-14	µg/L	5	U	NT		5	U	NT		**0.28**	=	0.1	U	**0.4**	=	0	U	1	U	0.1	U	0.1	U
SMW-01	SMW1-1404	15-Apr-14	µg/L	5	U	NT		5	U	NT		**0.42**	=	0.1	U	**0.48**	=	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1404-FD	15-Apr-14	µg/L	5	U	NT		5	U	NT		**0.44**	=	**0.033**	LJ	**0.54**	=	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		**0.6**	=	0.1	U	0.1	U	0	U	0.5	U	0.1	U	0.1	U
SMW-01	SMW1-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**0.19**	=	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-01	SMW1-1304-FD	17-Apr-13	µg/L	5	U	NT		5	U	NT		**0.22**	=	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-02	SMW2-1504	15-Apr-15	µg/L	**1170**	=	NT		**6770**	=	**93.7**	=	**4300**	=	**687**	=	**2290**	=	**1452**	=	NT		**1450**	=	**992**	=
SMW-02	SMW2-1410	7-Oct-14	µg/L	**1370**	J	NT		**7240**	J	NT		**5440**	J	**839**	J	**2590**	J	**1870**	J	**398**	J	**2080**	J	**1450**	J
SMW-02	SMW2-1404	14-Apr-14	µg/L	**90.7**	=	NT		**809**	=	NT		**328**	=	**57.9**	=	**52.6**	=	**18.5**	=	NT		**21.2**	=	**16.4**	=
SMW-02	SMW2-1311	12-Nov-13	µg/L	**354**	=	NT		**2590**	=	NT		**1400**	=	**208**	=	**617**	=	**376**	=	**458**	J	**372**	=	**260**	=
SMW-02	SMW2-1311-FD	12-Nov-13	µg/L	**174**	=	NT		**1410**	=	NT		**566**	=	**112**	=	**194**	=	**87.4**	=	**514**	J	**108**	=	**66**	=
SMW-02	SMW2-1304	15-Apr-13	µg/L	**89**	=	NT		**763**	=	NT		**313**	=	**71.9**	=	**43.5**	=	**9.8**	=	NT		20	U	**9.8**	=
SMW-03	SMW3-1504	16-Apr-15	µg/L	5	UJv	NT		5	UJv	5	U	**0.18**	=	0.1	U	**0.59**	=	0	U	NT		0.1	U	0.1	U
SMW-03	SMW3-1410	8-Oct-14	µg/L	5	U	NT		5	U	NT		**0.37**	J^	0.1	U	**0.19**	J^	0	U	1	U	0.1	U	0.1	U
SMW-03	SMW3-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**0.26**	=	**0.037**	LJ	**0.073**	LJ	**0.00344**	LJ	NT		0.1	U	0.1	U
SMW-03	SMW3-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	0.5	U	0.1	U	0.1	U
SMW-03	SMW3-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-06	SMW6-1504	16-Apr-15	µg/L	20	U	NT		**161**	=	**45**	=	**291**	=	5	U	**9.8**	=	0	U	NT		20	U	2	U
SMW-06	SMW6	17-Apr-14	µg/L	**30.6**	=	NT		**194**	=	NT		**334**	=	5	U	**6.4**	=	0	U	NT		20	U	2	U
SMW-06	SMW6-1304	16-Apr-13	µg/L	**20.4**	=	NT		**121**	=	NT		**239**	=	5	U	5	U	0	U	NT		20	U	2	U
SMW-07	SMW7-1504	15-Apr-15	µg/L	**21.8**	=	NT		0.5	U	2	U	**99.7**	=	**4.2**	=	**17**	=	0	U	NT		2	U	0.2	U
SMW-07	SMW7-1404	15-Apr-14	µg/L	**10**	=	NT		0.5	U	NT		**56.8**	=	**1.3**	=	**5.4**	=	0	U	NT		2.1	U	0.2	U
SMW-07	SMW7-1304	16-Apr-13	µg/L	**22**	=	NT		5	U	NT		**100**	=	**2.7**	=	**12**	=	**0.0242**	=	NT		**0.24**	=	0.1	U
SMW-08	SMW8-1504	14-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**39.5**	=	0.5	U	**0.8**	=	0	U	NT		2.1	U	0.2	U
SMW-08	SMW8-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**36**	=	**0.78**	LJ	**1.3**	LJ	0	U	NT		5	U	5	U
SMW-08	SMW8-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**42**	=	**0.23**	=	**0.49**	=	0	U	NT		0.1	U	0.1	U
SMW-09	SMW9-1504	16-Apr-15	µg/L	**139**	=	NT		**698**	=	**2800**	=	**872**	=	**29.9**	=	**94.3**	=	**41.9**	=	NT		**86.8**	=	**33.1**	=
SMW-09	SMW9-1410	7-Oct-14	µg/L	**1590**	J	NT		**5560**	J	NT		**9050**	J	**247**	J	**1460**	J	**850**	J	**153**	J	**1780**	J	**589**	J
SMW-09	SMW9-1311	12-Nov-13	µg/L	**337**	=	NT		**1530**	=	NT		**1970**	=	**53.8**	=	**348**	=	**144**	=	**133**	J	**291**	=	**102**	=
SMW-09	SMW9-1304	16-Apr-13	µg/L	**46.6**	=	NT		**405**	=	NT		**799**	=	**20.2**	=	**71.2**	=	**29.3**	=	NT		**61.4**	=	**20.7**	=
SMW-10	SMW10-1504	15-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**17**	=	0.5	U	0.5	U	0	U	NT		2.1	U	0.2	U
SMW-10	SMW10-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**17**	=	5	U	**0.75**	LJ	0	U	NT		5	U	5	U
SMW-10	SMW10-1304	16-Apr-13	µg/L	5	U	NT		5	U	NT		**10**	=	**0.13**	=	**0.35**	=	0	U	NT		0.1	U	0.1	U
SMW-11	SMW11-1504	15-Apr-15	µg/L	**49.5**	=	NT		**157**	=	**61**	=	**276**	=	**8.3**	=	**25.9**	=	**2.7**	=	NT		10	U	**2.7**	=
SMW-11	SMW11-1504-FD	15-Apr-15	µg/L	**48**	=	NT		**152**	=	**59**	=	**262**	=	**7.5**	=	**23.7**	=	**3.4**	=	NT		20	U	**3.4**	=
SMW-11	SMW11-1410	8-Oct-14	µg/L	**42.7**	=	NT		**125**	=	NT		**202**	=	**5.1**	=	**17.6**	=	**2.2**	=	**66.3**	=	10	U	**2.2**	=
SMW-11	SMW11-1404	15-Apr-14	µg/L	**52.1**	=	NT		**188**	=	NT		**257**	=	**6.6**	=	**21.8**	=	**1.7**	=	NT		8	U	**1.7**	=
SMW-11	SMW11-1404-FD	15-Apr-14	µg/L	**50**	=	NT		**213**	=	NT		**251**	=	**6.2**	=	**20**	=	**1.2**	=	NT		8	U	**1.2**	=

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Table 3-6. Shallow Aquifer Groundwater Summary for Draft Feasibility Study COCs 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	Chrysene	Q	Dibenz(a,h)a	Q	Dibenzofuran	Q	Ethylbenzene	Q	Fluoranthene	Q	Naphthalene	Q	Penta-	Q	Phenanthrene	Q	Pyrene	Q	Xylenes	Q
MW-02A	MW2A-1504 <F9N06>	17-Apr-15	µg/L	0.1	U	0.1	U	60	=	NT		0.37	=	73	=	0.2	UJ	15	Jv	0.21	=	NT	
MW-02A	MW2A-1410	7-Oct-14	µg/L	0.5	U	0.5	U	42	=	1	UJ	0.5	U	240	=	1	U	2.2	=	0.5	U	2.5	J
MW-02A	MW2A-1404	14-Apr-14	µg/L	0.2	U	0.2	U	54	=	NT		0.65	=	54	=	0.089	LJ	19	=	0.28	=	NT	
MW-02A	MW2A-1311	12-Nov-13	µg/L	0.1	U	0.1	U	6.9	=	0.5	U	0.19	=	0.51	J	0.2	UJ	0.44	=	0.11	J	1	U
MW-02A	MW2A-1304	15-Apr-13	µg/L	0.1	U	0.1	U	16	=	NT		0.29	=	5.3	=	0.2	UJ	2.1	=	0.14	=	NT	
MW-03A	MW3A-1504	15-Apr-15	µg/L	10	U	10	U	105	=	NT		5.2	=	2440	=	670	=	69.1	=	3.1	=	NT	
MW-03A	MW3A-1504-FD	15-Apr-15	µg/L	10	U	10	U	112	=	NT		4.8	=	2420	=	550	=	74.9	=	2.7	=	NT	
MW-03A	MW3A-1410	9-Oct-14	µg/L	2.1	U	2.1	U	116	=	NT		9.3	=	1210	=	172	=	81.9	=	5.1	=	NT	
MW-03A	MW3A-1410-FD	9-Oct-14	µg/L	2.1	U	2.1	U	109	=	NT		9.3	=	1220	=	176	=	75.7	=	4.4	=	NT	
MW-03A	MW3A-1410-HS	9-Oct-14	µg/L	2	U	2	U	13	=	NT		8.5	=	192	=	125	=	16	=	5.6	=	NT	
MW-03A	MW3A-1404	15-Apr-14	µg/L	4	U	4	U	78.1	=	NT		3.2	=	1370	=	196	=	53.5	=	1.8	=	NT	
MW-03A	MW3A-1404-FD	15-Apr-14	µg/L	4	U	4	U	73.7	=	NT		3.6	=	1300	=	175	=	51.3	=	2	=	NT	
MW-03A	MW3A-1304	15-Apr-13	µg/L	10	U	10	U	133	=	NT		6.3	=	1940	=	126	=	99	=	3.5	=	NT	
MW-03A	MW3A-1304-FD	15-Apr-13	µg/L	10	U	10	U	135	=	NT		6.5	=	1840	=	126	=	102	=	3.3	=	NT	
MW-06	MW6-1504	15-Apr-15	µg/L	497	=	40	U	1930	=	NT		3780	=	14700	=	5960	=	8190	=	1780	=	NT	
MW-06	MW6-1404	16-Apr-14	µg/L	135	=	40	U	767	=	NT		1020	=	9810	=	4880	=	2610	=	767	=	NT	
MW-06	MW6-1304	17-Apr-13	µg/L	20	U	20	U	266	=	NT		278	=	5630	=	2530	=	630	=	182	=	NT	
MW-08	MW8-1504	14-Apr-15	µg/L	2.1	U	2.1	U	2.1	U	NT		0.5	U	0.5	U	1	U	0.5	U	0.5	U	NT	
MW-08	MW8-1404	14-Apr-14	µg/L	5	U	5	U	5	U	NT		5	U	5	U	10	U	5	U	5	U	NT	
MW-08	MW8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.12	=	0.2	U	0.14	=	0.1	U	NT	
SMW-01	SMW1-1504 <F9N08>	17-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.96	=	0.2	UJ	0.28	=	0.1	U	NT	
SMW-01	SMW1-1504-FD <F9N09>	17-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.78	=	0.2	UJ	0.2	=	0.1	U	NT	
SMW-01	SMW1-1410	8-Oct-14	µg/L	0.1	U	0.1	U	5	U	1	U	0.1	U	0.1	U	0.2	U	0.21	=	0.1	U	3	U
SMW-01	SMW1-1410-FD	8-Oct-14	µg/L	0.1	U	0.1	U	5	U	1	U	0.1	U	0.1	U	0.1	LJ	0.28	=	0.1	U	3	U
SMW-01	SMW1-1404	15-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.22	=	0.16	LJ	0.21	=	0.1	U	NT	
SMW-01	SMW1-1404-FD	15-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.23	=	0.19	LJ	0.23	=	0.1	U	NT	
SMW-01	SMW1-1311	12-Nov-13	µg/L	0.1	U	0.1	U	5	U	0.5	U	0.1	U	0.095	LJ	0.2	U	0.25	=	0.1	U	1	U
SMW-01	SMW1-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SMW-01	SMW1-1304-FD	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SMW-02	SMW2-1504	15-Apr-15	µg/L	1290	=	195	=	3260	=	NT		5580	=	35000	=	20	U	12100	=	3250	=	NT	
SMW-02	SMW2-1410	7-Oct-14	µg/L	1860	J	200	UJ	4170	J	520	J	7110	J	38500	J	100	UJ	15600	J	5560	J	888	J
SMW-02	SMW2-1404	14-Apr-14	µg/L	20	U	20	U	216	=	NT		101	=	14600	=	10	U	349	=	67.3	=	NT	
SMW-02	SMW2-1311	12-Nov-13	µg/L	338	=	43.2	=	1050	=	3300	J	1730	=	19800	=	10	U	3460	=	1270	=	6500	J
SMW-02	SMW2-1311-FD	12-Nov-13	µg/L	89.7	=	20	U	526	=	649	J	432	=	13600	=	10	U	1120	=	316	=	1011	J
SMW-02	SMW2-1304	15-Apr-13	µg/L	20	U	20	U	195	=	NT		65.9	=	13000	=	10	U	268	=	50.2	=	NT	
SMW-03	SMW3-1504 <F9N14>	16-Apr-15	µg/L	0.1	U	0.1	U	5	UJv	NT		0.1	U	0.14	=	0.2	U	0.55	=	0.1	U	NT	
SMW-03	SMW3-1410	8-Oct-14	µg/L	0.1	U	0.1	U	5	U	1	U	0.1	U	0.098	LJ	0.12	LJ	0.42	J^	0.083	LJ	3	U
SMW-03	SMW3-1404	16-Apr-14	µg/L	0.037	LJ	0.1	U	5	U	NT		0.2	=	0.1	=	0.2	U	0.14	=	0.38	=	NT	
SMW-03	SMW3-1311	12-Nov-13	µg/L	0.1	U	0.1	U	5	U	0.5	U	0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	1	U
SMW-03	SMW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SMW-06	SMW6-1504	16-Apr-15	µg/L	20	U	20	U	120	=	NT		18.8	=	3580	=	10	U	90	=	10.7	=	NT	
SMW-06	SMW6	17-Apr-14	µg/L	20	U	20	U	131	=	NT		14.2	=	5090	=	11.1	=	84.3	=	10.3	=	NT	
SMW-06	SMW6-1304	16-Apr-13	µg/L	20	U	20	U	110	=	NT		8.4	=	3690	=	10	U	53.2	=	5	U	NT	
SMW-07	SMW7-1504	15-Apr-15	µg/L	2	U	2	U	63.2	=	NT		5.9	=	2.6	=	4.5	=	1.2	=	2.3	=	NT	
SMW-07	SMW7-1404	15-Apr-14	µg/L	2.1	U	2.1	U	29	=	NT		1.7	=	5.1	=	17.2	=	1	=	1.2	=	NT	
SMW-07	SMW7-1304	16-Apr-13	µg/L	0.18	=	0.1	U	65	=	NT		9	=	3.1	=	0.35	J	1.5	=	3.9	=	NT	
SMW-08	SMW8-1504	14-Apr-15	µg/L	2.1	U	2.1	U	2.1	U	NT		0.8	=	0.5	U	1	U	0.5	U	0.8	=	NT	
SMW-08	SMW8-1404	17-Apr-14	µg/L	5	U	5	U	5	U	NT		0.61	LJ	5	U	10	U	5	U	0.59	LJ	NT	
SMW-08	SMW8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.73	=	0.1	U	0.2	U	0.13	=	0.55	=	NT	
SMW-09	SMW9-1504	16-Apr-15	µg/L	70.4	=	40	U	521	=	NT		529	=	9880	=	242	=	1180	=	298	=	NT	
SMW-09	SMW9-1410	7-Oct-14	µg/L	1600	J	200	UJ	5980	J	54.8	J	9470	J	34100	J	636	J	21600	J	7230	J	108.4	J
SMW-09	SMW9-1311	12-Nov-13	µg/L	273	=	100	U	1280	=	87.7	J	1860	=	12400	=	286	=	4280	=	1260	=	155.6	J
SMW-09	SMW9-1304	16-Apr-13	µg/L	53.7	=	20	U	388	=	NT		429	=	6620	=	65	=	954	=	339	=	NT	
SMW-10	SMW10-1504	15-Apr-15	µg/L	2.1	U	2.1	U	7.2	=	NT		1.2	=	6	=	1	U	1.3	=	0.6	=	NT	
SMW-10	SMW10-1404	16-Apr-14	µg/L	5	U	5	U	6	=	NT		1.3	LJ	4.4	LJ	10	U	0.5	LJ	0.68	LJ	NT	
SMW-10	SMW10-1304	16-Apr-13	µg/L	0.1	U	0.1	U	4.3	LJ	NT		0.65	=	2.5	=	0.2	UJ	0.6	=	0.32	=	NT	
SMW-11	SMW11-1504	15-Apr-15	µg/L	10	U	10	U	186	=	NT		41.3	=	3040	=	35.8	=	253	=	17.2	=	NT	
SMW-11	SMW11-1504-FD	15-Apr-15	µg/L	20	U	20	U	168	=	NT		36.5	=	2940	=	42.5	=	247	=	18.4	=	NT	
SMW-11	SMW11-1410	8-Oct-14	µg/L	10	U	10	U	140	=	29.4	=	35.9	=	2160	=	19.6	=	195	=	22.4	=	87.1	=
SMW-11	SMW11-1404	15-Apr-14	µg/L	8	U	8	U	174	=	NT		36.2	=	2880	=	12.1	=	248	=	19.9	=	NT	
SMW-11	SMW11-1404-FD	15-Apr-14	µg/L	8	U	8	U	171	=	NT		32.1	=	3080	=	12.8	=	251	=	20.4	=	NT	

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Table 3-6. Shallow Aquifer Groundwater Summary for Feasibility Study COCs 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	1,1-biphenyl	Q	1-Methyl-	Q	2-Methyl-	Q	3&4-	Q	Acenaphthene	Q	Acenaph-	Q	Anthracene	Q	BAP	Q	Benzene	Q	Benzo(a)	Q	Benzo(a)p	Q
SMW-11	SMW11-1311	12-Nov-13	µg/L	**53.8**	**=**	NT		**301**	**=**	NT		**293**	**=**	**7.7**	**=**	**24.6**	**=**	**1.4**	**=**	**28.7**	**=**	4	U	**1.4**	**=**
SMW-11	SMW11-1304	15-Apr-13	µg/L	**58.6**	**=**	NT		**279**	**=**	NT		**277**	**=**	**8.5**	**=**	**24.5**	**=**	0	U	NT		20	U	2	U
SMW-11	SMW11-1304-FD	15-Apr-13	µg/L	**60.3**	**=**	NT		**283**	**=**	NT		**285**	**=**	**8.1**	**=**	**23.4**	**=**	0	U	NT		20	U	2	U
SMW-12	SMW12-1504	13-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.16**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-12	SMW12-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.049**	**LJ**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-12	SMW12-1304	18-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-13	SMW13-1504	13-Apr-15	µg/L	5	U	NT		5	U	5	U	0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-13	SMW-13-1410	22-Oct-14	µg/L	NT		0.025	U	**0.033**	**J**	NT		**0.051**	**J**	0.024	U	0.025	U	**0.0029**	**J**	NT		0.024	U	0.029	U
SMW-13	SMW13-1410	9-Oct-14	µg/L	5	UJ	NT		5	UJ	NT		0.1	U	0.1	U	**0.58**	**=**	0	UJv	NT		0.1	UJv	0.1	UJv
SMW-13	SMW13-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.064**	**LJ**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-13	SMW13-1304	18-Apr-13	µg/L	5	U	NT		5	U	NT		**0.2**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-14	SMW14-1504	17-Apr-15	µg/L	5	U	NT		5	UJv	5	U	**19**	**Jv**	**0.34**	**=**	**1.3**	**LJv**	0	U	NT		0.1	U	0.1	U
SMW-14	SMW14-1404	14-Apr-14	µg/L	5	U	NT		5	U	NT		**12**	**=**	**0.3**	**=**	**0.65**	**=**	0	U	NT		0.1	U	0.1	U
SMW-14	SMW14-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**3.6**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-15	SMW15-1504	13-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.085**	**LJ**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-15	SMW15-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SMW-15	SMW15-1304	18-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SP-01	SP1-1504	15-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**0.6**	**=**	0.5	U	0.5	U	0	U	NT		2.1	U	0.2	U
SP-01	SP1-1504-FD	15-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**0.5**	**=**	0.5	U	0.5	U	0	U	NT		2.1	U	0.2	U
SP-01	SP1-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.52**	**LJ**	5	U	5	U	0	U	NT		5	U	5	U
SP-01	SP1-1404-FD	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.46**	**LJ**	5	U	5	U	0	U	NT		5	U	5	U
SP-01	SP1-1304	16-Apr-13	µg/L	5	U	NT		5	U	NT		**16**	**=**	**0.92**	**=**	**0.33**	**=**	**0.1**	**=**	NT		**0.53**	**=**	0.1	U
SP-01	SP1-1304-FD	16-Apr-13	µg/L	**7**	**=**	NT		5	U	NT		**47**	**=**	**4.9**	**=**	**3**	**=**	**0.0482**	**=**	NT		**0.3**	**=**	0.1	U
SP-04	SP4-1504	16-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.29**	**=**	0.1	U	**0.63**	**=**	**0.017**	**LJ**	NT		**0.076**	**LJ**	0.1	U
SP-04	SP4-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.3**	**=**	**0.047**	**LJ**	**0.45**	**=**	**3.7E-05**	**LJ**	NT		0.1	U	0.1	U
SP-04	SP4-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**0.14**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SP-05	SP5-1504	16-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.11**	**=**	0.1	U	**0.09**	**LJ**	0	U	NT		0.1	U	0.1	U
SP-05	SP5-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**0.088**	**LJ**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SP-05	SP5-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
SP-07	SP7-1504	14-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**39.4**	**=**	**0.7**	**=**	**0.6**	**=**	**0.3**	**=**	NT		2.1	U	**0.3**	**=**
SP-07	SP7-1410	8-Oct-14	µg/L	2	U	NT		0.5	U	NT		**26**	**=**	0.5	U	**0.5**	**=**	**0.3**	**=**	NT		2	U	**0.3**	**=**
SP-07	SP7-1410-HS	8-Oct-14	µg/L	2.1	U	NT		0.5	U	NT		**35.3**	**=**	**4.4**	**=**	**2.4**	**=**	**13.5**	**=**	NT		**7.5**	**=**	**11.3**	**=**
SP-07	SP7-1404	15-Apr-14	µg/L	5	U	NT		5	U	NT		**32**	**=**	**0.51**	**LJ**	**0.92**	**LJ**	0	U	NT		5	U	5	U
SP-07	SP7-1311	12-Nov-13	µg/L	2	U	NT		0.5	U	NT		**21.7**	**=**	0.5	U	**0.6**	**=**	0	U	NT		2	U	0.2	U
SP-07	SP7-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**17**	**=**	**0.24**	**=**	**0.81**	**=**	**0.0151**	**=**	NT		**0.15**	**=**	0.1	U
SP-08	SP8-1504	14-Apr-15	µg/L	2	U	NT		0.5	U	2	U	**34.6**	**=**	**0.5**	**=**	**0.7**	**=**	0	U	NT		2	U	0.2	U
SP-08	SP8-1410	7-Oct-14	µg/L	2	UJ	NT		0.5	UJ	NT		**37.8**	**J**	**0.5**	**J**	**0.6**	**J**	0	UJ	NT		2	UJ	0.2	UJ
SP-08	SP8-1404	15-Apr-14	µg/L	5	U	NT		5	U	NT		**41**	**=**	**0.85**	**LJ**	**0.89**	**LJ**	0	U	NT		5	U	5	U
SP-08	SP8-1311	13-Nov-13	µg/L	5	U	NT		5	U	NT		**25**	**=**	**0.26**	**=**	**0.21**	**=**	0	U	NT		0.1	U	0.1	U
SP-08	SP8-1304	17-Apr-13	µg/L	5	U	NT		5	U	NT		**14**	**=**	0.1	U	**0.18**	**=**	0	U	NT		0.1	U	0.1	U
SP-09	SP9-1504	14-Apr-15	µg/L	**26.3**	**=**	NT		**98.4**	**=**	20	U	**193**	**=**	5	U	**12.6**	**=**	**2.9**	**=**	NT		20	U	**2.9**	**=**
SP-09	SP9-1410	8-Oct-14	µg/L	**20**	**=**	NT		**53.8**	**=**	NT		**148**	**=**	**3.4**	**=**	**8.9**	**=**	**1.8**	**=**	NT		10	U	**1.8**	**=**
SP-09	SP9-1404	14-Apr-14	µg/L	**28.3**	**=**	NT		**67.8**	**=**	NT		**170**	**=**	**3.1**	**=**	**12.4**	**=**	**3.9**	**=**	NT		8	U	**3.9**	**=**
SP-09	SP9-1311	12-Nov-13	µg/L	**35.3**	**=**	NT		**156**	**=**	NT		**220**	**=**	**3.5**	**J**	**11.1**	**J**	**3.56**	**=**	NT		**4.4**	**=**	**2.7**	**=**
SP-09	SP9-1304	15-Apr-13	µg/L	**37.8**	**=**	NT		**101**	**=**	NT		**197**	**=**	**3.5**	**J**	**14.4**	**=**	**2.7**	**=**	NT		10	U	**2.7**	**=**
SP-10	SP10-1504	14-Apr-15	µg/L	2	U	NT		0.5	U	2	U	**52**	**=**	**1.5**	**=**	**3.9**	**=**	0	U	NT		2	U	0.2	U
SP-10	SP10-1410	8-Oct-14	µg/L	2	U	NT		0.5	U	NT		**23.5**	**=**	**0.7**	**=**	**1.8**	**=**	0	U	NT		2	U	0.2	U
SP-10	SP10-1410-HS	8-Oct-14	µg/L	2.1	U	NT		0.5	U	NT		**26.5**	**=**	**0.7**	**=**	**1.6**	**=**	0	U	NT		2.1	U	0.2	U
SP-10	SP10-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**22**	**=**	**1**	**LJ**	**3.9**	**LJ**	0	U	NT		5	U	5	U
SP-10	SP10-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		**8.7**	**=**	**0.19**	**=**	**0.67**	**=**	0	U	NT		0.1	U	0.1	U
SP-10	SP10-1304	16-Apr-13	µg/L	5	U	NT		5	U	NT		**6.7**	**=**	**0.19**	**=**	**1.8**	**=**	0	U	NT		0.1	U	0.1	U
SP-11	SP11-1504	14-Apr-15	µg/L	2.1	U	NT		0.5	U	2.1	U	**27.9**	**=**	**0.7**	**=**	**1.4**	**=**	0	U	NT		2.1	U	0.2	U
SP-11	SP11-1410	8-Oct-14	µg/L	2	U	NT		0.5	U	NT		**21.2**	**=**	**0.6**	**=**	**1.1**	**=**	0	U	NT		2	U	0.2	U
SP-11	SP11-1410-FD	8-Oct-14	µg/L	2.1	U	NT		0.5	U	NT		**23.7**	**=**	**0.6**	**=**	**1**	**=**	0	U	NT		2.1	U	0.2	U
SP-11	SP11-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**32**	**=**	5	U	**1.9**	**LJ**	0	U	NT		5	U	5	U
SP-11	SP11-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		**17**	**=**	**0.36**	**=**	**0.51**	**=**	**0.0182**	**=**	NT		**0.18**	**=**	0.1	U
SP-11	SP11-1304	16-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	**0.34**	**=**	0	U	NT		0.1	U	0.1	U
SP-12	SP12-1504	16-Apr-15	µg/L	5	U	NT		5	U	5	U	**0.14**	**=**	**0.094**	**LJ**	**0.47**	**=**	0	U	NT		0.1	U	0.1	U
SP-12	SP12-1410	9-Oct-14	µg/L	5	U	NT		5	U	NT		**0.14**	**=**	**0.098**	**LJ**	**1.2**	**=**	0	U	NT		0.1	U	0.1	U
SP-12	SP12-1404	16-Apr-14	µg/L	5	U	NT		5	U	NT		**0.19**	**=**	**0.035**	**LJ**	**0.11**	**=**	0	U	NT		0.1	U	0.1	U
SP-12	SP12-1311	13-Nov-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U

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Table 3-6. Shallow Aquifer Groundwater Summary for Draft Feasibility Study COCs 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	Chrysene	Q	Dibenz(a,h)a	Q	Dibenzofuran	Q	Ethylbenzene	Q	Fluoranthene	Q	Naphthalene	Q	Penta-	Q	Phenanthrene	Q	Pyrene	Q	Xylenes	Q
SMW-11	SMW11-1311	12-Nov-13	µg/L	4	U	4	U	199	=	28.3	=	39.3	=	3860	=	19.7	=	270	=	27.1	=	113.2	J
SMW-11	SMW11-1304	15-Apr-13	µg/L	20	U	20	U	186	=	NT		32.5	=	3630	=	43.9	=	243	=	21.5	=	NT	
SMW-11	SMW11-1304-FD	15-Apr-13	µg/L	20	U	20	U	174	=	NT		30.2	=	3620	=	46.3	=	240	=	18.1	=	NT	
SMW-12	SMW12-1504 <F9N10>	13-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.45	=	0.2	U	0.1	=	0.1	U	NT	
SMW-12	SMW12-1404	17-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.06	LJ	0.2	U	0.1	U	0.1	U	NT	
SMW-12	SMW12-1304	18-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SMW-13	SMW13-1504 <F9N11>	13-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.28	=	0.2	U	0.17	=	0.1	U	NT	
SMW-13	SMW-13-1410	22-Oct-14	µg/L	0.033	U	0.031	U	1.3	U	NT		0.082	J	0.1	U	10	U	0.15	J	0.059	J	NT	
SMW-13	SMW13-1410	9-Oct-14	µg/L	0.1	UJv	0.1	UJv	5	UJ	NT		0.1	UJv	0.11	=	0.087	LJ	0.085	LJ	0.1	UJv	NT	
SMW-13	SMW13-1404	17-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.09	LJ	0.2	U	0.097	LJ	0.1	U	NT	
SMW-13	SMW13-1304	18-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.23	=	0.2	U	0.15	=	0.1	U	NT	
SMW-14	SMW14-1504 <F9N12>	17-Apr-15	µg/L	0.1	U	0.1	U	5.3	=	NT		0.1	U	5.8	Jv	0.2	UJ	0.1	U	0.1	U	NT	
SMW-14	SMW14-1404	14-Apr-14	µg/L	0.1	U	0.1	U	2.6	LJ	NT		0.1	U	5.7	=	0.2	U	0.22	=	0.1	U	NT	
SMW-14	SMW14-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.16	=	0.2	U	0.1	U	0.1	U	NT	
SMW-15	SMW15-1504 <F9N13>	13-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.42	=	0.2	U	0.13	=	0.1	U	NT	
SMW-15	SMW15-1404	17-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.16	=	0.2	U	0.1	U	0.1	U	NT	
SMW-15	SMW15-1304	18-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SP-01	SP1-1504	15-Apr-15	µg/L	2.1	U	2.1	U	2.1	U	NT		0.5	U	0.5	U	7	J	0.6	=	0.5	U	NT	
SP-01	SP1-1504-FD	15-Apr-15	µg/L	2.1	U	2.1	U	2.1	U	NT		0.5	U	0.5	U	1	UJ	0.5	U	0.5	U	NT	
SP-01	SP1-1404	17-Apr-14	µg/L	5	U	5	U	5	U	NT		5	U	5	U	0.89	LJ	5	U	5	U	NT	
SP-01	SP1-1404-FD	17-Apr-14	µg/L	5	U	5	U	5	U	NT		5	U	5	U	10	U	5	U	5	U	NT	
SP-01	SP1-1304	16-Apr-13	µg/L	0.43	=	0.1	U	5	U	NT		2.8	=	0.1	U	210	=	0.18	=	3.4	=	NT	
SP-01	SP1-1304-FD	16-Apr-13	µg/L	0.26	=	0.1	U	5.3	=	NT		7.5	=	0.14	=	230	=	2.7	=	3.2	=	NT	
SP-04	SP4-1504 <F9N16>	16-Apr-15	µg/L	0.078	LJ	0.1	U	5	U	NT		0.21	=	0.85	=	0.41	=	0.51	=	0.16	=	NT	
SP-04	SP4-1404	17-Apr-14	µg/L	0.037	LJ	0.1	U	5	U	NT		0.11	=	0.97	=	0.4	=	0.34	=	0.082	LJ	NT	
SP-04	SP4-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SP-05	SP5-1504 <F9N17>	16-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.091	LJ	0.2	=	0.19	LJ	0.24	=	0.1	=	NT	
SP-05	SP5-1404	16-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.067	LJ	0.047	LJ	0.11	=	0.1	U	NT	
SP-05	SP5-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.1	U	0.2	U	0.1	U	0.1	U	NT	
SP-07	SP7-1504	14-Apr-15	µg/L	2.1	U	2.1	U	8.5	=	NT		0.9	=	3.4	=	1	U	1.3	=	0.7	=	NT	
SP-07	SP7-1410	8-Oct-14	µg/L	2	U	2	U	7.3	=	NT		1.2	=	3.1	=	1	U	1	=	1.1	=	NT	
SP-07	SP7-1410-HS	8-Oct-14	µg/L	7.3	=	2.1	U	9.3	=	NT		10.2	=	0.6	=	1.1	U	5.9	=	11.5	=	NT	
SP-07	SP7-1404	15-Apr-14	µg/L	5	U	5	U	8.6	=	NT		0.75	LJ	0.44	LJ	10	U	1.2	LJ	0.6	LJ	NT	
SP-07	SP7-1311	12-Nov-13	µg/L	2	U	2	U	10	=	NT		1.5	=	0.8	=	1	U	2.2	=	1.2	=	NT	
SP-07	SP7-1304	17-Apr-13	µg/L	0.11	=	0.1	U	9.3	=	NT		1.9	=	0.4	=	0.2	U	6.3	=	0.85	=	NT	
SP-08	SP8-1504	14-Apr-15	µg/L	2	U	2	U	3.7	=	NT		0.5	U	1.2	=	1	U	0.5	U	0.5	U	NT	
SP-08	SP8-1410	7-Oct-14	µg/L	2	UJ	2	UJ	9	J	NT		0.5	UJ	0.5	UJ	1	UJ	0.5	UJ	0.5	UJ	NT	
SP-08	SP8-1404	15-Apr-14	µg/L	5	U	5	U	8.9	=	NT		5	U	5	U	10	U	0.58	LJ	5	U	NT	
SP-08	SP8-1311	13-Nov-13	µg/L	0.1	U	0.1	U	6.4	=	NT		0.086	LJ	0.13	=	0.2	U	0.51	=	0.1	U	NT	
SP-08	SP8-1304	17-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.17	=	0.2	U	0.12	=	0.1	U	NT	
SP-09	SP9-1504	14-Apr-15	µg/L	20	U	20	U	119	=	NT		26.2	=	2410	=	10	U	122	=	15.7	=	NT	
SP-09	SP9-1410	8-Oct-14	µg/L	10	U	10	U	94.2	=	NT		19.4	=	2090	=	5	U	93.8	=	13.1	=	NT	
SP-09	SP9-1404	14-Apr-14	µg/L	8	U	8	U	109	=	NT		28.6	=	2830	=	4	U	125	=	19.2	=	NT	
SP-09	SP9-1311	12-Nov-13	µg/L	4.5	=	4	U	138	=	NT		31.9	=	2900	=	2.9	=	168	=	20.4	=	NT	
SP-09	SP9-1304	15-Apr-13	µg/L	10	U	10	U	117	=	NT		27.8	=	3900	=	5	U	138	=	19.6	=	NT	
SP-10	SP10-1504	14-Apr-15	µg/L	2	U	2	U	24.5	=	NT		0.5	U	0.5	U	1	U	0.5	U	0.5	U	NT	
SP-10	SP10-1410	8-Oct-14	µg/L	2	U	2	U	10.4	=	NT		0.5	U	0.5	U	1	U	0.5	U	0.5	U	NT	
SP-10	SP10-1410-HS	8-Oct-14	µg/L	2.1	U	2.1	U	8.7	=	NT		0.5	U	0.5	U	1	U	0.5	U	0.5	U	NT	
SP-10	SP10-1404	16-Apr-14	µg/L	5	U	5	U	6.6	=	NT		5	U	5	U	10	U	5	U	0.52	LJ	NT	
SP-10	SP10-1311	12-Nov-13	µg/L	0.1	U	0.1	U	2.9	LJ	NT		0.2	=	0.18	=	0.2	U	0.18	=	0.25	=	NT	
SP-10	SP10-1304	16-Apr-13	µg/L	0.1	U	0.1	U	2.3	LJ	NT		0.18	=	0.1	U	0.27	J	0.1	U	0.18	=	NT	
SP-11	SP11-1504	14-Apr-15	µg/L	2.1	U	2.1	U	2.1	U	NT		3.9	=	0.5	U	1.5	=	0.5	U	2.9	=	NT	
SP-11	SP11-1410	8-Oct-14	µg/L	2	U	2	U	2.9	=	NT		5.5	=	0.5	U	2.9	=	0.6	=	3.8	=	NT	
SP-11	SP11-1410-FD	8-Oct-14	µg/L	2.1	U	2.1	U	2.9	=	NT		4.8	=	0.5	U	2.8	=	0.6	=	3.8	=	NT	
SP-11	SP11-1404	16-Apr-14	µg/L	5	U	5	U	2.1	LJ	NT		3.3	LJ	0.49	LJ	10	LJ	0.72	LJ	2.4	LJ	NT	
SP-11	SP11-1311	12-Nov-13	µg/L	0.16	=	0.1	U	5	U	NT		3.6	=	0.3	=	1.3	LJ	0.46	=	2.6	=	NT	
SP-11	SP11-1304	16-Apr-13	µg/L	0.1	U	0.1	U	5	U	NT		0.54	=	0.1	U	37	=	0.1	U	0.42	=	NT	
SP-12	SP12-1504 <F9N15>	16-Apr-15	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.21	=	0.16	LJ	0.25	=	0.1	U	NT	
SP-12	SP12-1410	9-Oct-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.078	LJ	0.11	LJ	0.31	=	0.1	U	NT	
SP-12	SP12-1404	16-Apr-14	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.059	LJ	0.053	LJ	0.25	=	0.1	U	NT	
SP-12	SP12-1311	13-Nov-13	µg/L	0.1	U	0.1	U	5	U	NT		0.1	U	0.095	LJ	0.2	U	0.1	U	0.1	U	NT	

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Table 3-6. Shallow Aquifer Groundwater Summary for Feasibility Study COCs 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	1,1-biphenyl	Q	1-Methyl-	Q	2-Methyl-	Q	3&4-	Q	Acenaphthene	Q	Acenaph-	Q	Anthracene	Q	BAP	Q	Benzene	Q	Benzo(a)	Q	Benzo(a)p	Q
SP-12	SP12-1304	16-Apr-13	µg/L	5	U	NT		5	U	NT		**0.32**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
TP-01	TP01-1504	14-Apr-15	µg/L	**44.1**	**=**	NT		**191**	**=**	20	U	**344**	**=**	5	U	**17.2**	**=**	0	U	NT		20	U	2	U
TP-01	TP01-1404	14-Apr-14	µg/L	8	UJ	NT		**209**	**=**	NT		**233**	**=**	**5.1**	**=**	**11.7**	**=**	0	U	NT		8	U	0.8	U
TP-01	TP01-1304	15-Apr-13	µg/L	**29.1**	**=**	NT		**84.9**	**=**	NT		**258**	**=**	**6**	**=**	**14.7**	**=**	0	U	NT		20	U	2	U
DMW-02	DMW2-1504	15-Apr-15	µg/L	5	U	NT		**2.5**	**LJ**	5	U	**1.3**	**=**	**0.16**	**=**	0.1	U	0	U	NT		0.1	U	0.1	U
DMW-02	DMW2-1504-FD	15-Apr-15	µg/L	5	U	NT		**2.5**	**LJ**	5	U	**1.3**	**=**	**0.15**	**=**	0.1	U	0	U	NT		0.1	U	0.1	U
DMW-02	DMW2-1410	7-Oct-14	µg/L	5	U	NT		5	U	NT		**0.078**	**LJ**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
DMW-02	DMW2-1410-FD	7-Oct-14	µg/L	5	U	NT		5	U	NT		**0.4**	**=**	**0.081**	**LJ**	**0.28**	**=**	**0.0152**	**=**	NT		**0.15**	**=**	0.1	U
DMW-02	DMW2-1404	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.14**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
DMW-02	DMW2-1404-FD	17-Apr-14	µg/L	5	U	NT		5	U	NT		**0.16**	**=**	0.1	U	0.1	U	0	U	NT		0.1	U	0.1	U
DMW-02	DMW2-1311	12-Nov-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	**0.00882**	**=**	NT		**0.087**	**LJ**	0.1	U
DMW-02	DMW2-1304	15-Apr-13	µg/L	5	U	NT		5	U	NT		**0.14**	**=**	**0.091**	**LJ**	**0.097**	**LJ**	**0.0111**	**=**	NT		**0.11**	**=**	0.1	U
DMW-02	DMW2-1304-FD	15-Apr-13	µg/L	5	U	NT		5	U	NT		0.1	U	0.1	U	0.1	U	**0.0192**	**=**	NT		**0.1**	**=**	0.1	U

Notes:

µg/L = micrograms per liter

= - analyte detected

BaP = benzo(a)pyrene

HS = hydrasleeve sample

J = The analyte was positively identified; the result is estimated.

L = The analyte was positively identified, but the associated numerical value may be biased low.

TEF = toxicity equivalent factor

U = The analyte was analyzed for, but not detected.

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Table 3-6. Shallow Aquifer Groundwater Summary for Draft Feasibility Study COCs 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample Id	Date	Units	Chrysene	Q	Dibenz(a,h)a	Q	Dibenzofuran	Q	Ethylbenzene	Q	Fluoranthene	Q	Naphthalene	Q	Penta-	Q	Phenanthrene	Q	Pyrene	Q	Xylenes	Q
SP-12	**SP12-1304**	**16-Apr-13**	**µg/L**	0.1	U	0.1	U	5	U	NT		0.1	U	**1.4**	**=**	0.2	UJ	**0.26**	**=**	0.1	U	NT	
TP-01	**TP01-1504**	**14-Apr-15**	**µg/L**	20	U	20	U	**195**	**=**	NT		**17.7**	**=**	**3610**	**=**	10	U	**182**	**=**	**9.8**	**=**	NT	
TP-01	**TP01-1404**	**14-Apr-14**	**µg/L**	8	U	8	U	**142**	**=**	NT		**9**	**=**	**2430**	**=**	4	U	**113**	**=**	**4.4**	**=**	NT	
TP-01	**TP01-1304**	**15-Apr-13**	**µg/L**	20	U	20	U	**175**	**=**	NT		**12.6**	**=**	**3360**	**=**	10	U	**140**	**=**	**7.3**	**=**	NT	
DMW-02	DMW2-1504 <F9N02>	**15-Apr-15**	**µg/L**	0.1	U	0.1	U	**1.1**	**LJ**	NT		0.1	U	**7.3**	**=**	0.2	U	**0.43**	**=**	0.1	U	NT	
DMW-02	DMW2-1504-FD <F9N03>	**15-Apr-15**	**µg/L**	0.1	U	0.1	U	**1.1**	**LJ**	NT		0.1	U	**7.4**	**=**	0.2	U	**0.44**	**=**	0.1	U	NT	
DMW-02	**DMW2-1410**	**7-Oct-14**	**µg/L**	0.1	U	0.1	U	5	U	NT		0.1	U	**0.098**	**LJ**	0.2	U	**0.11**	**=**	0.1	U	NT	
DMW-02	**DMW2-1410-FD**	**7-Oct-14**	**µg/L**	**0.16**	**=**	0.1	U	5	U	NT		**0.73**	**=**	**0.45**	**=**	0.2	U	**1.9**	**=**	**0.45**	**=**	NT	
DMW-02	**DMW2-1404**	**17-Apr-14**	**µg/L**	0.1	U	0.1	U	5	U	NT		0.1	U	**1.3**	**=**	0.2	U	**0.089**	**LJ**	0.1	U	NT	
DMW-02	**DMW2-1404-FD**	**17-Apr-14**	**µg/L**	0.1	U	0.1	U	5	U	NT		0.1	U	**1.6**	**=**	0.2	U	**0.1**	**=**	0.1	U	NT	
DMW-02	**DMW2-1311**	**12-Nov-13**	**µg/L**	**0.12**	**=**	0.1	U	5	U	NT		**0.18**	**=**	0.1	U	0.2	U	**0.11**	**=**	**0.2**	**=**	NT	
DMW-02	**DMW2-1304**	**15-Apr-13**	**µg/L**	**0.11**	**=**	0.1	U	5	U	NT		**0.3**	**=**	**0.59**	**=**	0.2	UJ	**0.41**	**=**	**0.23**	**=**	NT	
DMW-02	**DMW2-1304-FD**	**15-Apr-13**	**µg/L**	**0.098**	**LJ**	0.1	U	5	U	NT		**0.22**	**=**	0.1	U	0.2	UJ	**0.19**	**=**	**0.18**	**=**	NT	

Notes:

µg/L = micrograms per liter

= - analyte detected

BaP = benzo(a)pyrene

HS = hydrasleeve sample

J = The analyte was positively identified; the result is estimated.

L = The analyte was positively identified, but the associated numerical value may be biased low.

TEF = toxicity equivalent factor

U = The analyte was analyzed for, but not detected.

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Table 3-7A. Deep Aquifer Groundwater Carcinogenic PAH and BAP TEQ Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) anthracene		Indeno (1,2,3-cd) pyrene		BAP TEQ	
DMW-01	DMW1-1504	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-01	DMW1-1404	15-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-01	DMW1-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1504	15-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1504-FD	15-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1404-FD	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1410	07-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-02	DMW2-1410-FD	07-Oct-14	µg/L	0.15	=	0.1	U	0.1	U	0.1	U	0.16	=	0.1	U	0.1	U	0.02	=
DMW-02	DMW2-1311	12-Nov-13	µg/L	0.087	LJ	0.1	U	0.1	U	0.1	U	0.12	=	0.1	U	0.1	U	0.01	=
DMW-02	DMW2-1304	15-Apr-13	µg/L	0.11	=	0.1	U	0.1	U	0.1	U	0.11	=	0.1	U	0.1	U	0.01	=
DMW-03	DMW3-1504	16-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-03	DMW3-1404	16-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
DMW-03	DMW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-02	MW2-1504	17-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-02	MW2-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-02	MW2-1304	15-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-03	MW3-1504	15-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-03	MW3-1404	15-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
MW-03	MW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U

Notes:

BaP = benzo(a)pyrene

µg/L = microgram per liter

= indicates analyte detected

J = The analyte was positively identified; the result is estimated.

L = The analyte was positively identified, but the associated numerical value may be biased low.

LJ = The analyte was positively identified, the result is estiumated and the associated numerical value may be biased low.

PAH = polycyclic aromatic hydrocarbon

TEQ = toxicity equivalent quotient

U = The analyte was analyzed for, but not detected.

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Table 3-7B. Deep Aquifer Groundwater Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene		Acenaphthylene		Anthracene		Benzo (g,h,i) Perylene		Fluoranthene		Fluorene		Naphthalene		Phenanthrene		Pyrene		Total PAH	
DMW-01	DMW1-1504	17-Apr-15	µg/L	0.41	=	0.1	U	0.31	=	0.1	U	0.1	U	0.36	=	0.64	=	0.1	=	0.12	=	2.44	=
DMW-01	DMW1-1404	15-Apr-14	µg/L	0.1	U	0.037	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.79	LJ
DMW-01	DMW1-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.80	U
DMW-02	DMW2-1504	15-Apr-15	µg/L	1.3	=	0.16	=	0.1	U	0.1	U	0.1	U	0.82	=	7.3	=	0.43	=	0.1	U	10.6	=
DMW-02	DMW2-1504-FD	15-Apr-15	µg/L	1.3	=	0.15	=	0.1	U	0.1	U	0.1	U	0.81	=	7.4	=	0.44	=	0.1	U	10.6	=
DMW-02	DMW2-1410	07-Oct-14	µg/L	0.078	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.084	LJ	0.098	LJ	0.11	=	0.1	U	0.97	=
DMW-02	DMW2-1410-FD	07-Oct-14	µg/L	0.4	=	0.081	LJ	0.28	=	0.1	U	0.73	=	0.54	=	0.45	=	1.9	=	0.45	=	5.44	=
DMW-02	DMW2-1404	17-Apr-14	µg/L	0.14	=	0.1	U	0.1	U	0.1	U	0.1	U	0.1	=	1.3	=	0.089	LJ	0.1	U	2.23	=
DMW-02	DMW2-1404-FD	17-Apr-14	µg/L	0.16	=	0.1	U	0.1	U	0.1	U	0.1	U	0.11	=	1.6	=	0.1	=	0.1	U	2.57	=
DMW-02	DMW2-1311	12-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.091	LJ	0.18	=	0.1	U	0.1	U	0.11	=	0.2	=	1.29	=
DMW-02	DMW2-1304	15-Apr-13	µg/L	0.14	=	0.091	LJ	0.097	LJ	0.14	=	0.3	=	0.15	=	0.59	=	0.41	=	0.23	=	2.62	=
DMW-03	DMW3-1504	16-Apr-15	µg/L	0.28	=	0.1	U	0.1	U	0.1	U	0.1	U	0.29	=	0.97	=	0.32	=	0.1	U	2.46	=
DMW-03	DMW3-1404	16-Apr-14	µg/L	0.081	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.078	LJ	0.09	LJ	0.15	=	0.1	U	1.00	LJ
DMW-03	DMW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.11	=	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.86	=
MW-02	MW2-1504	17-Apr-15	µg/L	0.11	=	0.1	U	0.1	U	0.1	U	0.1	U	0.15	=	0.38	=	0.15	=	0.1	U	1.39	=
MW-02	MW2-1404	17-Apr-14	µg/L	0.034	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.053	LJ	0.12	=	0.12	=	0.1	U	0.93	=
MW-02	MW2-1304	15-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.80	U
MW-03	MW3-1504	15-Apr-15	µg/L	0.14	=	0.1	U	0.1	U	0.1	U	0.1	U	0.15	=	0.52	=	0.12	=	0.1	U	1.53	=
MW-03	MW3-1404	15-Apr-14	µg/L	0.054	LJ	0.1	U	0.1	U	0.1	U	0.1	U	0.063	LJ	0.24	=	0.075	LJ	0.1	U	1.03	=
MW-03	MW3-1304	17-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.80	U

Notes:

µg/L = microgram per liter
= indicates analyte detected
J = The analyte was positively identified; the result is estimated.
L = The analyte was positively identified, but the associated numerical value may be biased low.
LJ = The analyte was positively identified, the result is estiumated and the associated numerical value may be biased low
PAH = polycyclic aromatic hydrocarbon
TEQ = toxicity equivalent quotient
U = The analyte was analyzed for, but not detected.

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Table 3-8A. Creosote Branch Surface Water Carcinogenic PAH and BAP TEQ Concentration Summary for 2015 to 2013
American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b) Fluoranthene		Benzo (k) Fluoranthene		Chrysene		Dibenzo(a,h) anthracene		Indeno (1,2,3-cd) pyrene		BAP TEQ	
SW-01	SW1-1504	13-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-01	SW1-1410	09-Oct-14	µg/L	0.1	UJ	0.1	UJ	0.1	UJ	0.1	UJ	0.1	UJ	0.1	UJ	0.1	UJ	0	UJ
SW-01	SW1-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-01	SW1-1311	13-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-01	SW1-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-21	SW21-1504	16-Apr-15	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-21	SW21-1410	09-Oct-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-21	SW21-1404	17-Apr-14	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-21	SW21-1311	13-Nov-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U
SW-21	SW21-1304	18-Apr-13	µg/L	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0	U

Notes:

BAP = Benzo(a)pyrene

µg/L = microgram per liter

U = The analyte was analyzed for, but not detected.

UJ = The analyte was analyzed for but not detected; the detection limit is estimated.

PAH = polycyclic aromatic hydrocarbon

TEQ = toxicity equivalent quotient

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Table 3-8B. Creosote Branch Surface Water Non-Carcinogenic PAH and Total PAH Concentration Summary for 2015 to 2013

American Creosote Works, Winnfield, Louisiana

Station ID	Sample ID	Date Collected	Units	Acenaphthene	Acenaphthylene	Anthracene	Benzo (g,h,i) Perylene	Fluoranthene	Fluorene	Naphthalene	Phen anthrene	Pyrene	Total PAH	Pentachloro-phenol
		PLTS Effluent Criteria	µg/L		**47**	**47**	**100**	**54**	**47**	**47**	**47**	**48**	**Not Applicable**	**100**
Surface Water														
SW-01	SW1-1504	13-Apr-15	µg/L	0.16 =	0.1 U	0.1 U	0.1 U	0.1 U	0.14 =	0.4 =	0.079 LJ	0.1 U	1.38 LJ	0.2 U
SW-01	SW1-1410	09-Oct-14	µg/L	0.15 J	0.1 UJ	0.17 Jv	0.1 UJ	0.1 UJ	0.14 J	0.14 J	0.095 LJ	0.1 UJ	1.25 J	0.2 UJ
SW-01	SW1-1404	17-Apr-14	µg/L	0.088 LJ	0.1 U	0.1 U	0.1 U	0.1 U	0.05 LJ	0.42 =	0.058 LJ	0.1 U	1.22 =	0.07 LJ
SW-01	SW1-1311	13-Nov-13	µg/L	0.08 LJ	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.14 =	0.1 U	0.1 U	0.92 =	0.20 U
SW-01	SW1-1304	18-Apr-13	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.80 U	0.20 U
SW-21	SW21-1504	16-Apr-15	µg/L	0.17 =	0.1 U	0.08 LJ	0.1 U	0.08 LJ	0.12 =	0.35 =	0.12 =	0.1 U	1.42 LJ	0.24 =
SW-21	SW21-1410	09-Oct-14	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.12 =	0.1 U	0.1 U	0.1 U	0.87 =	0.66 =
SW-21	SW21-1404	17-Apr-14	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.80 U	0.18 LJ
SW-21	SW21-1311	13-Nov-13	µg/L	0.1 U	0.1 U	0.1 U	0.10 LJ	0.1 U	0.1 U	0.10 LJ	0.1 U	0.1 U	0.90 LJ	0.20 U
SW-21	SW21-1304	18-Apr-13	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.80 U	0.20 U

Notes:

µg/L = microgram per liter

= indicates detected

J = The analyte was positively identified; the result is estimated.

Jv: The analyte was positively identified; the result is estimated and biased low.

L = The analyte was positively identified, but the associated numerical value may be biased low.

LJ: = The analyte was positively identified, the result is estimated and the associated numerical value may be biased low.

PAH = polycyclic aromatic hydrocarbon

U = The analyte was analyzed for, but not detected.

UJ = The analyte was analyzed for but not detected; the detection limit is estimated.

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Table 3-9. Performance-Based Contracting Metric - Monthly Summary for 2015

American Creosote Works, Winnfield, Louisiana

	Incentive Fee Evaluation Criteria														
	Remedial Action Accomplishments					Quality Assurance					Other Non-Fee Criteria Tracked for O&M Only			Total Incentive Fee (Labor)	
Month and Year	Actual Run Time (Percent)	Incentive Fee (Percent)	Percent of Inward Hydraulic Gradient "Yes" Values	Incentive Fee (Percent)	Subtotal Incentive Fee (percent)	Meter Readings and Calibration Performed?	FOP Sampling and Analysis Performed?	PLTS Effluent Discharge Criteria Met?	No Lost-Time Accidents?	Subtotal Incentive Fee (Percent)	6-Month Moving Average Fluids Extracted (gal)	6-Month Moving Average Monthly Operations Cost	6-Month Moving Average ($/gal)	Earned (Percent)	Available (Percent)
WPA 8 Revised PBCM															
01/31/15	96.0%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	214,960	$ 46,595	$ 0.0255	10.00	10.00
02/27/15	97.0%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	211,741	$ 47,512	$ 0.0281	10.00	10.00
03/27/15	73.2%	0.00	75.0%	0.00	0.00	Yes	Yes	Yes	Yes	4.00	204,189	$ 45,210	$ 0.0333	4.00	10.00
04/24/15	93.9%	3.00	100.0%	2.00	5.00	Yes	Yes	Yes	Yes	4.00	215,586	$ 40,612	$ 0.0235	9.00	10.00
05/29/15	99.5%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	253,956	$ 41,814	$ 0.0192	10.00	10.00
06/26/15	99.9%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	257,326	$ 41,175	$ 0.0203	10.00	10.00
07/31/15	98.3%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	257,181	$ 35,478	$ 0.0143	10.00	10.00
08/28/15	100.0%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	261,843	$ 33,695	$ 0.0147	10.00	10.00
09/25/15	98.9%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	274,517	$ 34,863	$ 0.0149	10.00	10.00
10/30/15	80.7%	2.00	76.7%	0.00	2.00	Yes	Yes	Yes	Yes	4.00	264,985	$ 37,231	$ 0.0267	6.00	10.00
11/27/15	100.0%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	260,049	$ 33,107	$ 0.0168	10.00	10.00
12/26/15	98.8%	4.00	100.0%	2.00	6.00	Yes	Yes	Yes	Yes	4.00	253,513	$ 31,168	$ 0.0165	10.00	10.00

Notes:

% = percent
$ = United States dollars
FOP = field operations plan
gal = gallon(s)
O&M = operations and maintenance
PLTS = process liquid treatment system
PBCM = performance-based contracting metric
WPA = work plan amendment

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Figures

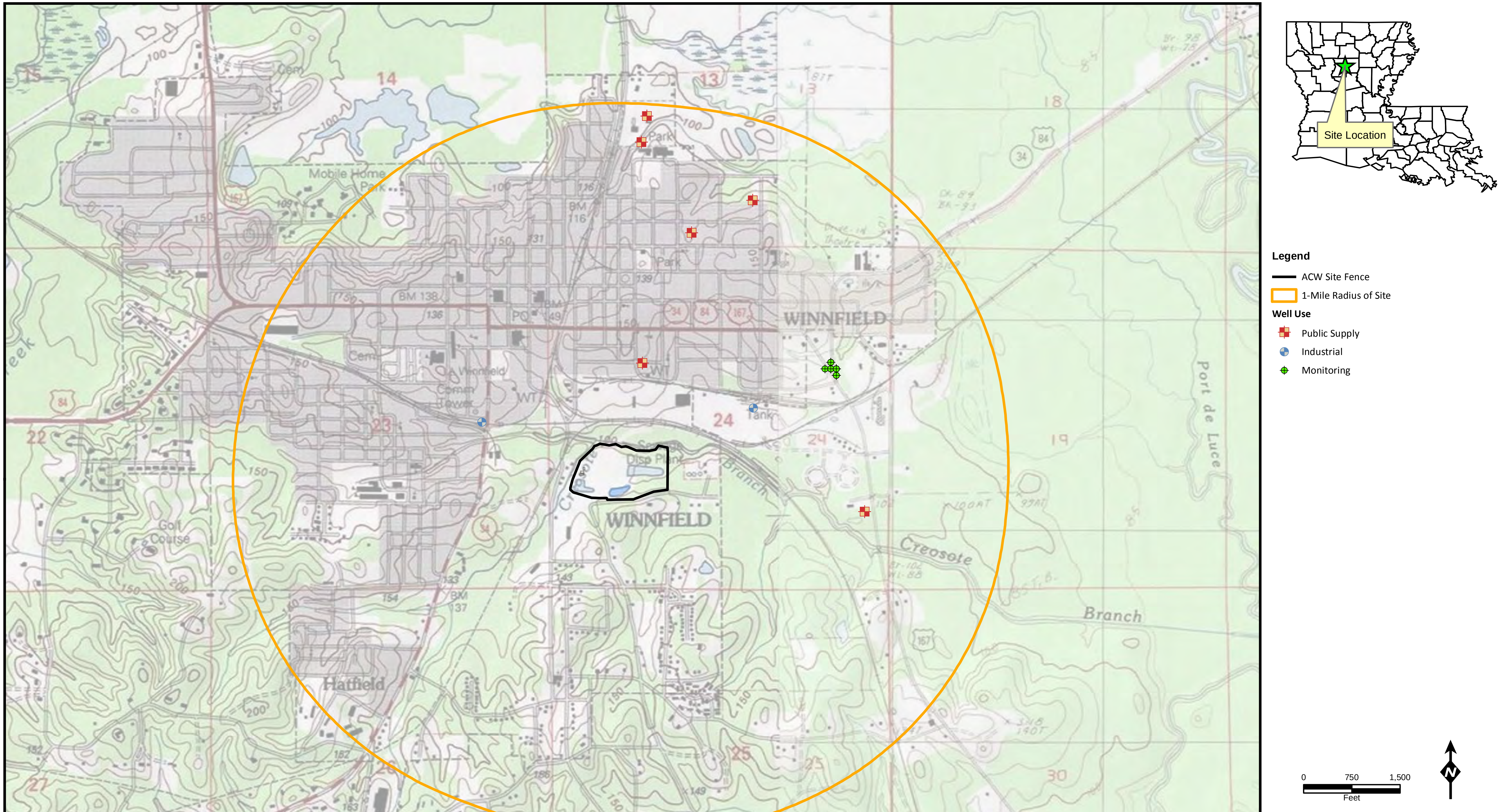

Figure 1-1.
Vicinity Map and Water Supply Well Locations
American Creosote Works
Winnfield, Louisiana

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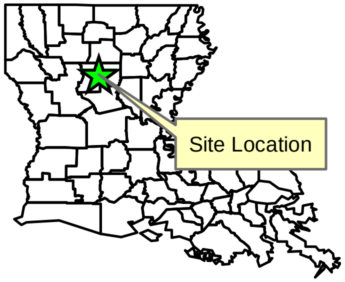

LEGEND

A ━━ A'	Location of CSM Section Shown in Figure 1-3

Note:
1. CSM = Conceptual Site Model

Figure 1-2.
American Creosote Works Site Map - 1999

American Creosote Works
Winnfield, Louisiana

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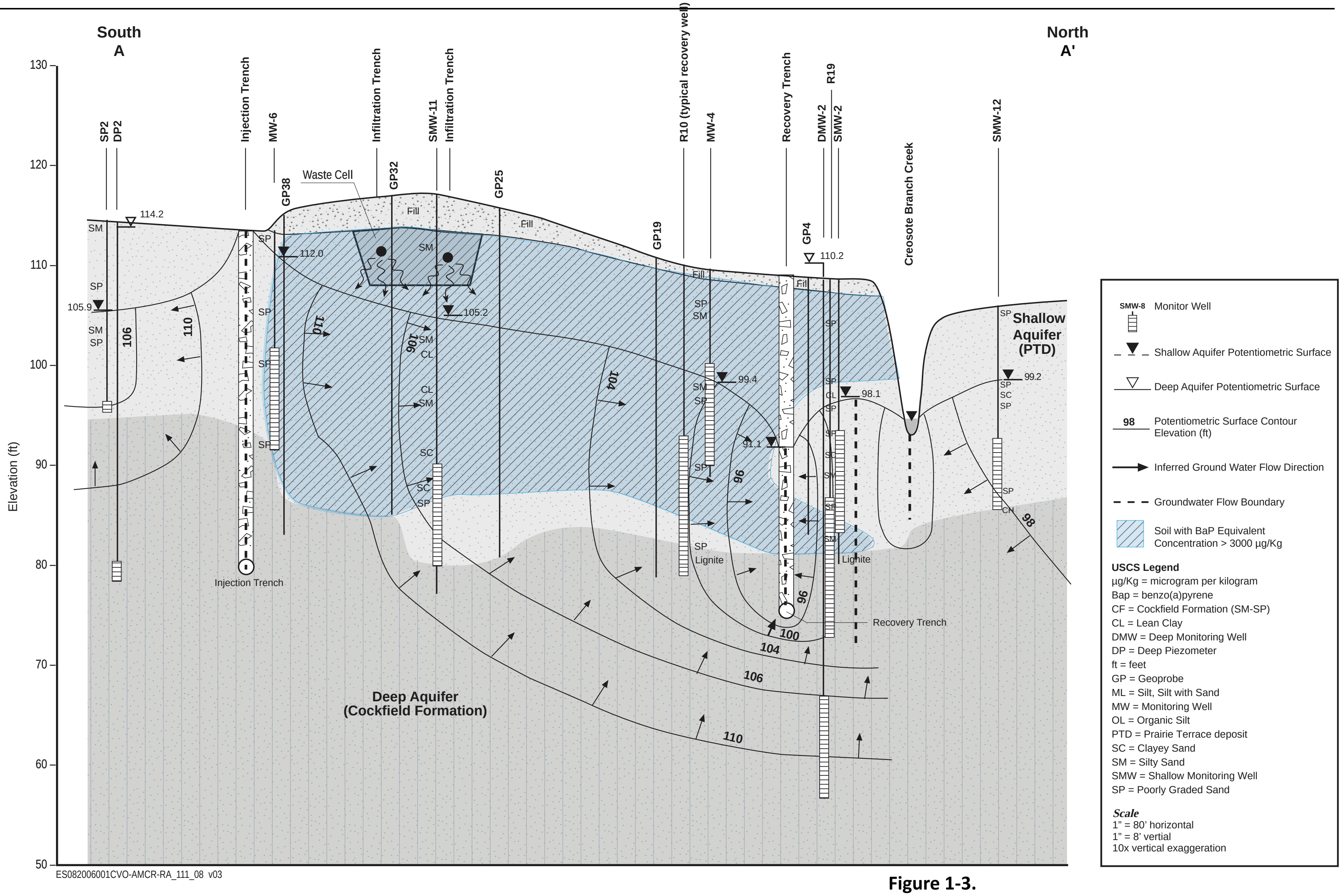

Figure 1-3.

Conceptual Hydrogeologic Model

American Creosote Works

Winnfield, Louisiana

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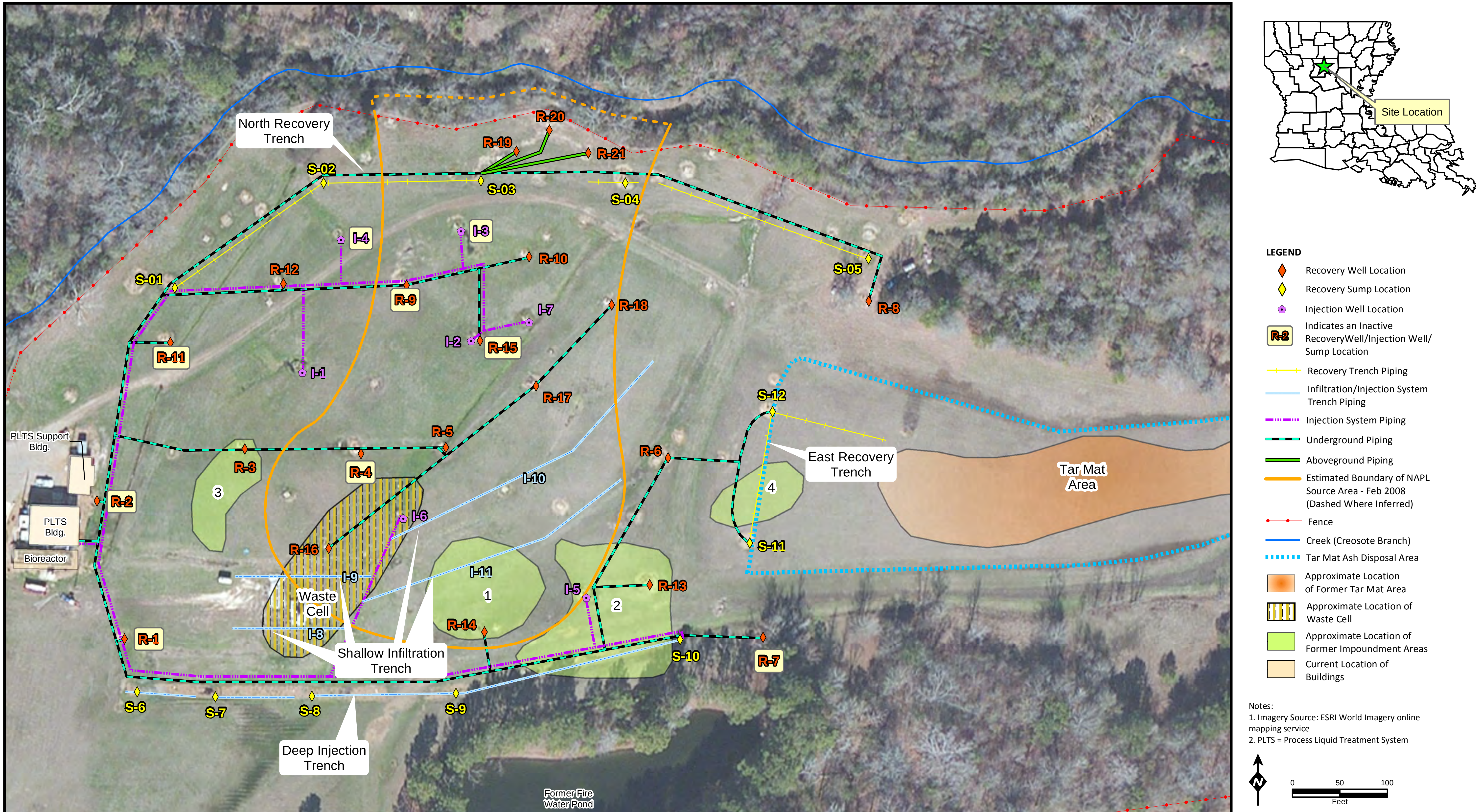

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System

Figure 1-4.
Current Site Map
American Creosote Works
Winnfield, Louisiana

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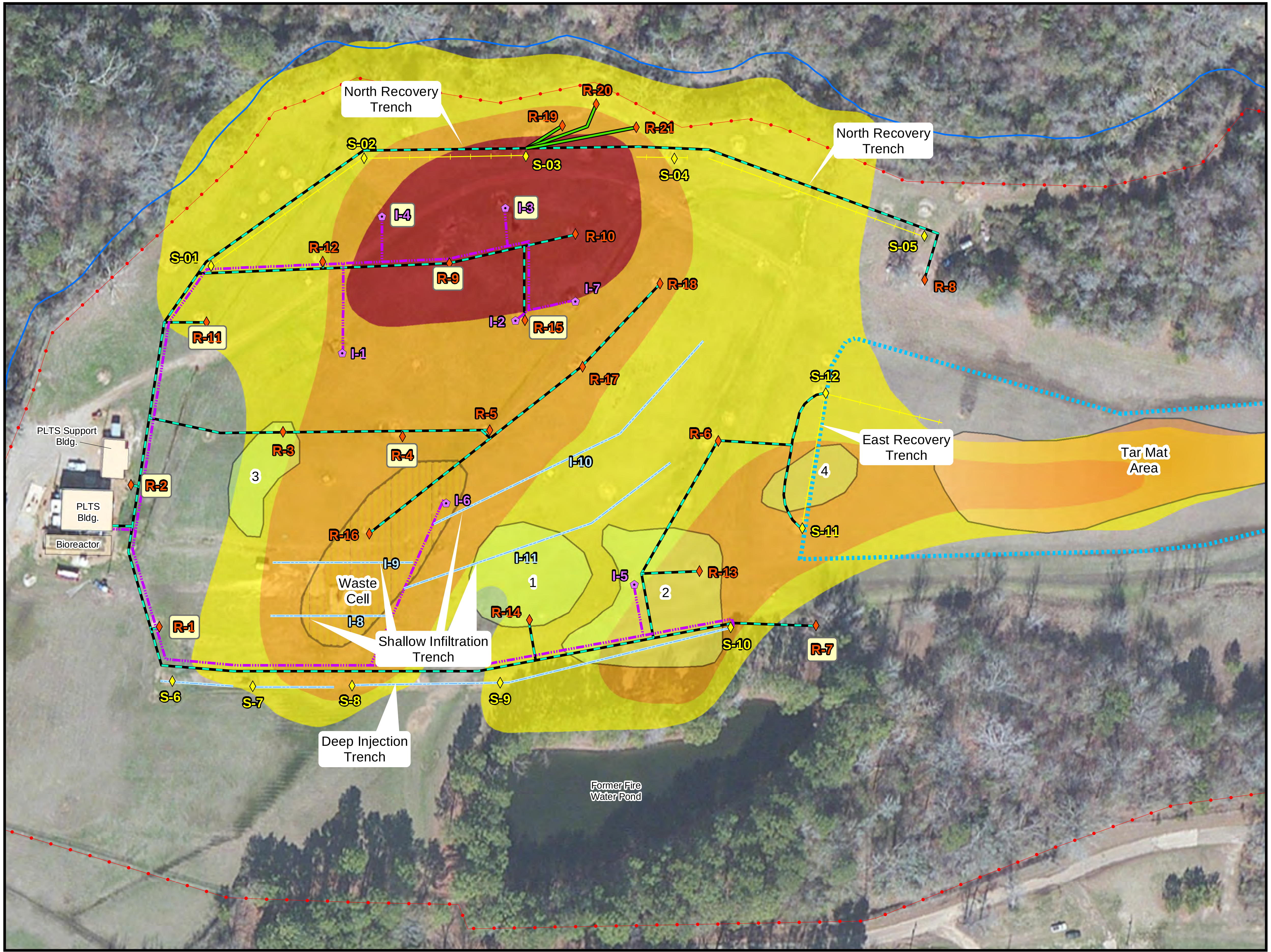

LEGEND

- ♦ Recovery Well Location
- ◊ Recovery Sump Location
- ⬟ Injection Well Location
- R-2 Indicates an Inactive RecoveryWell/Injection Well/ Sump Location
- Recovery Trench Piping
- Infiltration/Injection System Trench Piping
- Injection System Piping
- Underground Piping
- Aboveground Piping
- Fence
- Creek (Creosote Branch)
- Tar Mat Ash Disposal Area
- 🟧 Approximate Location of Former Tar Mat Area
- ▥ Approximate Location of Waste Cell
- 🟩 Approximate Location of Former Impoundment Areas
- ▭ Current Location of Buildings
- 🟨 Soil Contamination 0-10 ft.
- 🟧 Soil Contamination 0-20 ft.
- 🟥 Soil Contamination 0-30 ft.

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System
3. The estimated extent of contamination shown was geo-referenced from graphical information presented in the Remedial Investigation/Feasibility Study for American Creosote Works, Inc. Winnfield, Louisiania (CDM Federal Program, 1992)

N

0 50 100
Feet

Figure 1-5.
Initial Extent of Soil Contamination - June 1992
American Creosote Works
Winnfield, Louisiana

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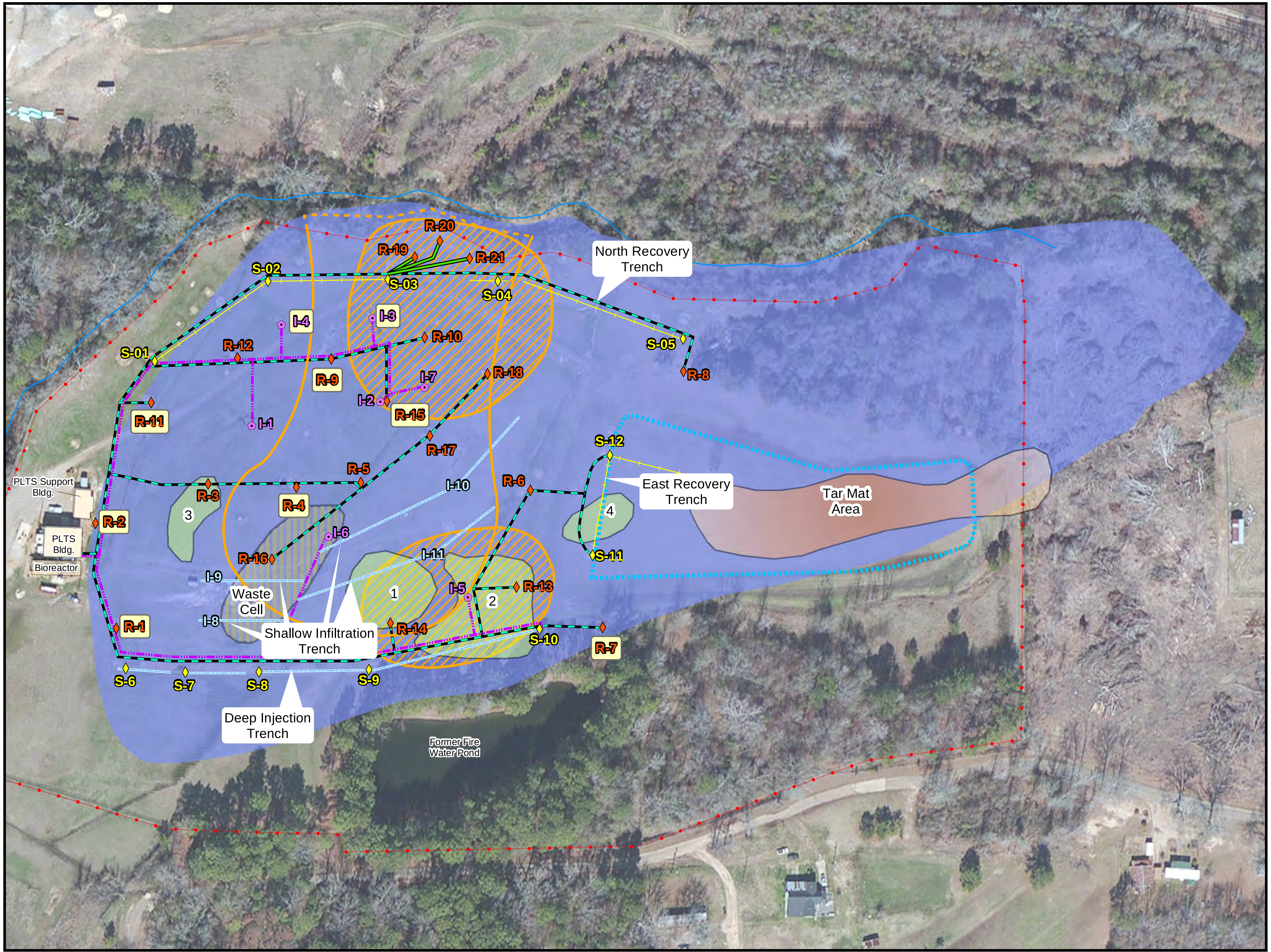

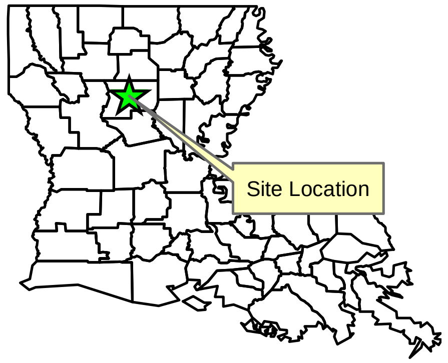

LEGEND

- ♦ Recovery Well Location
- ♦ Recovery Sump Location
- ⬟ Injection Well Location
- **R-2** Indicates an Inactive RecoveryWell/Injection Well/Sump Location
- Recovery Trench Piping
- Infiltration/Injection System Trench Piping
- Injection System Piping
- Underground Piping
- Aboveground Piping
- Estimated Boundary of NAPL Source Area - Feb 2008
- Fence
- Creek (Creosote Branch)
- Tar Mat Ash Disposal Area
- 🟧 Approximate Location of Former Tar Mat Area
- ▥ Approximate Location of Waste Cell
- 🟩 Approximate Location of Former Impoundment Areas
- 🟨 Current Location of Buildings
- 🟦 Estimated Extent of Shallow Groundwater Contamination (24 Million Gallons)
- ▨ Estimated Extent of Oil (1 Million Gallons)

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System
3. The estimated extent of contamination shown was geo-referenced from graphical information presented in the Remedial Investigation/Feasibility Study for American Creosote Works, Inc. Winnfield, Louisiana (CDM Federal Program, 1992)

N

0 67.5 135
Feet

Figure 1-6.
Estimated Extent of Groundwater Contamination - June 1992

American Creosote Works
Winnfield, Louisiana

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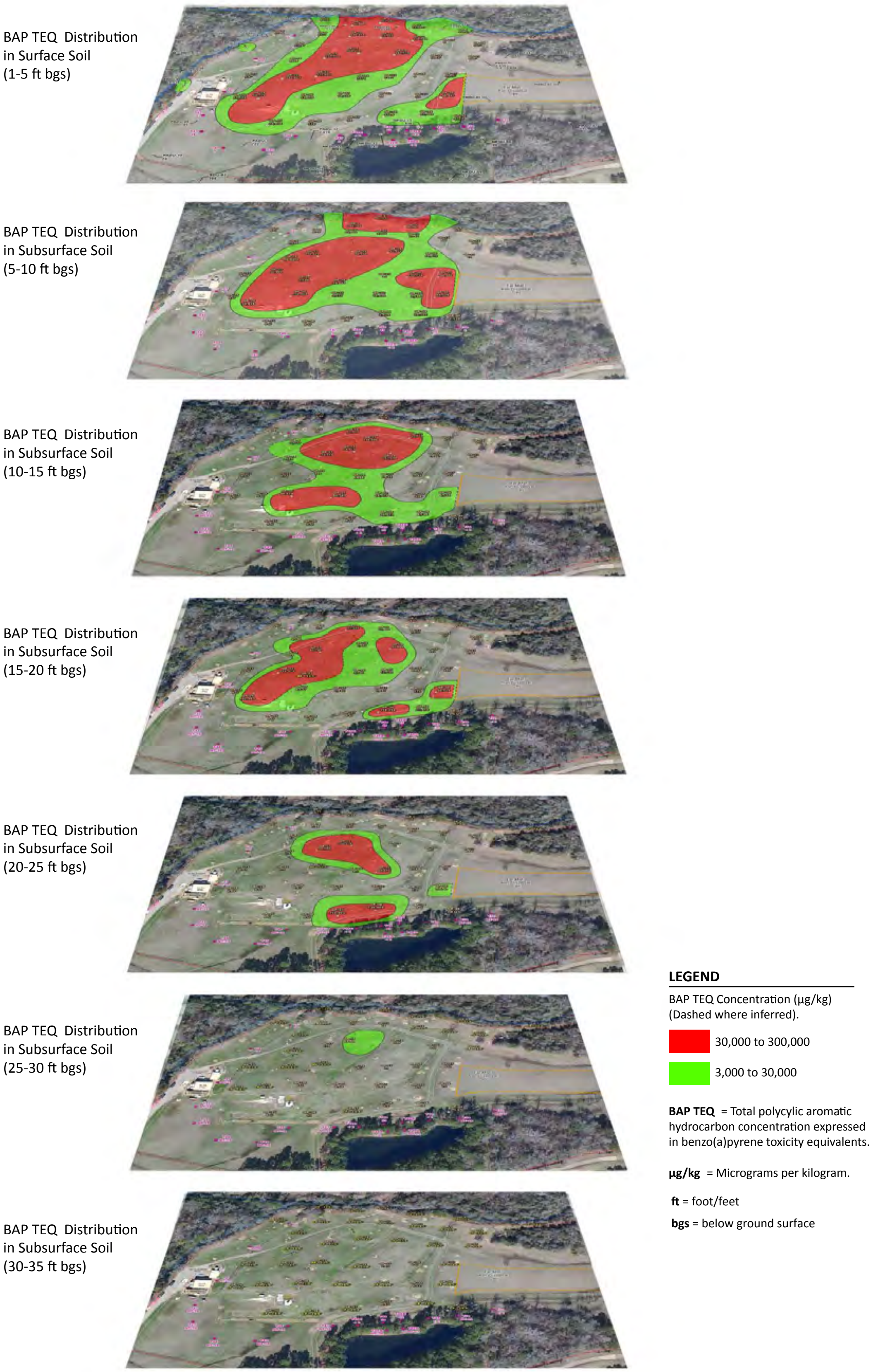

Figure 1-7.
BAP TEQ Distribution in Surface and Subsurface Soil
American Creosote Works
Winnfield, Louisiana

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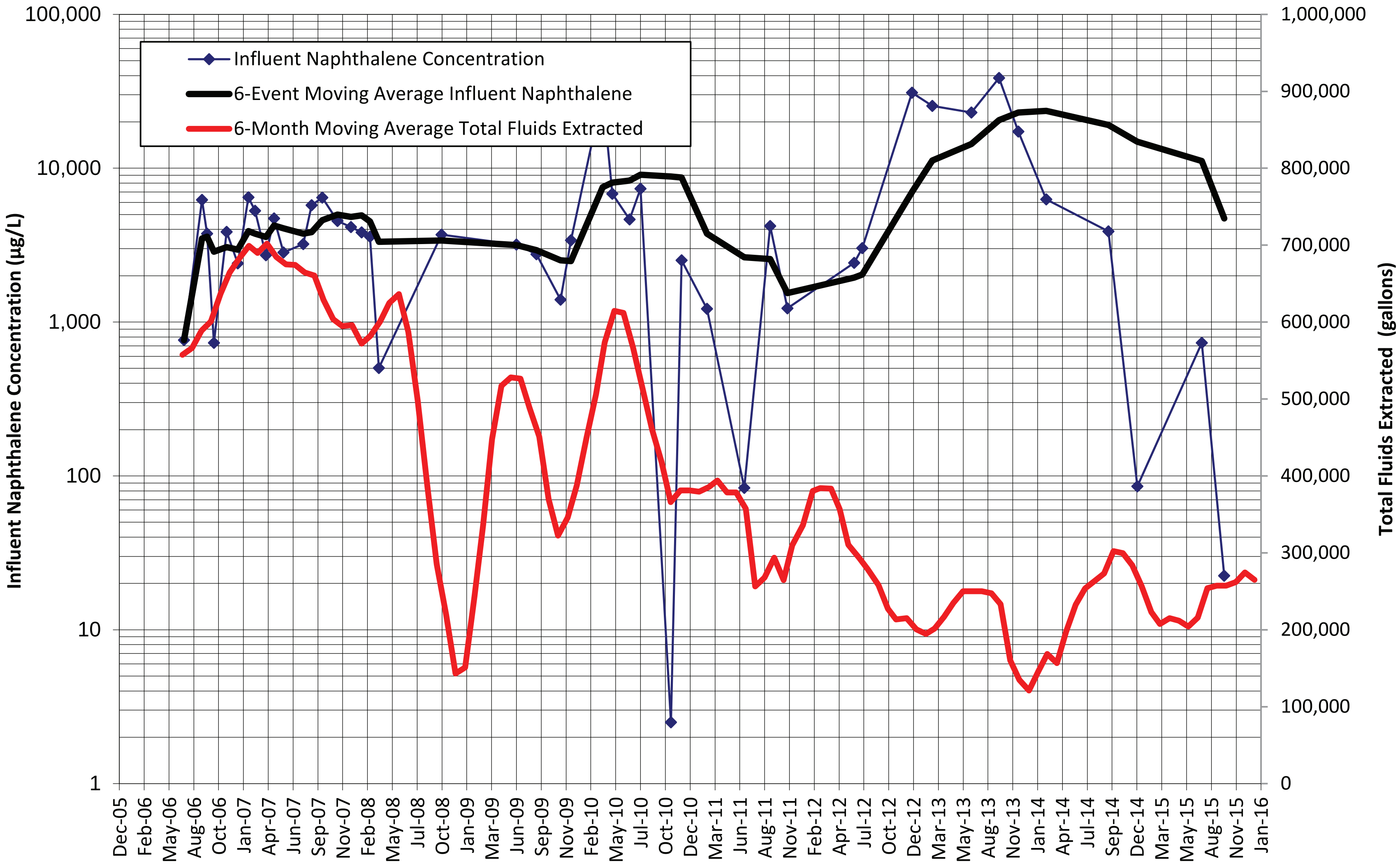

Figure 1-8.
Wellfield Influent Naphthalene Concentration Trends
American Creosote Works
Winnfield, Louisiana

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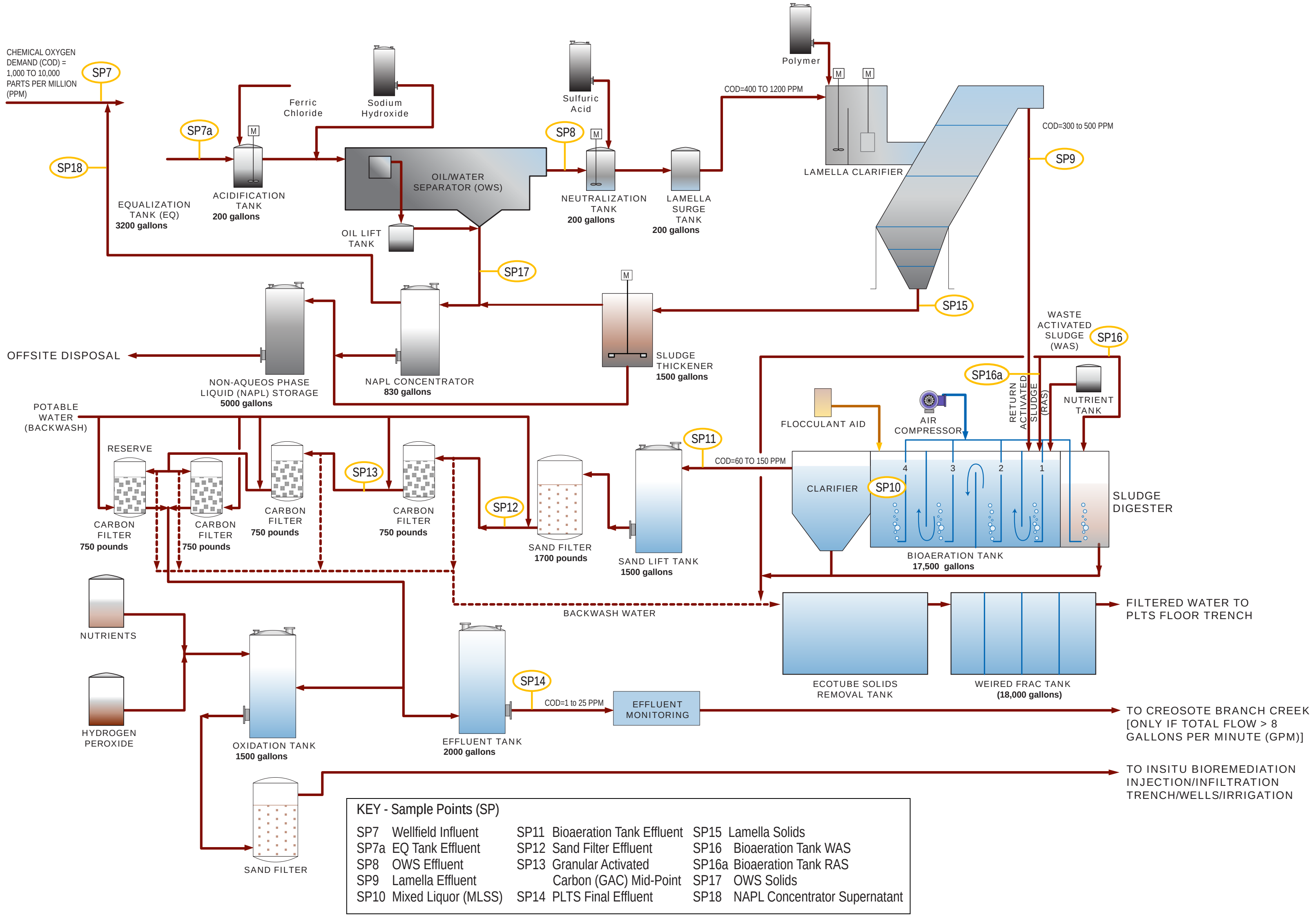

KEY - Sample Points (SP)

SP7	Wellfield Influent	SP11	Bioaeration Tank Effluent	SP15	Lamella Solids
SP7a	EQ Tank Effluent	SP12	Sand Filter Effluent	SP16	Bioaeration Tank WAS
SP8	OWS Effluent	SP13	Granular Activated Carbon (GAC) Mid-Point	SP16a	Bioaeration Tank RAS
SP9	Lamella Effluent			SP17	OWS Solids
SP10	Mixed Liquor (MLSS)	SP14	PLTS Final Effluent	SP18	NAPL Concentrator Supernatant

Figure 1-9.
Process Liquid Treatment System (PLTS) Process Flow Diagram
American Creosote Works
Winnfield, Louisiana

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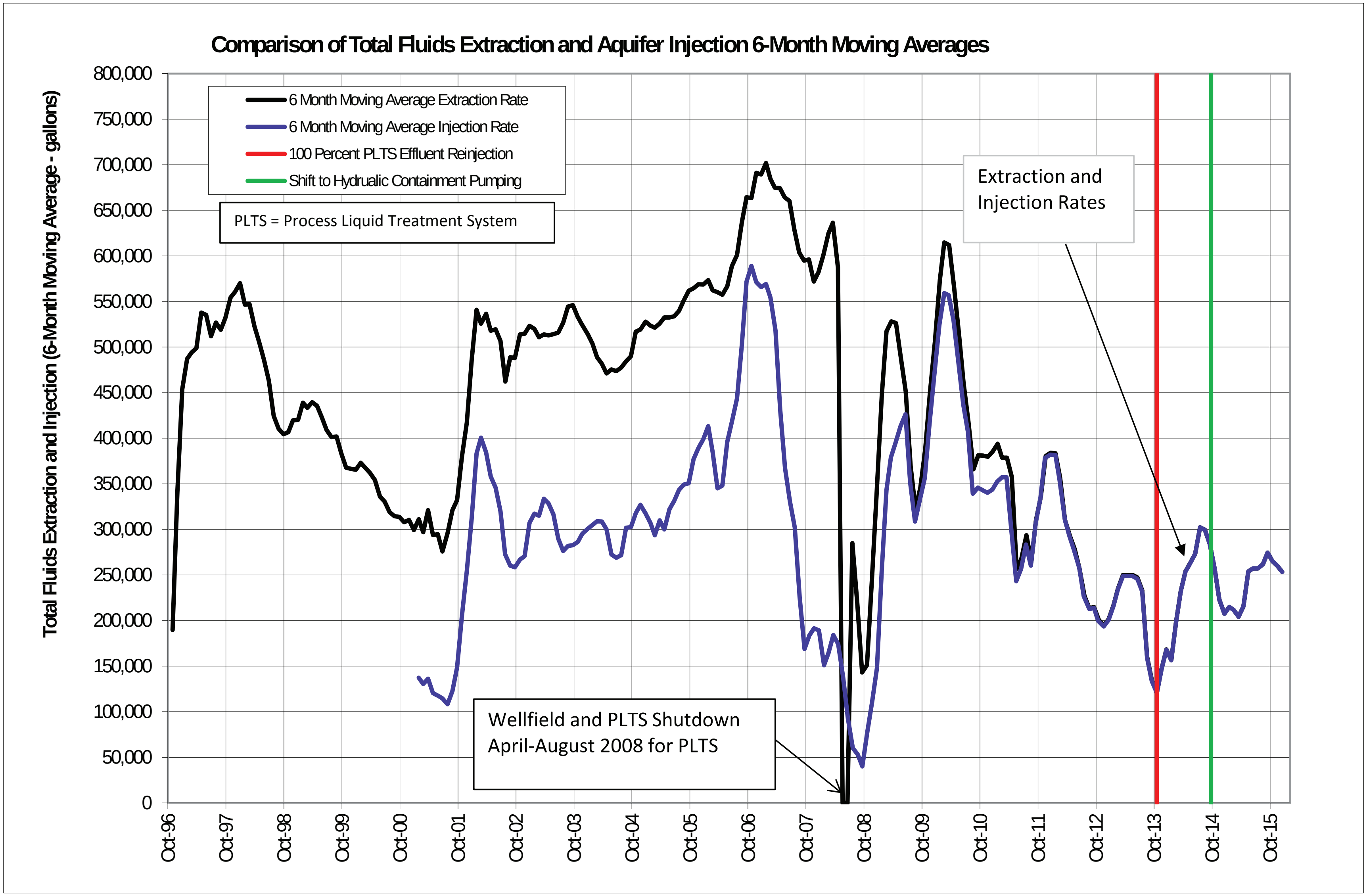

Figure 2-1.
Remedial Action Progress Summary
American Creosote Works
Winnfield, Louisiana

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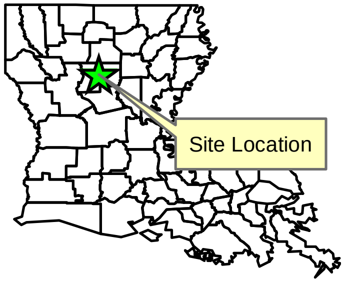

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● Stormwater Sample Location

Figure 2-2.
Stormwater Sample Locations
American Creosote Works
Winnfield, Louisiana

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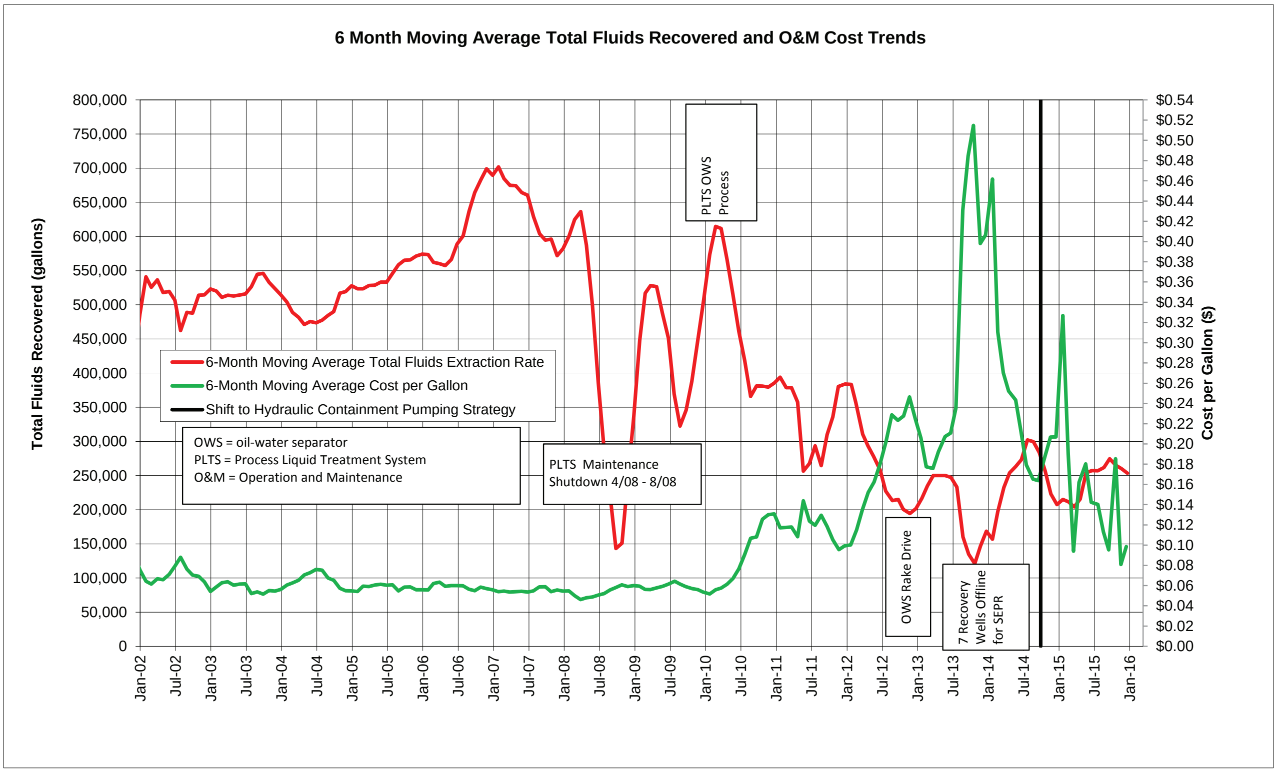

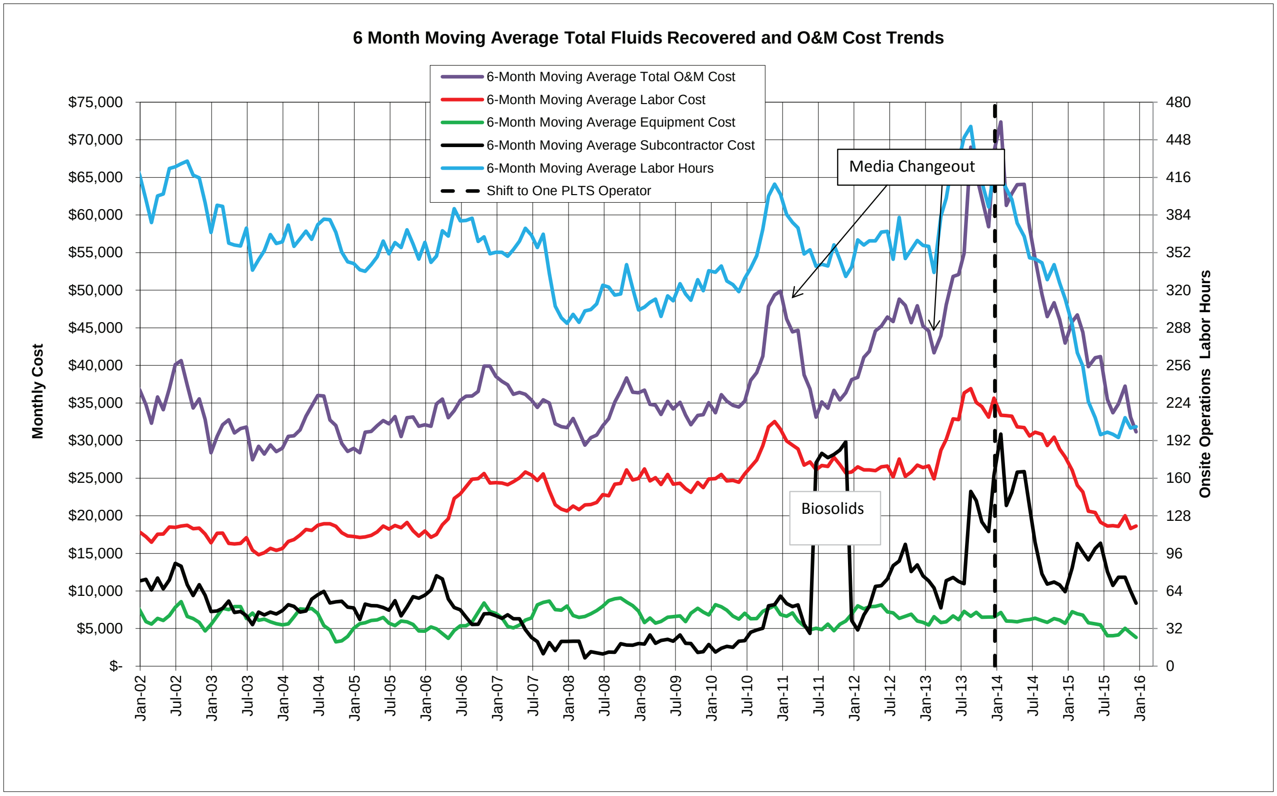

Figure 2-3.
Total Fluids Pumped with Operation and Maintenance Cost Trends
American Creosote Works
Winnfield, Louisiana

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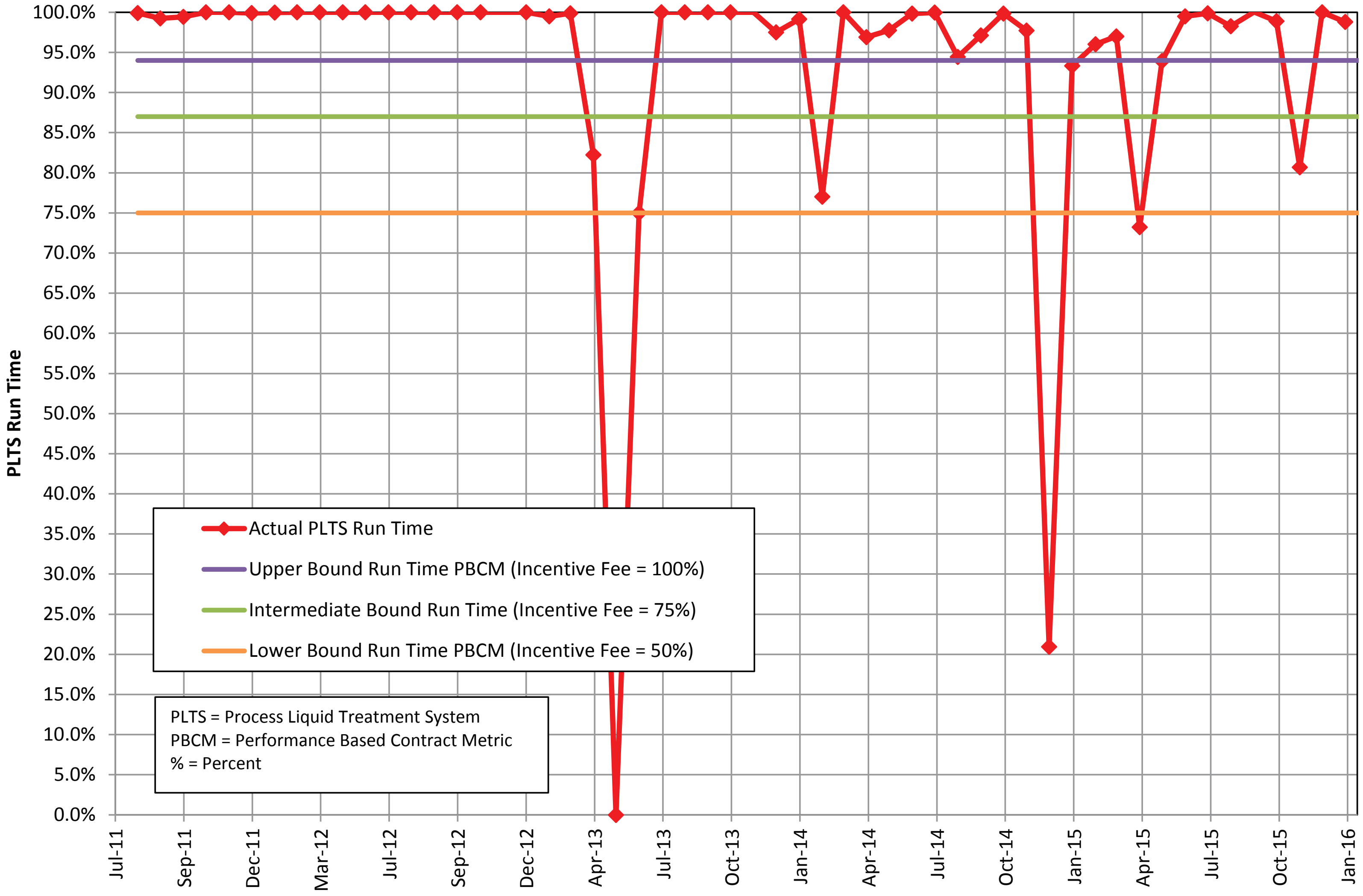

Figure 3-1.
PLTS Performance Run Time
Compared to PBCMs
American Creosote Works
Winnfield, Louisiana

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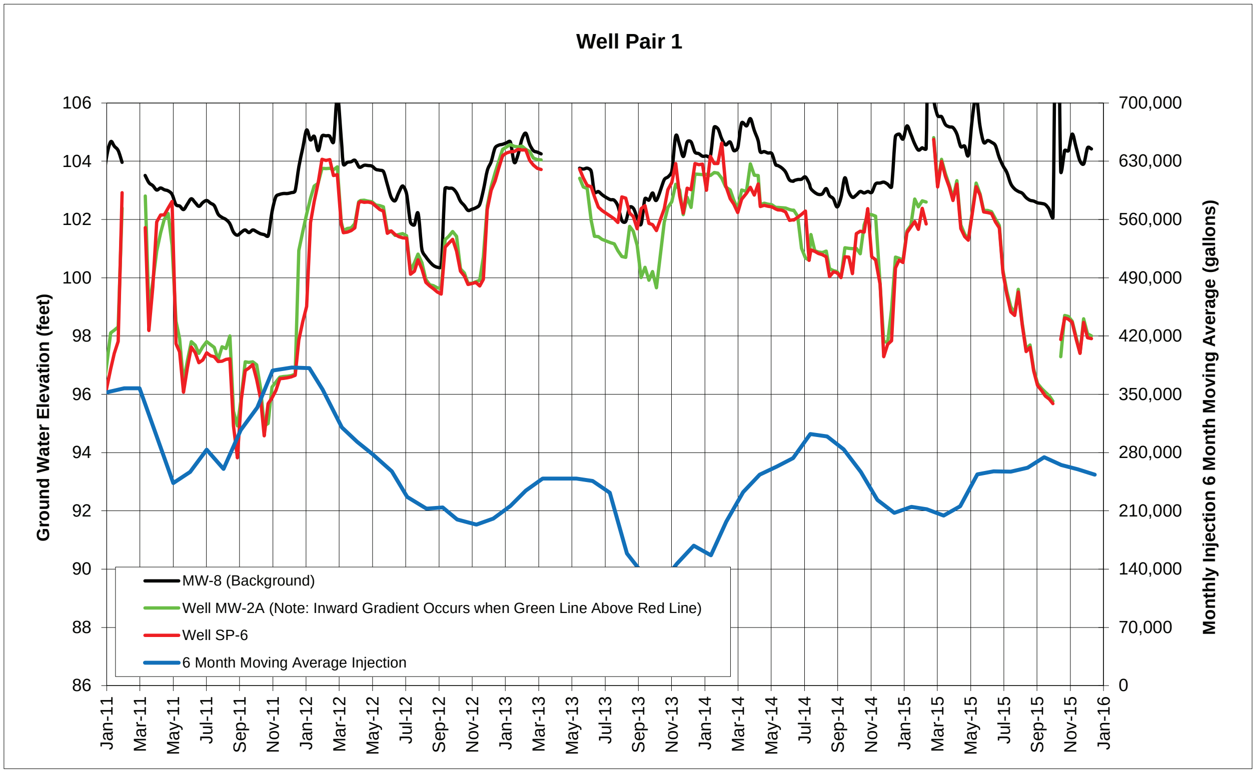

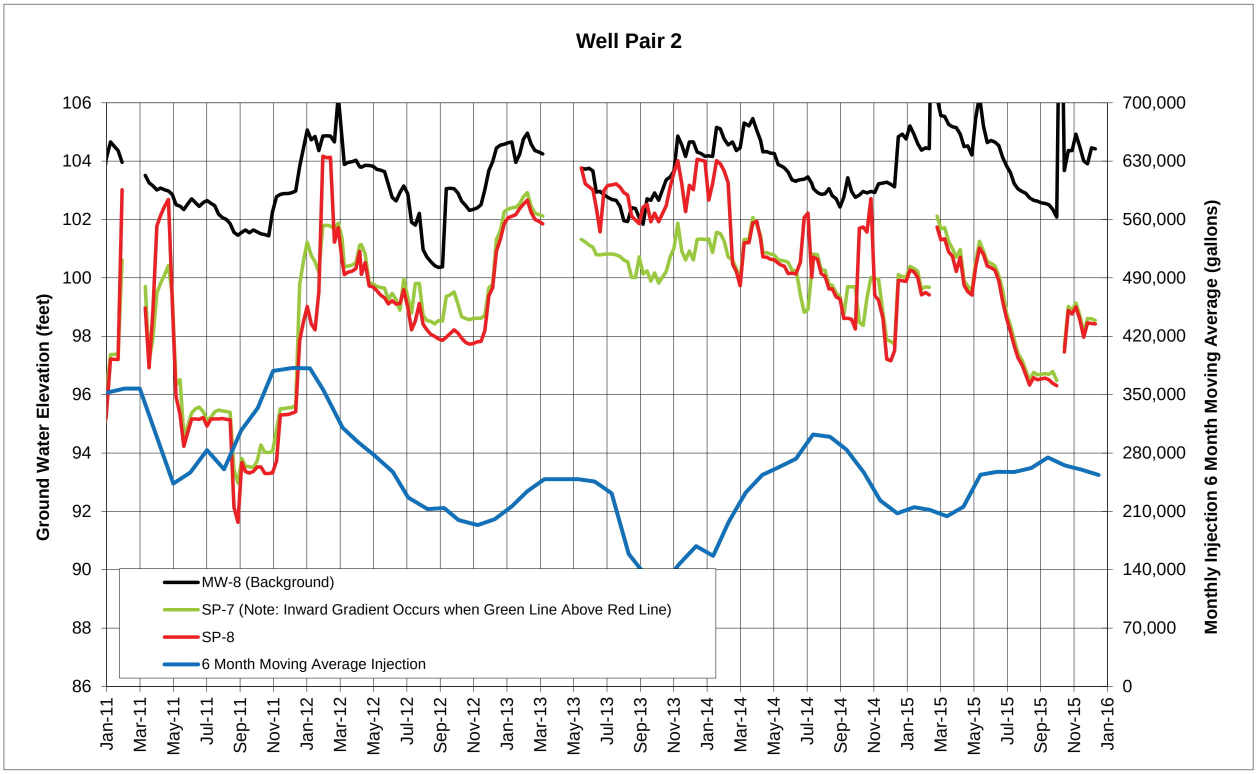

Figure 3-2A.
Shallow Aquifer Groundwater Elevation Trends at Well Pairs 1 and 2
American Creosote Works
Winnfield, Louisiana

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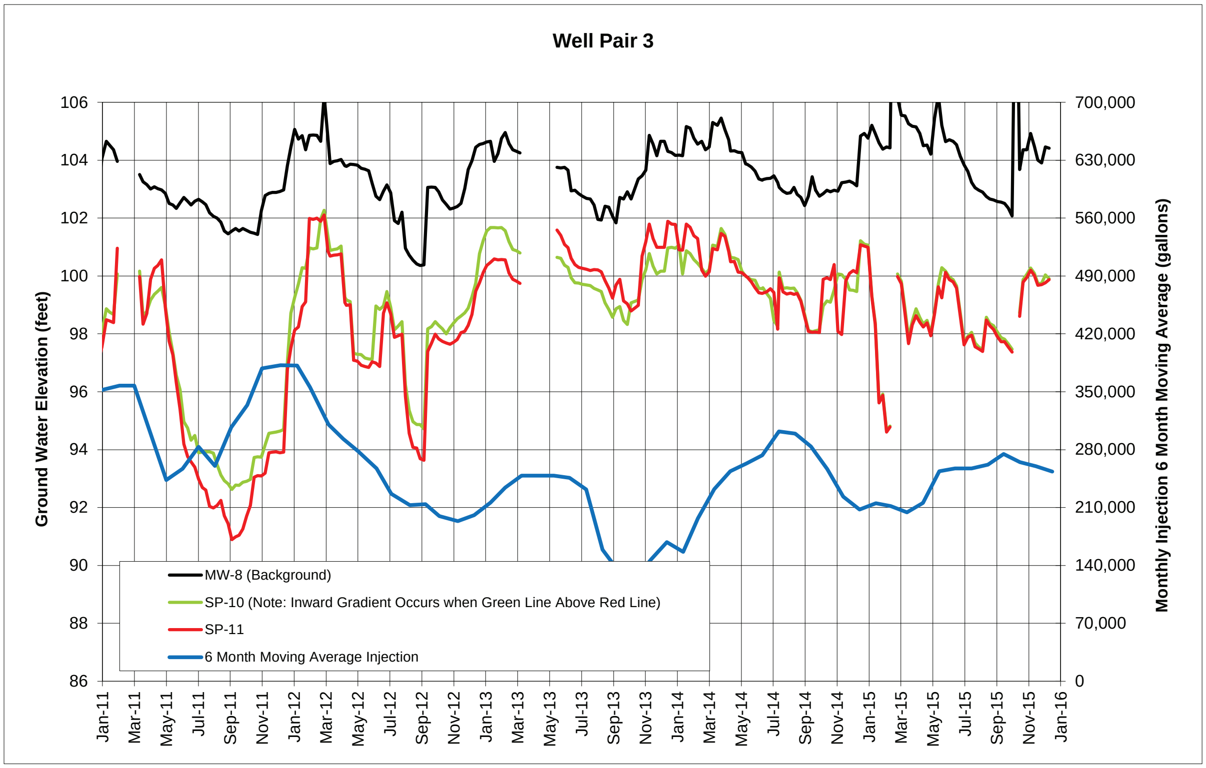

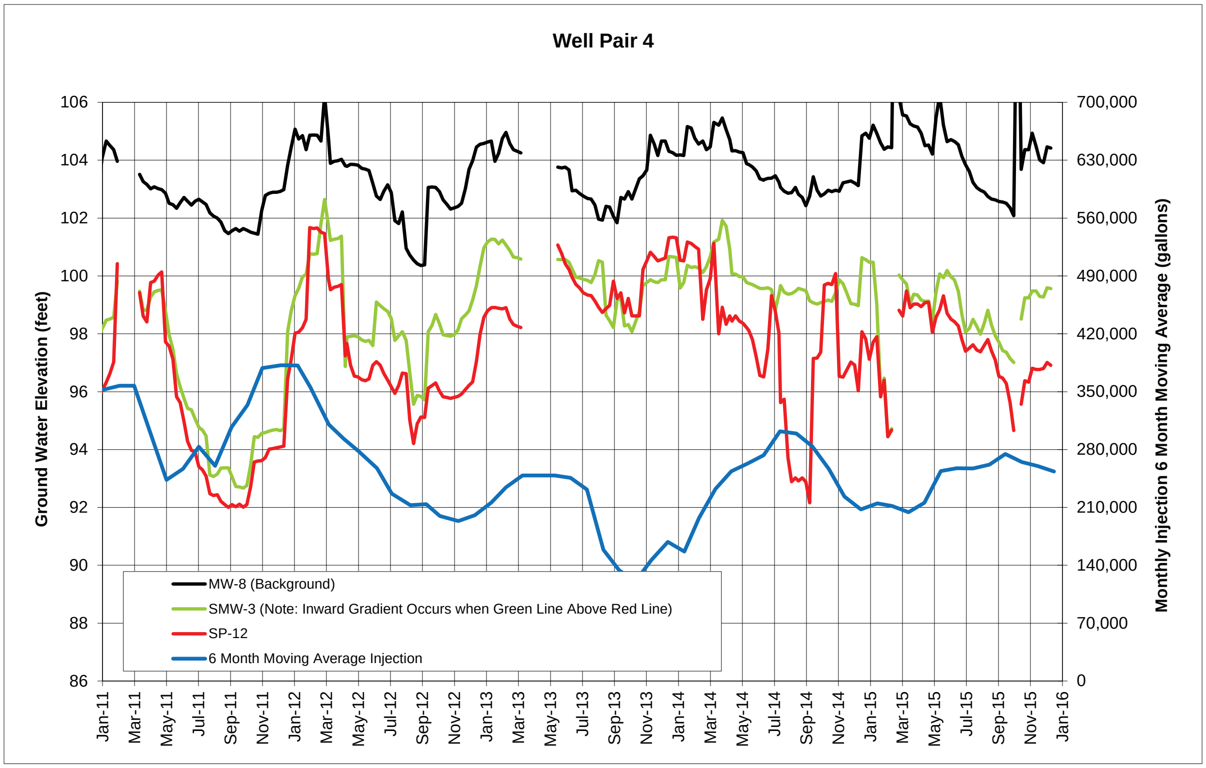

Figure 3-2B.
Shallow Aquifer Groundwater Elevation Trends at Well Pairs 3 and 4
American Creosote Works
Winnfield, Louisiana

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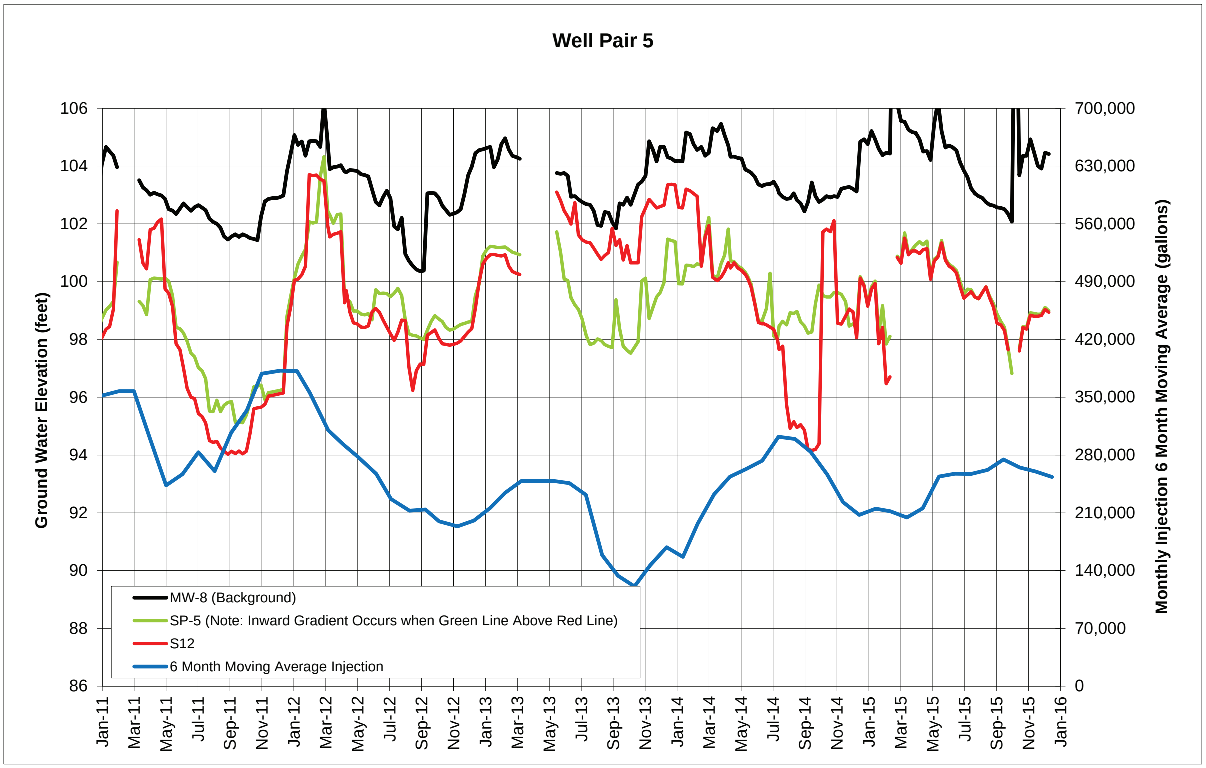

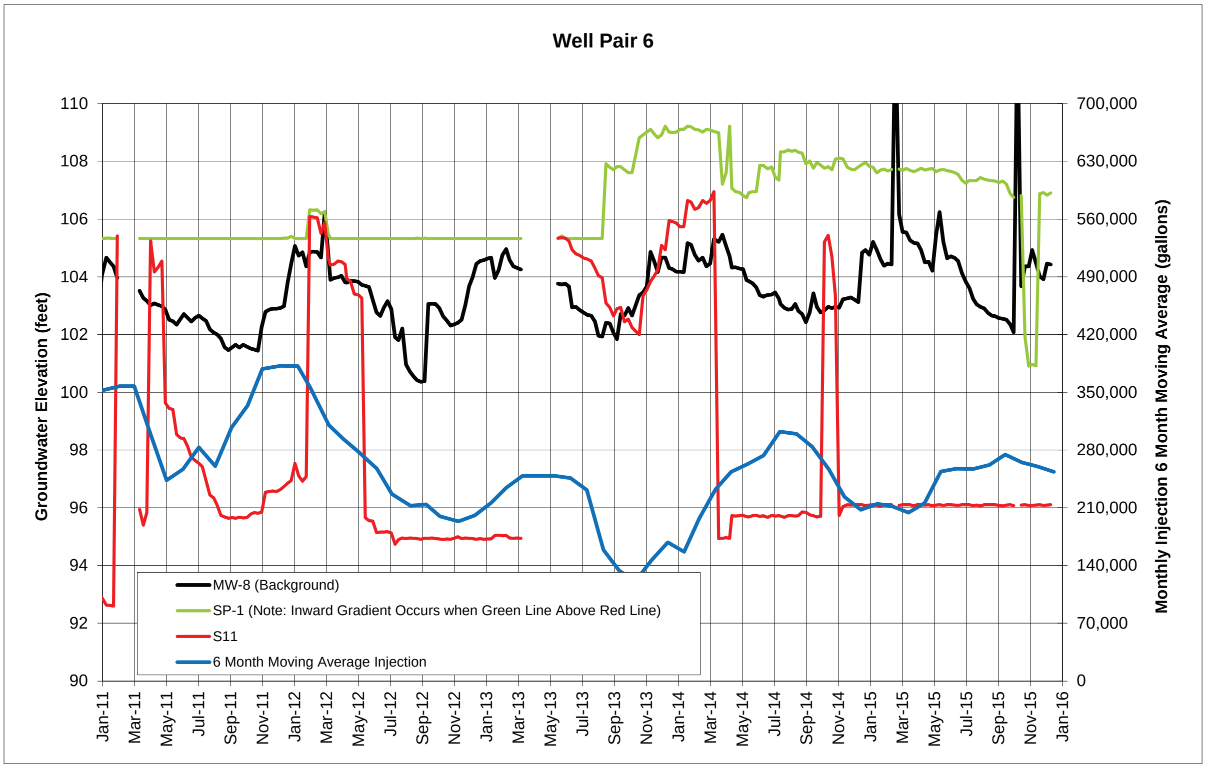

Figure 3-2C.
Shallow Aquifer Groundwater Elevation Trends at Well Pairs 5 and 6
American Creosote Works
Winnfield, Louisiana

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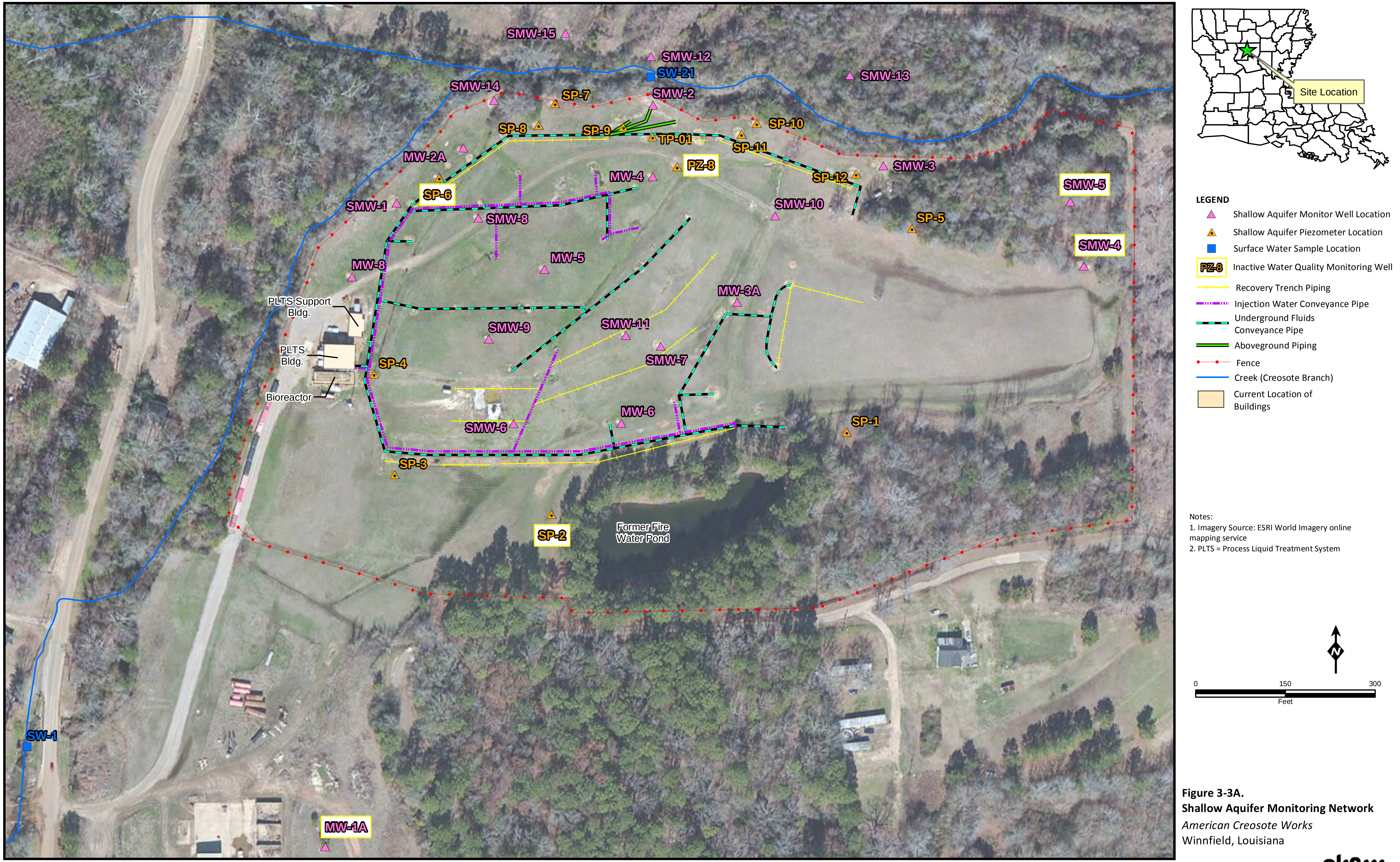

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System

Figure 3-3A.
Shallow Aquifer Monitoring Network
American Creosote Works
Winnfield, Louisiana

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LEGEND

- 🟦 Deep Monitor Well Location
- 🟩 Deep Piezometer Location
- MW-3 Inactive Water Quality Monitoring Well
- Recovery Trench Piping
- Injection Water Conveyance Pipe
- Underground Fluids Conveyance Pipe
- Aboveground Piping
- Fence
- Creek (Creosote Branch)
- Current Location of Buildings

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System

Figure 3-3B.
Deep Aquifer Monitoring Network
American Creosote Works
Winnfield, Louisiana

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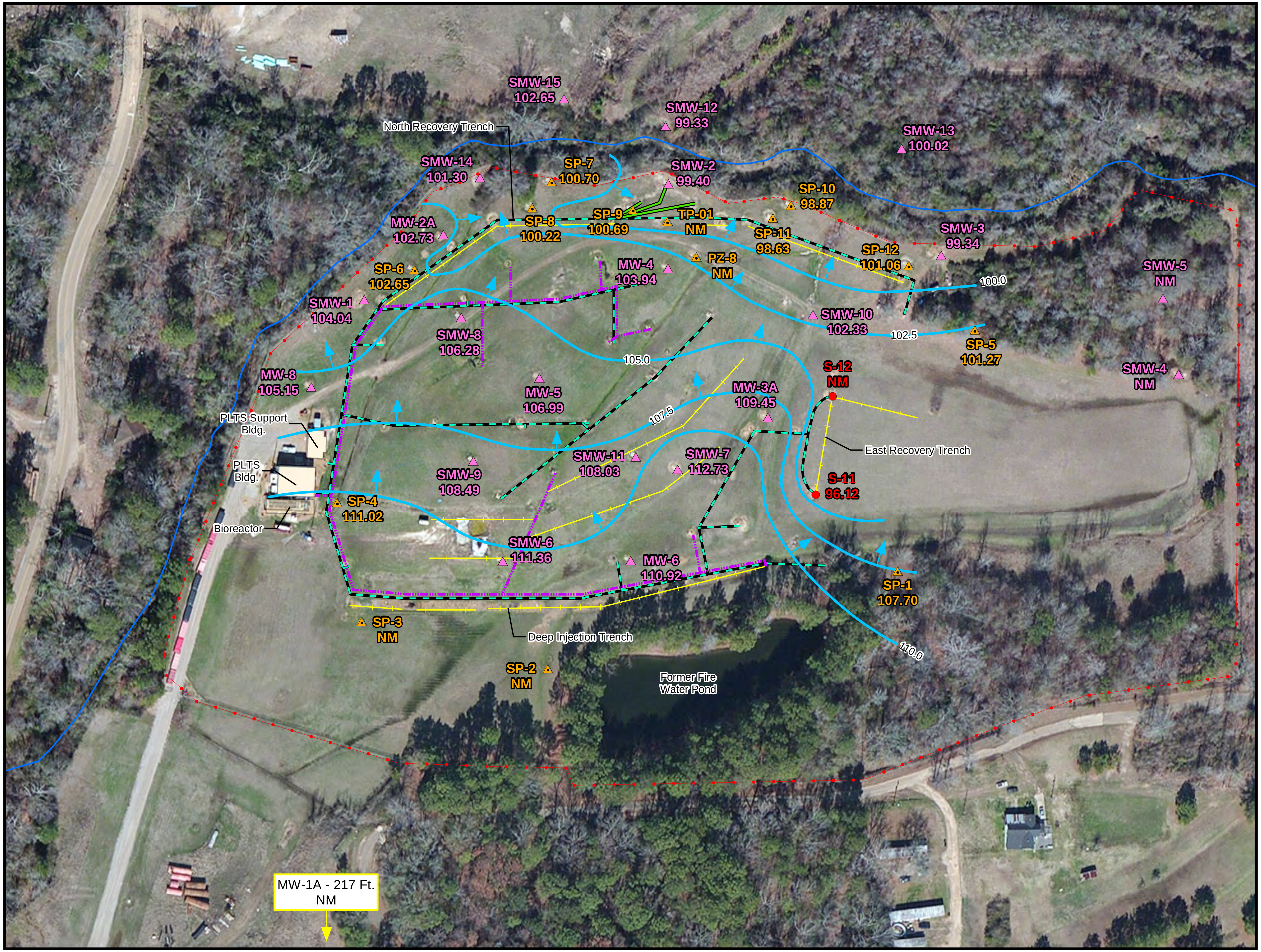

LEGEND

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System

Figure 3-4.
Shallow Aquifer Groundwater Elevation Contour and Flow Map - April 2015
American Creosote Works
Winnfield, Louisiana

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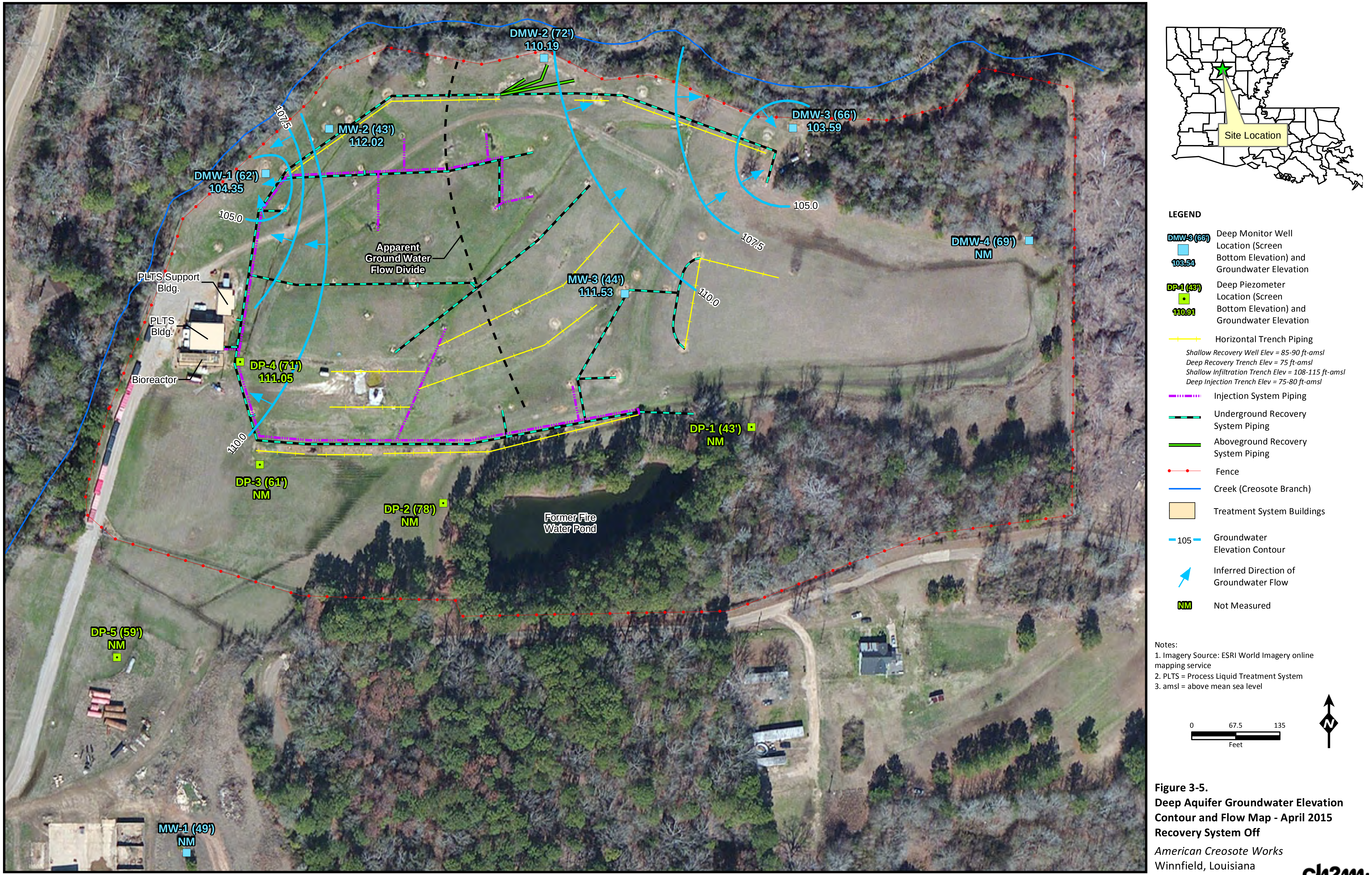

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System
3. amsl = above mean sea level

Figure 3-5.
Deep Aquifer Groundwater Elevation Contour and Flow Map - April 2015 Recovery System Off

American Creosote Works
Winnfield, Louisiana

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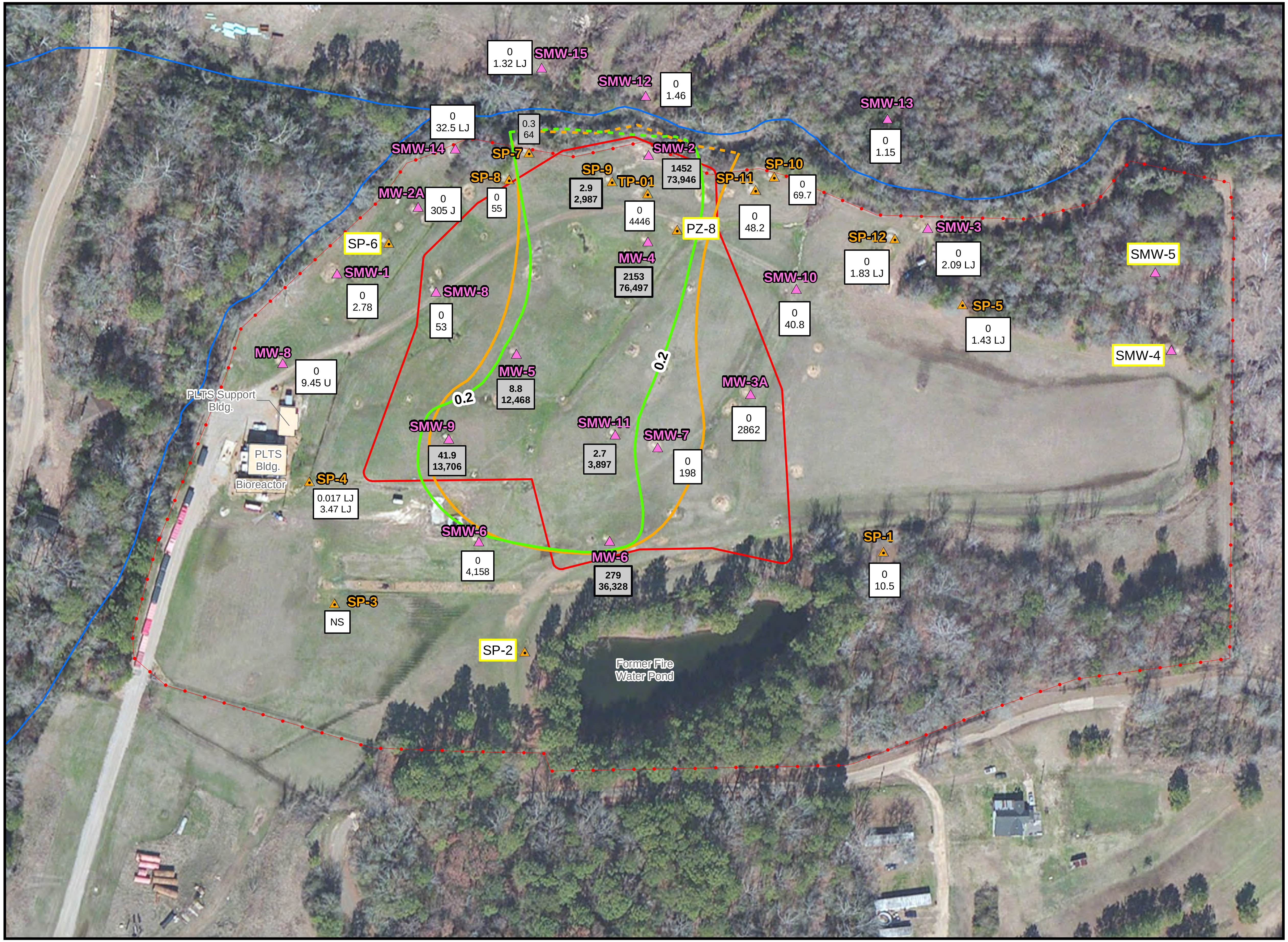

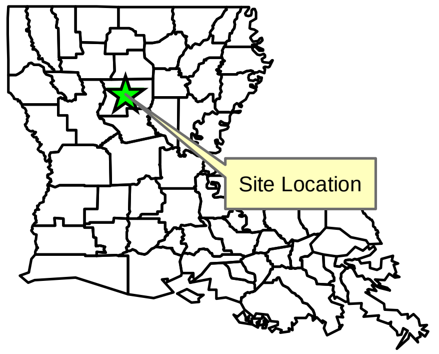

LEGEND

SMW-3 △	Shallow Aquifer Monitor Well Location
SP-5 △	Shallow Aquifer Piezometer Location
5219 5226	Highest BAP TEQ Concentration (µg/L) 2015 Highest Total PAH Concentration (µg/L) 2015
▨	Monitor Well with BAP TEQ Concentration Greater than 0.2 µg/L in 2015
NS	Indicates Not Sampled
U	Indicates Not Detected
LJ	Indicates Estimated Value, Biased Low
—0.2—	BAP TEQ Isopach at ROD Remediation Goal
MW-3	Inactive Water Quality Monitoring Well
—	Estimated Boundary of NAPL Source Area - Feb 2008
🟥	Preferred Alternative ISS Footprint
•—•	Fence
—	Creek (Creosote Branch)
▭	Current Location of Buildings

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS: Process Liquid Treatment System
3. BAP TEQ: Total polycyclic aromatic hydrocarbon concentration expressed in benzo(a)pyrene toxicity equivlents
4. NAPL: non-aqueous phase liquid
5. ROD: Record of Decision (EPA, 1993)
6. PAH: Polycyclic Aromatic Hydrocarbon
7. µg/L: micrograms per liter

0 67.5 135
Feet

N

Figure 3-6.
Shallow Aquifer Groundwater Highest Observed BAP TEQ and Total PAH Concentrations in 2015

American Creosote Works
Winnfield, Louisiana

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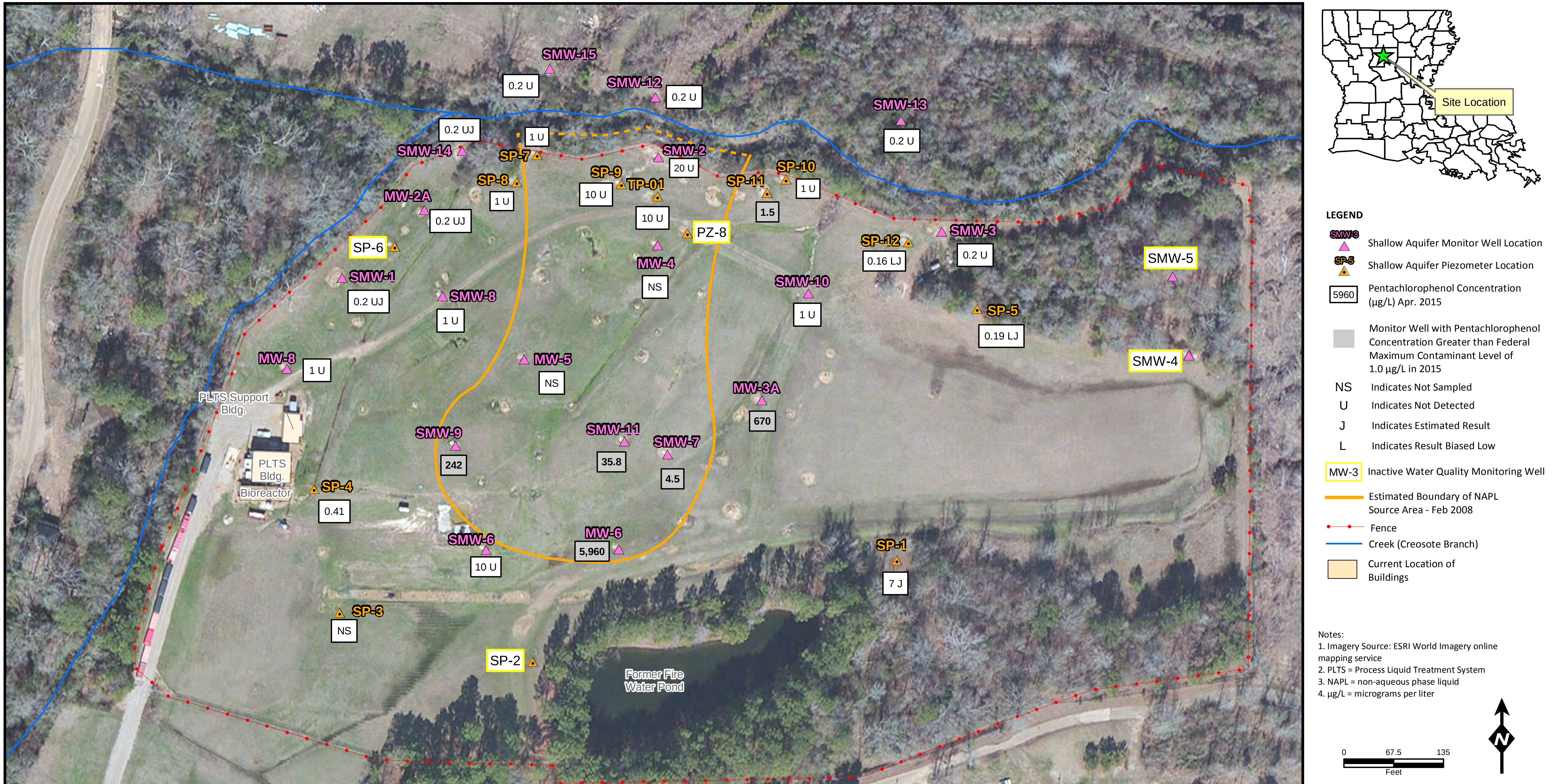

Notes:
1. Imagery Source: ESRI World Imagery online mapping service
2. PLTS = Process Liquid Treatment System
3. NAPL = non-aqueous phase liquid
4. µg/L = micrograms per liter

Figure 3-7.
Shallow Aquifer Groundwater
Pentachlorophenol Concentrations
April 2015
American Creosote Works
Winnfield, Louisiana

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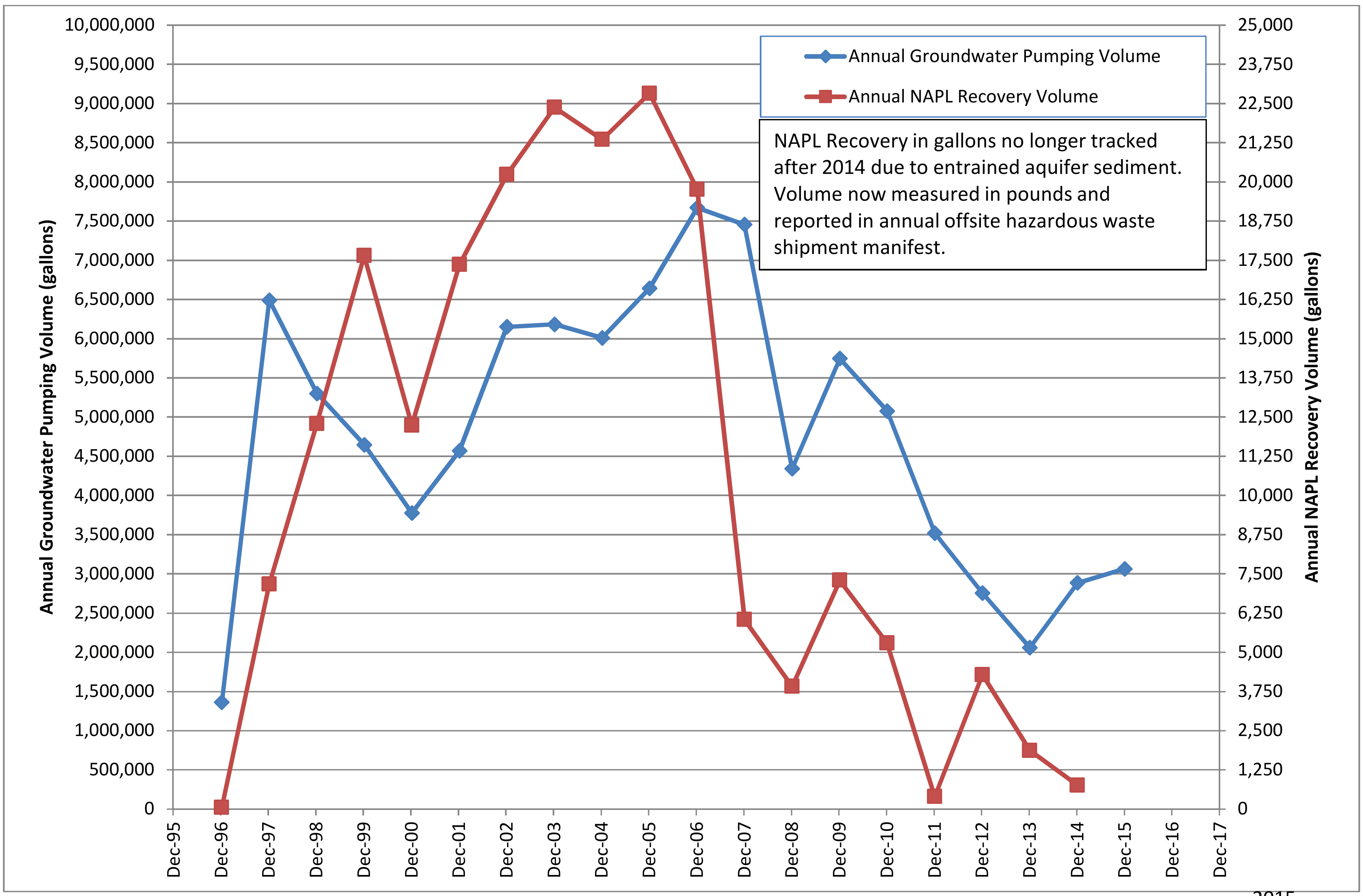

NAPL Recovery in gallons no longer tracked after 2014 due to entrained aquifer sediment. Volume now measured in pounds and reported in annual offsite hazardous waste shipment manifest.

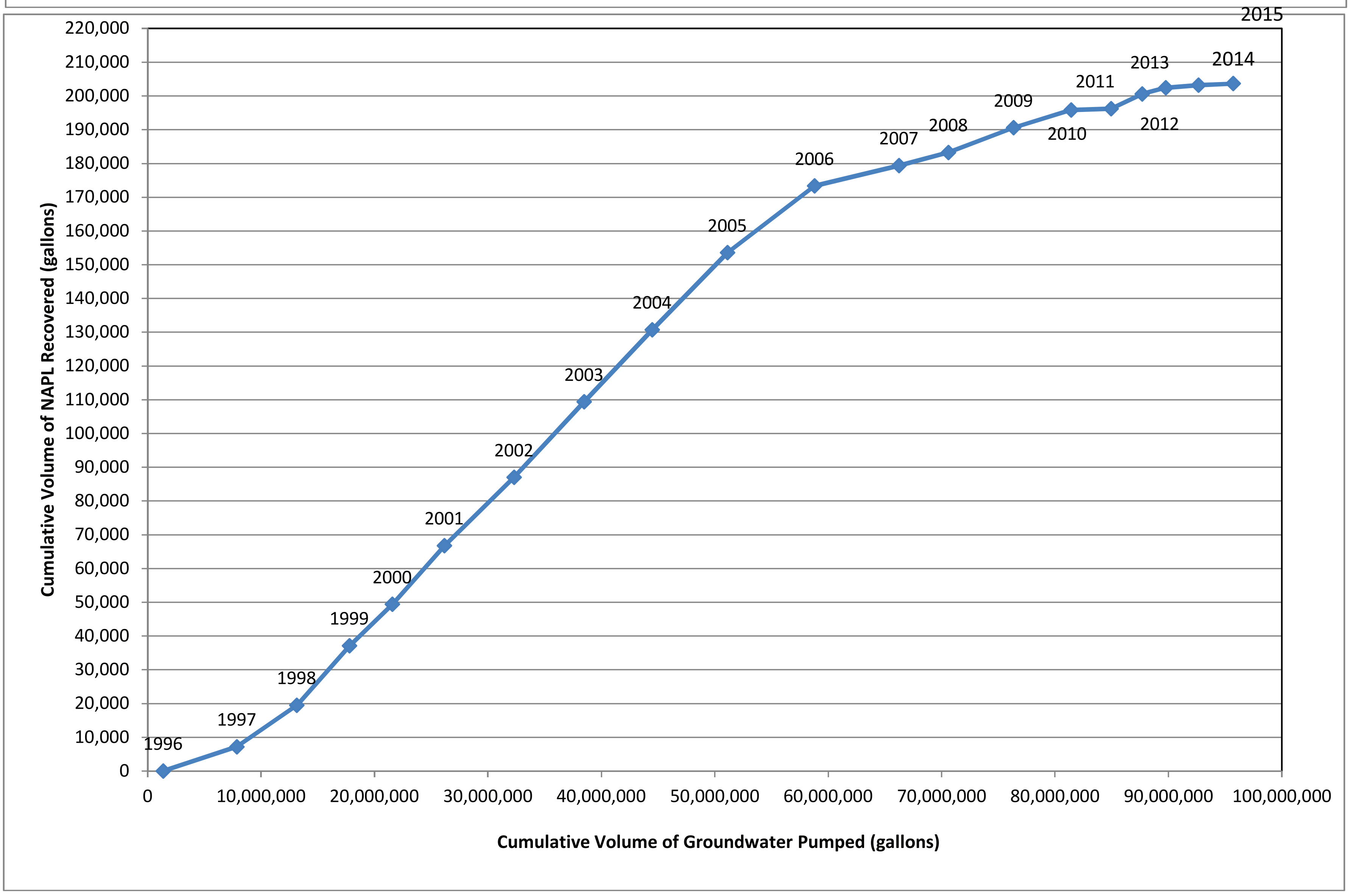

Figure 3-8.
Groundwater and NAPL Recovery Volume Trends
American Creosote Works
Winnfield, Louisiana

Acronym
NAPL = Nonaqueous Phase Liquid

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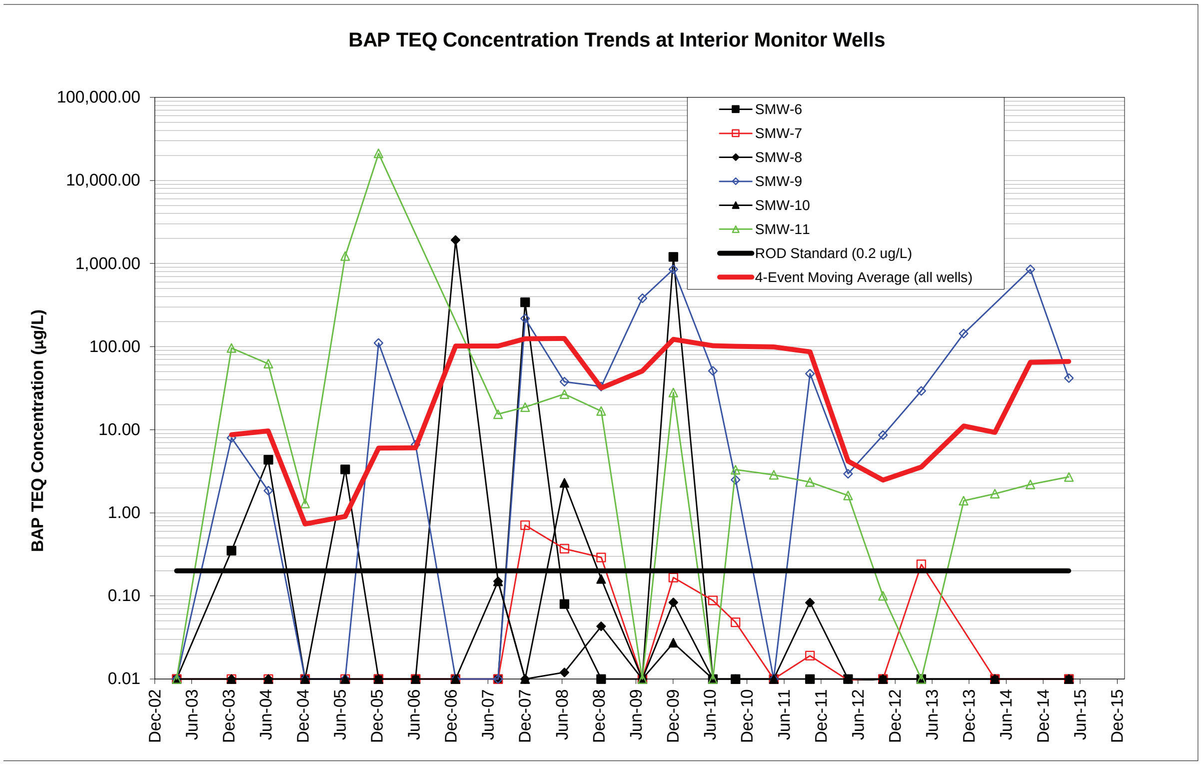

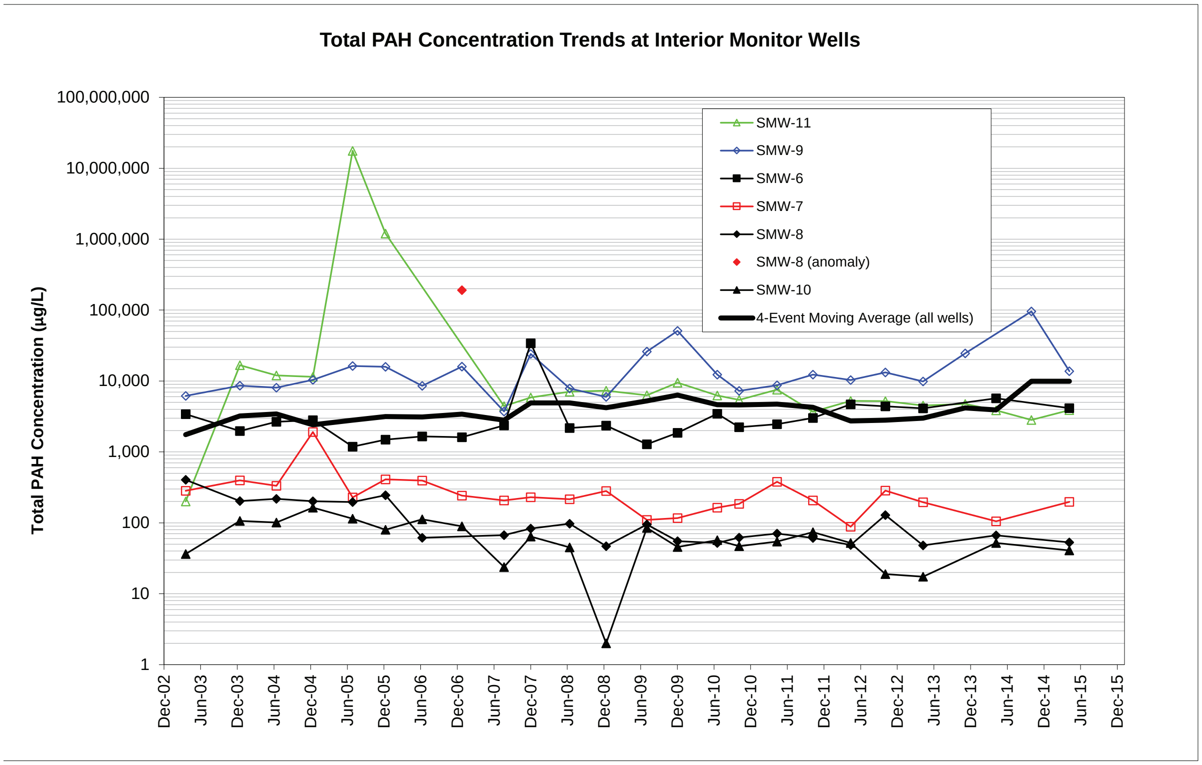

Figure 3-9A.

PAH Concentration Trends in Shallow Aquifer Groundwater – Interior Wells

American Creosote Works

Winnfield, Louisiana

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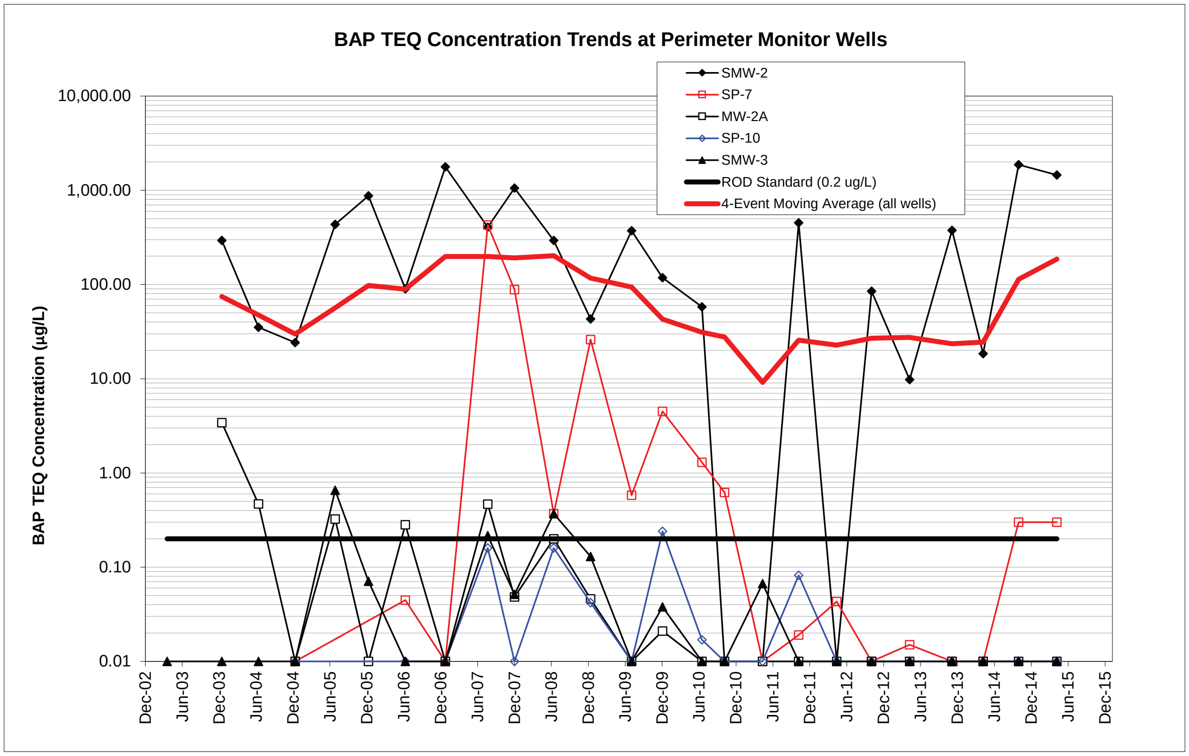

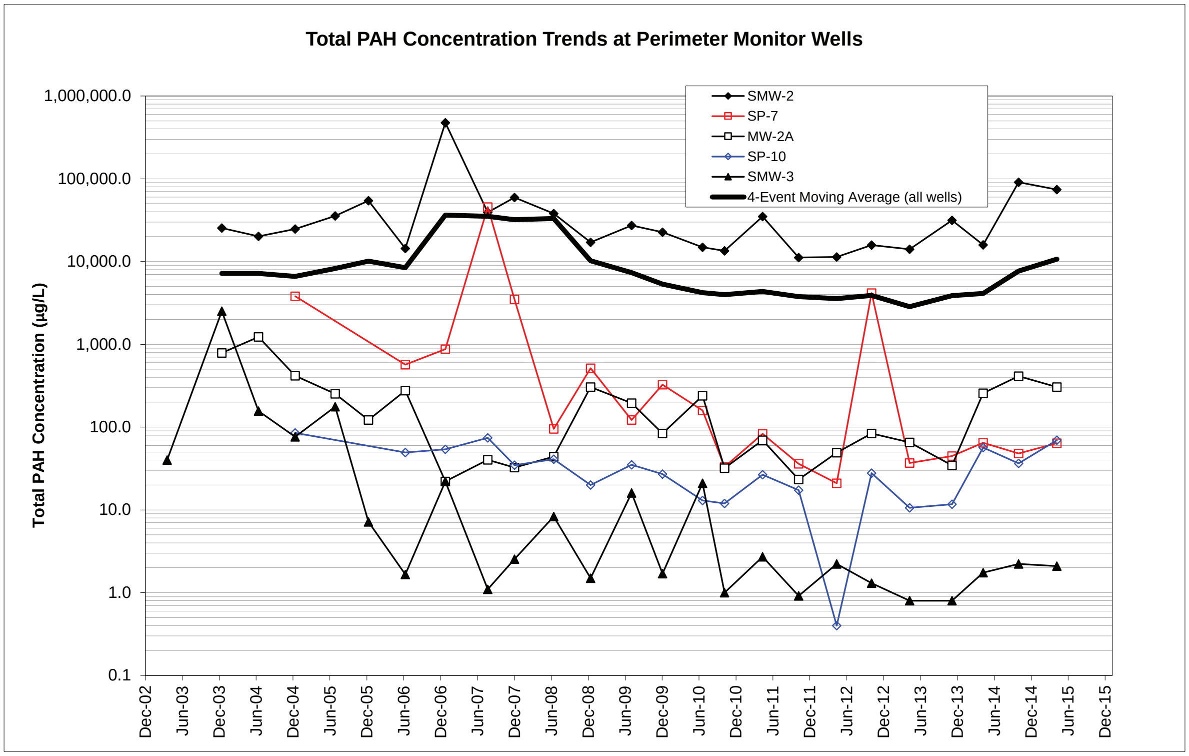

Figure 3-9B.
PAH Concentration Trends in Shallow Aquifer Groundwater – Perimeter Wells
American Creosote Works
Winnfield, Louisiana

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Appendix A1
ACW RCRA Biennial Report for 2015

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Send completed form to this address:

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

RCRA SUBTITLE C SITE IDENTIFICATION FORM (2015)

Louisiana Department of Environmental Quality Office of Environmental Services
Public Participation and Permit Support Division
PO Box 4313, Baton Rouge, LA 70821

1. Reason for Submittal MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** ☐ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location) ☐ To provide Subsequent Notification of Regulated Waste Activity (to update site identification information). ☐ As a component of a First RCRA Hazardous Waste Part A Permit Application. ☐ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # ________). ☒ As a component of the Hazardous Waste Report. (If marked, see sub-bullet below) ☒ Site was a TSD facility and/or generator of >1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)
2. Site EPA ID Number	**EPA ID Number:** LAD000790279
3. Site Name	**Name:** AMERICAN CREOSOTE WORKS SUPERFUND SITE
4. Site Location Information	**Street Adress:** 1109 FRONT STREET **City, Town, or Village:** WINNFIELD **County:** LA127 **State:** LA **Country** US **Zip Code:** 71483
5. Site Land Type	☐ Private ☐ County ☐ District ☒ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other
6. NAICS Code(s) for the Site	**A.** 924110 **B.** **C.** **D.**
7. Site Mailing Address	**Street or P. O. Box:** 1109 FRONT STREET **City, Town, or Village:** WINNFIELD **State:** LA **Country:** US **Zip Code:** 71483
8. Site Contact Person	**First Name:** JOHN **MI:** **Last Name:** KNOTT **Title:** PROJECT MANAGER **Street or P. O. Box:** 14701 ST. MARY'S LANE, SUITE 300 **City, Town, or Village:** HOUSTON **State:** TX **Country:** US **Zip Code:** 77079 **Email :** john.knott@ch2m.com **Phone:** 9726632209 **Ext:** **Fax:** 9723850846
9. Operator and Legal Owner of the Site	**A. Name of Site's Owner:** USEPA, REGION 6, MICHAEL HEBERT **Date Became Owner:** 10/14/1992 **Type:** ☐ Private ☐ County ☐ District ☒ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other **Street or P. O. Box:** 1445 ROSS AVENUE, SUITE 1200, MAIL CODE 6SF **City, Town, or Village:** DALLAS **Phone** 2146658315 **State:** TX **Country:** US **Zip Code:** 75202
	B. Name of Site's Operator: JOHN KNOTT / CH2M HILL **Date Became Operator:** 01/01/1999 **Type:** ☐ Private ☐ County ☐ District ☐ Federal ☐ Indian ☐ Municipal ☐ State ☒ Other

EPA ID Number: LAD000790279

10. Type of Regulated Waste Activity
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-7.

Y☒ N☐ **1. Generator of Hazardous Waste**
If Yes, choose only one of the following - a, b, or c.

☒ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs./mo.) or more of hazardous waste; or Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste; or Generates, in any calendar month, or accumulates at any time, more than 100 kg/mo (220 lbs./mo) of acute hazardous spill cleanup

☐ b. SQG:. 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste; or

☐ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

If "Yes" above, indicate other generator activities.

Y☐ N☒ 2 Short-Term Generator (generate from a short-term or onetime event and not from on-going processes). If "Yes", provide an explanation in the Comments

Y☐ N☒ 3. United States Importer of Hazardous Waste

Y☐ N☒ 4. Mixed Waste (hazardous and radioactive) Generator

Y☐ N☒ **5. Transporter of Hazardous Waste**
If Yes, mark all that apply.

☐ a. Transporter

☐ b. Transfer Facility (at your site)

Y☐ N☒ **6. Treater, Storer, or Disposer of Hazardous Waste (at your site)**
Note: A hazardous waste permit is required for this activity.

Y☐ N☒ **7. Recycler of Hazardous Waste (at your site)**

Y☐ N☒ **8. Exempt Boiler and/or Industrial Furnace**
If Yes, mark each that applies.

☐ a. Small Quantity On-site Burner Exemption

☐ b. Smelting, Melting, and Refining Furnace Exemption

Y☐ N☒ **9. Underground Injection Control**

Y☐ N☒ **10. Receives Hazardous Waste from Off-site**

B. Universal Waste Activities; Complete all parts 1-2.

Y☐ N☒ **1. Large Quantity Handler of Universal Waste (accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site.**
If "Yes", mark all boxes that apply:

a. Batteries ☐

b. Pesticides ☐

c. Mercury containing equipment ☐

d. Lamps ☐

e. Other (specify) ______ ☐

f. Other (specify) ______ ☐

g. Other (specify) ______ ☐

Y☐ N☒ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this

C. Used Oil Activities; Complete all parts 1-4.

Y☐ N☒ **1. Used Oil Transporter**
If Yes, mark each that applies.

☐ a. Transporter

☐ b. Transfer Facility

Y☐ N☒ **2. Used Oil Processor and/or Re-refiner**
If Yes, mark each that applies.

☐ a. Processor

☐ b. Re-refiner

Y☐ N☒ **3. Off-Specification Used Oil Burner**

Y☐ N☒ **4. Used Oil Fuel Marketer**
If Yes, mark each that applies.

☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner

☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

EPA ID Number: LAD000790279

D. Eligible Academic Entities with Laboratories-Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

You must check with your State to determine if you are eligible to manage laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

☐ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:

- ☐ a. College or University
- ☐ b. Teaching Hospital that is owned by or has a formal written affiliation agreement with a college or university
- ☐ c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

☐ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Wastes

A. Waste Codes for Federally Regulated Hazardous Wastes.

Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

U051

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes.

Please list the waste codes of the State-regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed for waste codes.

EPA ID Number: LAD000790279

12. Notification of Hazardous Secondary Material (HSM) Activity

Y☐ N☒ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes", you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

JOHN KNOTT / CH2M HILL SIGNS THIS REPORT AS AN AUTHORIZED CONTRACTOR ON BEHALF OF THE US EPA. THIS FACILITY IS A CERCLA SUPERFUND SITE, ID NUMBER 0600317, THAT IS BEING REMEDIATED UNDER A RECORD OF DECISION (ROD) SIGNED ON APRIL 28,1993. THE LONG-TERM PHASE OF THE REMEDIAL ACTION FOR IN-SITU BIOLOGICAL TREATMENT OF CONTAMINATED SOIL AND THE PUMPING AND TREATMENT OF LIQUID CONTAMINANTS IS ONGOING. HAZARDOUS WASTE IDENTIFIED IN THIS REPORT ARE FROM THE ON-SITE CERCLA REMEDIAL ACTION. EPA CONTINUES TO MONITOR THE PERFORMANCE OF THE REMEDY TO ASSESS ITS EFFECTIVENESS IN ACHIEVING THE ESTABLISHED REMEDIAL OBJECTIVES

14. Certification

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

Signature of Operator, Owner, or an Authorized Representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
John J Knott On Behalf of USEPA	JOHN KNOTT, PROJECT MANAGER	01/07/2016

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER

SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE

EPA ID NO: **LAD000790279**

FORM GM

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 HAZARDOUS WASTE REPORT

WASTE GENERATION AND MANAGEMENT

Instructions: Please see the detailed instructions begining of the instructions and forms booklet before completing this form

SEC. 1

A. Waste description
CREOSOTE CONTAMINATED SOIL / MEDIA FROM THE SAND FILTER OF THE ONSITE TREATMENT PLANT

B. EPA hazardous waste code
U051

C. State hazardous waste code

D. Source code G43

Management method code for source code G25

E. Form code
W301

F. Quantity generated in 2015
100.0

UOM Pounds

Density ☐ 1 lbs/gal ☐ 2 sg

G. Waste minization code
N

SEC. 2

Was any of this waste managed on site?

☐ 1. Yes (CONTINUE TO ON-SITE PROCESS SYSTEM 1

☒ 2. No (SKIP TO SEC.3)

	On-site management method code	Total quantity treated, disposed, or recycled On-site in 2015

SEC. 3

A. Was any of this waste shipped off site in 2015 for treatment, disposal, or recycling?

☒ 1 Yes (CONTINUE TO BOX B)

☐ 2 No (FORM IS COMPLETE)

	B. EPA ID No. of facility to which waste was shipped	C. Off-site management method code shipped to	D. Total quantity shipped in 2015
SITE 1	TXD981053770	H039	100.00

Comments:

WASTE MINIMIZATION HAS NOT BEEN FOUND TO BE PRACTICALLY AND ECONOMICALLY ACCEPTABLE.

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER

SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE

EPA ID NO: **LAD000790279**

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 HAZARDOUS WASTE REPORT

FORM GM

WASTE GENERATION AND MANAGEMENT

Instructions: Please see the detailed instructions begining of the instructions and forms booklet before completing this form

SEC. 1

A. Waste description
BIOSOLIDS

B. EPA hazardous waste code
U051

C. State hazardous waste code

D. Source code G43

Management method code for source code G25

E. Form code
W409

F. Quantity generated in 2015
25.0
UOM Cubic Yards
Density 1.10 ☐ 1 lbs/gal ☒ 2 sg

G. Waste minization code
A

SEC. 2

Was any of this waste managed on site?
☐ 1. Yes (CONTINUE TO ON-SITE PROCESS SYSTEM 1 ☒ 2. No (SKIP TO SEC.3)

	On-site management method code	Total quantity treated, disposed, or recycled On-site in 2015

SEC. 3

A. Was any of this waste shipped off site in 2015 for treatment, disposal, or recycling?
☒ 1 Yes (CONTINUE TO BOX B) ☐ 2 No (FORM IS COMPLETE)

	B. EPA ID No. of facility to which waste was shipped	C. Off-site management method code shipped to	D. Total quantity shipped in 2015
SITE 1	TXD055141378	H040	25.00

Comments:

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER

SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE

EPA ID NO: **LAD000790279**

FORM GM

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 HAZARDOUS WASTE REPORT

WASTE GENERATION AND MANAGEMENT

Instructions: Please see the detailed instructions begining of the instructions and forms booklet before completing this form

SEC. 1

A. Waste description
CREOSOTE CONTAMINATED WATER

B. EPA hazardous waste code
U051

C. State hazardous waste code

D. Source code G43

Management method code for source code G25

E. Form code
W113

F. Quantity generated in 2015
1000.0
UOM Gallons
Density 1.00 ☐ 1 lbs/gal ☒ 2 sg

G. Waste minization code
A

SEC. 2

Was any of this waste managed on site?
☐ 1. Yes (CONTINUE TO ON-SITE PROCESS SYSTEM 1 ☒ 2. No (SKIP TO SEC.3)

	On-site management method code	Total quantity treated, disposed, or recycled On-site in 2015

SEC. 3

A. Was any of this waste shipped off site in 2015 for treatment, disposal, or recycling?
☒ 1 Yes (CONTINUE TO BOX B) ☐ 2 No (FORM IS COMPLETE)

	B. EPA ID No. of facility to which waste was shipped	C. Off-site management method code shipped to	D. Total quantity shipped in 2015
SITE 1	TXD055141378	H040	1,000.00

Comments:

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER
SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE

EPA ID NO: **LAD000790279**

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 HAZARDOUS WASTE REPORT

FORM GM

WASTE GENERATION AND MANAGEMENT

Instructions: Please see the detailed instructions begining of the instructions and forms booklet before completing this form

SEC. 1

A. Waste description
CREOSOTE CONTAMINATED DEBRIS

B. EPA hazardous waste code
U051

C. State hazardous waste code

D. Source code G43

Management method code for source code G25

E. Form code
W002

F. Quantity generated in 2015
450.0
UOM Pounds
Density ☐ 1 lbs/gal ☐ 2 sg

G. Waste minization code
A

SEC. 2

Was any of this waste managed on site?
☐ 1. Yes (CONTINUE TO ON-SITE PROCESS SYSTEM 1 ☒ 2. No (SKIP TO SEC.3)

	On-site management method code	Total quantity treated, disposed, or recycled On-site in 2015

SEC. 3

A. Was any of this waste shipped off site in 2015 for treatment, disposal, or recycling?
☒ 1 Yes (CONTINUE TO BOX B) ☐ 2 No (FORM IS COMPLETE)

	B. EPA ID No. of facility to which waste was shipped	C. Off-site management method code shipped to	D. Total quantity shipped in 2015
SITE 1	ARD069748192	H141	450.00

Comments:

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER

SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE

EPA ID NO: **LAD000790279**

FORM OI

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 Hazardous Waste Report

OFF-SITE IDENTIFICATION

Instructions: Use the detailed instructions of the 2015 Hazardous Waste Annual Report Booklet for assistace completing this form.

SITE 1

A. EPA ID No. of off-site installation or transporter: ARD069748192

B. Name of off-site installation or transporter: EL DORADO, AR FACILITY

C. Handler type (CHECK ALL THAT APPLY)
☐ Generator
☐ Transporter
☒ Receiving facility

D. Address of off-site installation
Street 309 AMERICAN CIRCLE
City EL DORADO
State AR Zip 71730

SITE 2

A. EPA ID No. of off-site installation or transporter: LAR000059592

B. Name of off-site installation or transporter: HINE ENVIRONMENTAL SERVICES

C. Handler type (CHECK ALL THAT APPLY)
☐ Generator
☒ Transporter
☐ Receiving facility

D. Address of off-site installation
Street 4309 HWY 27 S
City SULPHUR
State LA Zip 70665

SITE 3

A. EPA ID No. of off-site installation or transporter: MAD039322250

B. Name of off-site installation or transporter: CLEAN HARBORS ENVIRONMENTAL SERVICES INC

C. Handler type (CHECK ALL THAT APPLY)
☐ Generator
☒ Transporter
☐ Receiving facility

D. Address of off-site installation
Street 42 LONGWATER DR
City NORWELL
State MA Zip 02061

SITE 4

A. EPA ID No. of off-site installation or transporter: TXD055141378

B. Name of off-site installation or transporter: CLEAN HARBORS DEER PARK, TX FACILITY

C. Handler type (CHECK ALL THAT APPLY)
☐ Generator
☐ Transporter
☒ Receiving facility

D. Address of off-site installation
Street 2027 INDEPENDENCE PARKWAY S.
City LA PORTE
State TX Zip 77571

Comments:

BEFORE COPYING FORM, ATTACH SITE IDENTIFICATION LABEL OR ENTER
SITE NAME: AMERICAN CREOSOTE WORKS SUPERFUND SITE
EPA ID NO: **LAD000790279**

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

2015 Hazardous Waste Report

FORM OI

OFF-SITE IDENTIFICATION

Instructions: Use the detailed instructions of the 2015 Hazardous Waste Annual Report Booklet for assistace completing this form.

SITE 5	A. EPA ID No. of off-site installation or transporter TXD981053770	B. Name of off-site installation or transporter CLEAN HARBORS SAN LEON, TX
	C. Handler type (CHECK ALL THAT APPLY) ☐ Generator ☐ Transporter ☒ Receiving facility	D. Address of off-site installation Street 2700 AVENUE S City SAN LEON State TX Zip 77539
SITE 6	A. EPA ID No. of off-site installation or transporter	B. Name of off-site installation or transporter
	C. Handler type (CHECK ALL THAT APPLY) ☐ Generator ☐ Transporter ☐ Receiving facility	D. Address of off-site installation Street City State Zip
SITE 7	A. EPA ID No. of off-site installation or transporter	B. Name of off-site installation or transporter
	C. Handler type (CHECK ALL THAT APPLY) ☐ Generator ☐ Transporter ☐ Receiving facility	D. Address of off-site installation Street City State Zip
SITE 8	A. EPA ID No. of off-site installation or transporter	B. Name of off-site installation or transporter
	C. Handler type (CHECK ALL THAT APPLY) ☐ Generator ☐ Transporter ☐ Receiving facility	D. Address of off-site installation Street City State Zip

Comments:

DECLARATION OF ELECTRONIC FILING OF THE 2015 ANNUAL HAZARDOUS WASTE REPORT

For the calendar year January 1, 2015, through December 31, 2015

EPA ID LAD000790279

Site/Company Name AMERICAN CREOSOTE WORKS SUPERFUND SITE

Site Address 1109 FRONT STREET

City WINNFIELD State LA Zip 71483

Mailing Address 1109 FRONT STREET

City WINNFIELD State LA Zip 71483

Contact Name JOHN KNOTT Phone No 9726632209 Ext

Contact Title PROJECT MANAGER

Part I - Declaration of Filer

I certify under penalty of law that the information shown on my 2015 Hazardous Waste Report, which I filed electronically, and that this document and all attachments were prepared under my direction or supervision, in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted, is correct and current. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties under Section 3008 of the Resource Conservation and Recovery Act for submitting false information, including the possibility of fine and imprisonment for known violations.

Part II- Signature of Certification

Last Name KNOTT First Name JOHN Title PROJECT MANAGER

Signature John J Knott On Behalf of USEPA Date 01/07/2016

Part III - Method of File Transmittal

____CD __X__ARM Web Site

** Note: This is not the 2015 Annual Hazardous Waste Report. Only file this form if you submitted your 2015 Annual Hazardous Waste Report electronically. This form alone does not constitute submittal of the 2015 Hazardous Waste Report but is required for all methods of electronic submission of the report.

Submit Date: 01/07/2016

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Appendix A2

ACW EPCRA Tier II Report for Reporting Year 2015

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EPCRA Tier II Reporting Information for ACW 2015

PREPARED FOR:	American Creosote Works Superfund Site, Project File
COPY TO:	John Knott/HOU Terry Gerrish/NJO
PREPARED BY:	Rellergert, Carla/DEN
DATE:	17 February 2016
PROJECT NUMBER:	344582

This TM has been developed to document Louisiana's electronic filing information, for future reference in filing EPCRA Tier II electronic reports with the Louisiana State Police (available at http://www.lsp.org/rtk.html).

EPCRA Tier II Reporting for the American Creosote Works Superfund Site (ACW) was first conducted in 2014, for the filing year 2013. This reporting was done in compliance with Louisiana Revised Statutes (LRS) 30:2361-30:2380; Louisiana Administrative Code (LAC)-Title 33 Part V Subpart 2 Chapter 101; 40 CFR 68 and 40 CFR 355. We have reported in 2015, for the filing year 2014 and we are filing this year for the filing year 2015.

Reporting is required for any hazardous material that was on-site on any single day of the preceding calendar year. The threshold inventory quantity for a hazardous chemical in Louisiana is at or above 500 pounds, except for extremely hazardous substances, which have a threshold planning quantity (TPQ) that is lower.

Basis for Filing

EPCRA regulations (40 CFR Parts 350-372) established four major provisions, each with reporting obligations for facilities that store or manage specific chemicals, to state/tribe and local governments. The four EPCRA reporting requirements are:

Emergency Planning ***(40 CFR Part 355, Subpart A).*** Requires facilities to develop emergency response plans and establish an emergency facility coordinator, which community officials can use at the time of a chemical accident. Any facility that has an extremely hazardous substance (EHS) at or above its threshold planning quantity (TPQ) (listed in 40 CFR Part 355, Appendix A and B) must notify the State Emergency Response Commission (SERC)/tribes[1] and the Local Emergency Planning Committee (LEPC)[2] within 60 days after receiving their first shipment. Emergency response plans must also include any chemicals that are used or stored on-site in excess of reportable quantities (RQs) per 40 CFR 302.4.

ACW Status: Hydrogen Peroxide and Sulfuric Acid were the two EHSs that formed the basis for the 2013 filing. In 2015, Hydrogen Peroxide used in 2015 was at a concentration of 30% (below the >52% level to be considered an EHS). The quantity of sulfuric acid stored and used at any one time in 2015 is only one 55 gallon drum or 650 lbs., which is below its threshold planning quantity (TPQ) of 1000 lbs. Therefore, ACW is no longer subject to EPCRA's emergency planning requirements. ACW's contingency plan does include chemicals used or stored onsite in excess of their RQs.

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[1] The SERC in Louisiana is the Louisiana State Police (available at http://www.lsp.org/rtk.html) with a specific web page at http://lerc.dps.louisiana.gov/.

[2] The LEPC for this site is the Winn Parish Emergency Planning Committee-Mr. Cranford Jordan, Chair c/o Winn Parish Fire District #3; PO Box 30, Winnfield LA 71483; Phone: 318-628-4611, Fax: 318-628-7969; email: wp1jordan@winnparish.org; available at http://www.winnparish.org.

Emergency Release Notification ***(40 CFR Part 355, Subpart B).*** Requires facilities that produce, store or use EHSs (40 CFR Part 355 Appendix A and B) or CERCLA hazardous substances (40 CFR Part 302.4) to immediately notify federal, state (SERC) and local (LEPC) authorities if there is a release to the environment above RQs.

ACW Status: ACW continues to use the EHS sulfuric acid as well as the CERCAL hazardous substances hydrogen peroxide, ferric chloride and sodium hydroxide. In addition, ACW generates creosote, which is also considered a hazardous substance. Each have an RQ. It should be noted that the quantities used/stored on site for sulfuric acid and for hydrogen peroxide do not exceed their respective RQs. ACW is subject to emergency release notification for those hazardous substance with RQs.

Hazardous Chemical Storage Reporting Requirements ***(40 CFR Part 370).*** Reporting is required if OSHA requires, employers to maintain Safety Data Sheets (SDS) for any hazardous chemicals stored or used in the work place and if either of the following conditions are met:

> Facilities that have extremely hazardous chemicals (EHS) in an amount of 500 pounds or the TPQ, whichever is less for EHSs (and large quantities of fuels).
>
> A hazardous chemical that is not an EHS is present at your facility at any one time in an amount equal to or greater than the threshold level for that hazardous chemical. Threshold levels for such hazardous chemicals are 10,000 pounds (or 4,540 kg).

A substance is a hazardous chemical if it is required to have an MSDS and meets the definition of hazardous chemical under the OSHA regulations found at 29 CFR 1910.1200(c): *Hazardous chemical* means any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified. Note: Creosote is considered a hazardous chemical.

Reporting includes SDS reporting and inventory reporting. SDS reporting requires the facility to submit either copies of their SDS or a list of these chemicals to SERC, LEPC and local fire department. Inventory reporting requires the facility to submit annually an Emergency and Hazardous Chemical Inventory Form to LEPC, the SERC and local fire department using either a Tier I or Tier II inventory form, before March 1 each year for the previous year's chemical inventory.

ACW Status: ACW uses and/or stores sulfuric acid, an EHS, in a quantity greater than 500 lbs., and has creosote on site in a quantity in excess of 10,000 lbs. The creosote is not purchased or manufactured onsite. It is extracted from groundwater as a hazardous substance and is shipped offsite as a hazardous waste. OSHA typically does not require an SDS to be maintained for hazardous waste. *However,* for purposes of emergency preparedness, we have historically reported this creosote since it is stored onsite in excess of the reporting threshold.

The threshold inventory quantity for a hazardous chemical in Louisiana is at or above 500 pounds, except for extremely hazardous substances, which has a threshold planning quantity (TPQ) that is lower. Therefore, ferric chloride, hydrogen peroxide and sodium hydroxide were also reported.

Toxic Chemical Release Inventory (TRI) ***(40 CFR Part 372).*** Requires facilities with 10 or more employees, in different industry sectors (SIC codes 20 to 39) to annually report how much of each toxic chemical (listed in 40 CFR 372.65) they manage through recycling, energy recovery, treatment and environmental releases. TRI reporting must be submitted to EPA and the State by July 1 of each year.

ACW Status: ACW only has 1 onsite employee. TRI reporting is not applicable to ACW.

Chemical Accident Prevention ***[Section 112(r) of CAA, 40 CFR Part 68].*** Requires facilities that are a stationary air emission source and uses or stores any chemical listed in 40 CFR §68.115, to establish a Risk Management Program-RMP.

ACW Status: ACW is not a stationary air emission source and does not use or store any chemical listed in 40 CFR §68.115. Therefore, ACW is not subject to these requirements.

Electronic Filing Information

The Louisiana State Police Right-to-Know, Tier II electronic filing site is available at https://webdev01.dps.louisiana.gov/t2access.nsf/wpWebWelcome?OpenForm.

The web site's Tier II filing instructions were followed and form the basis for entering the information into the web site.

Tier II Filer Information

The person filing the electronic form in February 2016 (the 3rd time reporting) and associated information is:

Carla Rellergert
Title: Environmental Manager
Address: 9191 South Jamaica Street, Englewood CO 80112-5946
Telephone: 720-286-0707
Fax: 720-286-8051
Cell Phone: 303-330-6495
Email: Carla.Rellergert@ch2m.com
Forgotten Password Security Answer: spaz (my first dog's name-no capital letters)

By submitting the form, I met the federal and state certification requirement. At the bottom of the invoice is the following certification statement: "I certify under penalty of law that I have personally examined and am familiar with the information being submitted, and that my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true and complete. "

Electronic Access:

The ACW Facility ID#: 48835
User ID: T2-11311
Password: X7M4J2X9

Facility Information

Facility Status: Active
Facility Name: American Creosote Works Superfund Site
Facility Type: Fixed
Facility Address: 1109 Front Street, Winnfield LA 71483.
Parrish: Winn
SIC/NAICS or Dunn & Brad No: Per Executive Order 13423, Section VIII.C, we should not have to list this information. However, the database does not allow you to 'save or proceed' without filling in both of these codes. The NAICS code entered was based on 26 Feb 2014 email from John Knott and last year's filing of the Tier II Report. For EPA this is a code of 924110 Administration of Air and Water Resources and Solid Waste Management Programs. This code was selected to also support the basis that this is a federal project/site where no filing fee is required for the federal government. The SIC code identified was 9511 Air and Water Resources and Solid Waste Management.
Latitude and Longitude: Obtained from Google Earth based on facility address. Latitude: 31.917386 and Longitude: -92.636428.
Adjoining Parish: The electronic report required every parish within 1 mile of the facility to be listed, so Winn Parish was included again.
Facility is: Manned (Notes: this is during the week from 8am – 5 pm and each day and on the weekends for approximately 1-2 hours each day; then it is Unmanned in the evenings and a majority of the time on weekends and holidays. We also have capability for remote monitoring and an operator at Jasper and Hart which is approximately 2.5 miles away if needed.)
Maximum Number of People at the facility at any given time in 2015: 6

Facility Emergency Coordinator

This was required to be completed since the site is subject to the Emergency Planning, notification requirement under 77Section 302 of EPCRA (40 CFR Part 355) due to the quantities of Hydrogen peroxide and Sulfuric acid present at the site during 2013.

However, in 2015 the concentration of hydrogen peroxide was reduced down to 30%, which no longer classifies it as an extremely hazardous substance (EHS). To be an EHS it has to be at a concentration greater than 52%). And the quantity of sulfuric acid stored onsite (650 lbs.) is now below the TPQ of 1000 lbs. Therefore, the site is no longer subject to EPCRA's Emergency Planning requirements. In addition, although these two chemicals are still considered hazardous substances under CERLCA's RQ reporting (40 CFR 302.4), the quantities onsite will never exceed their respective 1000 lbs. RQs even if the entire quantity is released. Although, a Facility Emergency Coordinator is no longer required to be identified, for consistency we are continuing to report one.

The Facility Emergency Coordinator, per discussions with John Knott, is Joe Collins/BTR.

Site Operator/Site Safety Officer
Phone: 318-648-0392 (site office number)
24-hr phone: (318) 413-0128 (cell phone)
Fax: 318-648-0392 (faxes are received on the site office number)
Email: Joseph.Collins@ch2m.com

Facility Operator and Parent Company Information

Operator information is identified as:

CH2M
14701 St. Mary, Suite 300
Houston TX 77079
Phone 972.663.2209
Fax 972.385.5165
Email: John.Knott@CH2M.com

EPA Region 6 was identified as the parent company, since there was no other place to enter this information and EPA is not the true owner of the site.

Emergency Contact Information

Emergency Contact #1 is Joe Collins, since he is on-site
Emergency Contact #2 is John Knott, since he is the PM.

Filed Worksheet Information

Five chemicals have historically been reported electronically, based on the TM submitted to EPA on 14 February 2014 and based on inventories of these chemicals during each filing year. Chemical specific information that was included in the electronic Tier II report is based on the detailed information provided in Table 1, below.
Each chemical was reported to be stored in containers (plastic) located in the process liquid treatment system building, with the exception of creosote which was reported in an above ground metal tank and a metal vac box.

Quantities of chemicals are based on the product containers shipped to the site, and not based on their use within the treatment system.

Table 1: 2015 Inventory with EPCRA and CFATS Applicability

Inventory and Thresholds						*Applicability*^{4}							
Chemical Name	**CAS Number**	**Quantity (lbs.)^{1} at any one time**	**RQ (lbs.)**	**TPQ (lbs.)**	**STQs (lbs.)**	**Emergency Planning**	**Emergency Notification^{2}**	**Chemical Storage^{3}**	**TRI**	**CFATS**	**# of Days on Site in 2015**	**Max. Daily Amt. (lbs)^{5}**	**Avg. Daily Amt. (lbs)^{6}**
Creosote (Contaminant not process chemical-no SDS)	8001-58-9	22,500(a)	1	NA	NA		√^{2}	√*			365	22,500	100
Ferric Chloride	7705-08-0	1200 (b)	1000	NA	NA		√^{2}	*			365	1200	600
Hydrogen Peroxide 30%	7722-84-1	500(c)	1000	1000 (>52%)	400 (≥35%)		^{7}	*			225	500	250
Sodium Hydroxide	1310-73-2	2600 (d)	1000	NA	NA		√^{2}	*			365	2600	650
Sulfuric Acid	7664-93-9	650 (e)	1000	1000	NA		^{7}	√			365	650	325

Table Notes:

a- Based on 2500 gallons stored in tank (500 gallons) and vac box (2000 gallons) at 100% concentration with a density of 9 lbs/gal.
b- Based on 2-55 gallon drums at 38.25%, which is invoiced at 600 lbs./55 gallons. (Density is 11.6 lbs. /gal.)
c- Based on 1-55 gallon drum at 30% and 8.6 lbs./gal or 473 lbs./ 55 gallons. Conservatively rounded to 500 lbs. onsite at any one time.
d- Based on 4-55 gallon drums at 50%, which is invoiced at 650 lbs./55 gallons. (Density is 12.8 lbs. /gal.)
e- Based on 1-55 gallon drums at 93%, which is invoiced at 650 lbs./55 gallons. (Density is approximately 15 lbs/gal.)
NA- Not Applicable
1- Quantity or weight is based on the invoiced weight per 55 gallons or concentration and density, which are provided in parenthesis.
2- The emergency notification reporting requirements were initially triggered in 2013 and 2014 based on the presence of sulfuric acid and hydrogen peroxide being present on-site in excess of TPQs, which would require reporting of any chemical that is released in excess of each chemical's RQ that occurs within a 24-hour period. In 2015, only one drum of sulfuric acid was stored at the site (below TPQ) and the concentration of hydrogen peroxide was below reporting levels.
3- Chemical storage reporting is required if an EHS is present above the TPQ or 500 lbs, whichever is lower and in LA for non-EHS 500 lbs.
4- Per LA's Tier II electronic filing form, ACW is not subject to Section 112 of the Clean Air Act (40 CFR Part 68) because none of the chemicals used on-site are listed in 40 CFR Part 68.
5- For each hazardous substance, the maximum amount is the estimate of the greatest amount present at the facility on any single day during the reporting period. This is based on current practice and is based on the "Quantity at any one time" column.
6- For each hazardous chemical, estimate the average weight that was present at the facility during the year. This is based on one drum of each chemical being on-site on average, based on current practice. For creosote this was based on the maximum amount daily amount divided by 365 days (which is 62 lbs., and then rounded up to 100 lbs.)
7- Although these chemicals are hazardous substances with RQs, the quantity now stored onsite will not exceed their respective RQs if released.

Shaded rows indicate chemicals that are considered extremely hazardous substances (EHSs). Hydrogen Peroxide is no longer considered an EHS since it is below the EHS concentration.

*Note: Although creosote is a contaminant at ACW and a hazardous waste, the site does handle and store this chemical per 33 LAC Part V Subpart 2 Chapter 101, §10103A. Creosote, Ferric chloride and Sodium hydroxide are not EHSs. However, the electronic filing report does require other chemicals with RQs that are not considered Extremely Hazardous Substances or any chemical that is below threshold planning quantities to be reported as well. Hydrogen Peroxide, although no longer considered an EHS since it is below the EHS concentration of >52%. However, since ACW had 500 lbs., onsite last year at any one time, the Louisiana Chemical Inventory reporting limits is 500 lbs., so this chemical was also include.

Reportable Quantity Calculations:

Hydrogen Peroxide

RQ for Hydrogen Peroxide is 1000 lbs., from 40 CFR 302.4 Table.
Quantity of Material on-site at any one time: 1-55 gallon drum weighing approximately 473 lbs.
The hazardous ingredient and weight percent: hydrogen peroxide at a concentration of 30%.
Density of 8.6 lbs./gallon

$$8.6\ \frac{\text{pounds}}{\text{Gallon}} \times 55 \text{ gallons} \times 0.30 = 142 \text{ pounds}$$

Therefore, if the entire quantity of hydrogen peroxide was spilled onsite, it would not exceed the RQ of 1000 lbs.

Sulfuric Acid

RQ for Sulfuric Acid is 1000 lbs., from 40 CFR 302.4 Table.
Quantity of Material on-site at any one time: 1-55 gallon drum weighing approximately 650 lbs. (which is never quite full).
The hazardous ingredient and weight percent: sulfuric acid at a concentration of 93%.
Density of 15 lbs./gallon (This is based on the density of sulfuric acid is 1.84 g/cm3 = 114.87 pounds/ft3 x 7.4 ft3/55 gallons = 850 lbs. per 55 gallons or approximately 15 lbs. per gallon.)

$$15\ \frac{\text{pounds}}{\text{Gallon}} \times 55 \text{ gallons} \times 0.93 = 767 \text{ pounds}$$

Therefore, if the entire quantity of sulfuric acid was spilled onsite, it would not exceed the RQ of 1000 lbs.

Hydrogen Peroxide

RQ for Sulfuric A is 1000 lbs., from 40 CFR 302.4 Table.
Quantity of Material on-site at any one time: 1-55 gallon drum weighing approximately 650 lbs. (which is never quite full).
The hazardous ingredient and weight percent: sulfuric acid at a concentration of 93%.
Density of 15 lbs./gallon (This is based on the density of sulfuric acid is 1.84 g/cm3 = 114.87 pounds/ft3 x 7.4 ft3/55 gallons = 850 lbs. per 55 gallons or approximately 15 lbs. per gallon.)

$$15\ \frac{\text{pounds}}{\text{Gallon}} \times 55 \text{ gallons} \times 0.93 = 767 \text{ pounds}$$

Therefore, if the entire quantity of sulfuric acid was spilled onsite, it would not exceed the RQ of 1000 lbs.

Filing:
When all the information is entered/reviewed, on the Facility information page, in edit mode, check the box that says “Ready for Filing”

<u>*BEFORE SUBMITTING:</u>** From the Facility Information page, select Printable Report and print a pdf of the report

Invoicing

From the Home screen, after all information is entered and the submittal is marked as “ready for filing, go to the Filing Worksheet button at the top
It asks you 4 questions.

1. # of Facilities 1
2. # of Employees less than or equal to 9? Yes
3. Annual Gross Receipts Under $2MM? Yes
4. Exemptions-Federal Govt.

<u> As indicated, Print the invoice before leaving this page**</u>**

This is the submittal process. The system will not give you a confirmation/notification that the submittal was complete/successful; however, go back to the Home screen and it should indicated for the target reporting year “YES” under the Filed column heading:

<A HREF="/tier2.nsf/$Resources/HelpIndFacFacList?OpenDocument" target="top"><IMG SRC="/tier2.nsf/$Resources/redNavHelp.jpg/$FILE/redNavHelp.jpg" ALT="Help" BORDER=0></A>

Reporting Year	Facility ID	Facility Name	Filed
2015	48835	AMERICAN CREOSOTE WORKS SUPERF	Yes
2014	48835	AMERICAN CREOSOTE WORKS SUPERF	Yes

Required Submittals

Submittals are required to:

- SERC (Louisiana Emergency Response Commission or LERC)
- LEPC
- Fire Department

SERC – the online Tier II program submits the Tier II report electronically to the Louisiana Emergency Response Commission. As indicated on the invoice, a copy of the invoice was sent using delivery confirmation to:

Office of Management and Finance
Financial Services Division
P.O. Box 66909
Baton Rouge, LA 70896

LEPC – Last year a copy of the Tier II report was e-mailed on February 13, 2015 to
Mr. Harry Foster: winnohsep@winnparish.org

The LEPC information was obtained from the following website:

Parish Homeland Security & Emergency Preparedness Contact Numbers:
http://gohsep.la.gov/about/parishpa

Winn Parish	**Harry Foster** email: winnohsep@winnparish.org	(318) 628-1160	(318) 727-3112

However, on the Louisiana Tier II Reporting web site available at https://webdev01.dps.louisiana.gov/t2access.nsf, there is a link that lists the parishes where we no longer have to send paper submissions to the local LEPC. This list indicates "The Local Emergency Planning Committees on the above list have officially designated the State Police Right-to-Know Unit as the repository of their Tier Two filings by signing the State Repository Agreement. This designation allows the LEPC to accept reports filed into the state database as having been filed with them since they have electronic internet access to the information. Therefore, reporting facilities in the listed parishes are no longer required to send paper submittals of their Tier Two chemical inventory data to the LEPC."

Therefore, no email or hardcopy was sent to the LEPC in 2016 for filing year 2015.

Fire Department – a hard copy of the_Tier II report was mailed using delivery confirmation on February 17, 2016 to:

Winnfield Fire Department
306 South Abel Street
Winnfield, Louisiana 71483
318-628-3923

Note: During an open house at ACW on 3December2015, based on the sign in sheet, Harry Foster from Winn Parish Fire Department and Brian Montgomery from Winnfield Fire Department attended.