RECORD OF DECISION AMENDMENT

Marion Pressure Treating Company Site
Marion, Union Parish, Louisiana

U.S. Environmental Protection Agency
Region 6
Dallas, Texas

September 2016

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Tables

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below ground surface
B(a)P	Benzo(a)pyrene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of concern
DNAPL	Dense non-aqueous phase liquid
ECs	Engineering controls
EPA	U.S. Environmental Protection Agency
FSR	Feasibility Study Reassessment
ft	foot
ICs	Institutional controls
LDEQ	Louisiana Department of Environmental Quality
LDR	Land Disposal Restriction
LTM	Long-term monitoring
MCL	Maximum Contaminant Level
mg/kg	Milligram(s) per kilogram
MPTC	Marion Pressure Treating Company
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
PAH	Polycyclic aromatic hydrocarbon
RA	Remedial action
RD	Remedial design
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RECAP	LDEQ Risk Evaluation/Corrective Action Program
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Site	Marion Pressure Treating Company Superfund Site
TBC	To be considered
TCLP	Toxic Characteristic Leaching Procedure
WBZ	Water-bearing zone

PART 1. DECLARATION

1.1. SITE NAME AND LOCATION

Marion Pressure Treating Company
Marion, Union Parish, Louisiana
CERCLIS Identification Number: LAD008473142
SITE ID: 0604491

The Site is a former wood-treating operation located in Marion, Union Parish, Louisiana that operated from 1964 to 1985. The Site is located about 14 miles northeast of Farmersville and 35 miles north-northwest of Monroe, Louisiana. The Site covers approximately 22 acres, is bounded on the west side by State Highway 551 and by forest to the north, east, and south. Big Creek is an intermittent stream located to the east of the property, and an unnamed tributary to Big Creek is located west of the property. Creosote was used to pressure-treat wood products.

The public participation requirements set out in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) § 117, 42 United States Code (U.S.C.) § 9617, 40 Code of Federal Regulations (CFR) §300.435(c)(2)(ii), have been met for this remedy amendment. This Record of Decision (ROD) Amendment will become part of the Administrative Record (pursuant to 40 CFR §300.825(a)(2)), which has been developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k), and which is available for review at the information repository locations listed below and in Part 2, Section 2.8 (Public Participation), of this ROD Amendment. A "Notice of Availability" and a brief description of this ROD Amendment will be published in a local newspaper, as required by 40 CFR §300.435(c)(2)(ii)(G).

1.2. STATEMENT OF BASIS AND PURPOSE

In this 2016 ROD Amendment, the U.S. Environmental Protection Agency (EPA) presents the "Selected Remedy" for soils and sediments contaminated with creosote, which contains polycyclic aromatic hydrocarbons (PAHs), and dense non-aqueous phase liquids (DNAPL) present in soil as isolated residual globules and in the shallow ground water at the Site. This Selected Remedy is based upon a re-evaluation of the remedy selected in the 2002 ROD (EPA 2002), consideration of information derived through additional investigations since the 2002 ROD, and an Independent Technical Review (USACE 2006) of the remedial design (RD). A ground water remedy will be evaluated and selected in a future decision document.

This Selected Remedy documents changes to the selected remedial action described in the Final ROD dated June 1, 2002, for the Site. The amended remedial action presented in this ROD Amendment is chosen in accordance with CERCLA, 42 U.S.C. § 9601 *et seq*., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent

practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300 *et seq*., as amended. The Director of the Superfund Division, EPA Region 6, is delegated the authority to approve this ROD Amendment.

This decision was based on the Administrative Record, which has been developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k), and which is available for review at the Marion City Hall in Marion, Louisiana, and at the Louisiana Department of Environmental Quality, Public Records Center in Baton Rouge, Louisiana. The Administrative Record Index identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

The State of Louisiana, acting through the Louisiana Department of Environmental Quality (LDEQ) concurs with the Remedy Amendment.

1.3. ASSESSMENT OF SITE

The response actions selected in this ROD Amendment are necessary to protect the public health or welfare or the environment from actual and threatened releases of hazardous substances into the environment.

1.4. DESCRIPTION OF SELECTED REMEDY

This ROD Amendment sets forth the change in remedy to address the creosote contamination in the soils and sediments on the site and in the DNAPL in the shallow ground water by:

- Capping of the Residual DNAPL area
- Deep soil mixing with solidification/stabilization in the Free-Phase DNAPL area
- Consolidation and capping in the Big Creek Exposure area
- Limited action with long-term monitoring for the Shallow Ground Water area

A final decision document for cleanup of ground water will be in a future decision document.

1.5. STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Since hazardous substances, pollutants, or contaminants will be left in place at concentrations that prevent unlimited use and unrestricted exposure, a statutory review is required under CERCLA § 121(c), 42 U.S.C. § 9621(c). Five-year reviews are conducted as a matter of policy at sites where the cleanup will take more than five years to complete and will allow for unlimited use and unrestricted exposure. A five-year review will be required for this remedial action no less often than every five years and will be conducted by EPA in coordination with LDEQ.

1.6. DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision Amendment. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations (Sections 2.2.2 , 2.2.5)
- Baseline risk represented by the chemicals of concern (Sections 2.2.2 , 2.2.5)
- Cleanup levels established for chemicals of concern and the basis for these levels (2.4.1)
- How source materials constituting principal threats are addressed (Sections 2.2.4 and 2.3)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the Baseline Human Health Risk Assessment and ROD (2.4.2)
- Potential land and ground water use that will be available at the site as a result of the Selected Remedy (Section 2.4.2)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.7and Table 1)
- Key factor(s) that led to selecting the remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Sections 2.6, 2.7 and Table 1)

1.7. AUTHORIZING SIGNATURES

This ROD Amendment documents the selection of an alternate remedy for contaminated soil, sediments, and DNAPL at the Marion Pressure Treating Company Superfund Site. The EPA selected this remedy with the concurrence of the LDEQ. The Director of the Superfund Division (EPA, Region 6) has been delegated the authority to approve and sign this ROD Amendment.

Pam Phillips, Acting
Carl E. Edlund, P.E., Director
Superfund Division

9/30/16
Date

CONCURRENCE PAGE - RECORD OF DECISION AMENDMENT

Marion Pressure Treating Company Site

Janet Brooks, Remedial Project Manager
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9/28/2016
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9/30/16
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PART 2. DECISION SUMMARY

2.1. INTRODUCTION

The Decision Summary provides an overview of the site characteristics, an analysis of those options that led to an amendment of the June 2002 ROD, and a comparison between the previous ROD and this ROD Amendment. The original ROD was not implemented due to concerns about the cost-effectiveness of the selected remedy. This ROD Amendment identifies the Selected Alternate Remedy and explains how the remedy fulfills statutory and regulatory requirements.

2.1.1 Site Name and Location

The Site is listed as Marion Pressure Treating in the EPA National Superfund database under the identification number LAD008473142. The site location is within the corporate limits of the town of Marion, in Union Parish, Louisiana. Specifically, the site is located at 3583 Martin Luther King, Jr. Drive (State Highway 551) in Marion. The site is also known as the Marion Pressure Treating Company (MPTC) site. The Site occupies approximately 22 acres in a rural area northwest of Marion, Union Parish, Louisiana (Figure 1). The Site is located about 14 miles northeast of Farmersville and 35 miles north-northwest of Monroe, Louisiana. The Site is on the east side of State Highway 551 about 0.5 miles north of the intersection of State Highway 551 and State Highway 33. Big Creek is an intermittent stream located to the east of the property, and an unnamed tributary to Big Creek is located west of the property (Figure 2).

2.1.2 Lead and Support Agencies

U.S. Environmental Protection Agency – Lead Agency
Louisiana Department of Environmental Quality – Support Agency

2.1.3 Statute Requiring Record of Decision Amendment

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Section 117(c), and NCP Section 300.435(c)(2)(ii).

2.1.4 2002 Record of Decision

The Record of Decision was signed on June 1, 2002. The selected remedy in the 2002 ROD was excavation and treatment using on-site low temperature thermal desorption, off-site disposal of debris, and a DNAPL recovery system, if required (see Section 2.4 for additional information).

2.1.5 Need for a Record of Decision Amendment

This is the first amendment of the ROD and will fundamentally change the remedy for the soils and sediments and the DNAPL contaminated areas at the Site. An EPA removal action in 1996 consolidated and capped the PAH-contaminated soil; however, creosote had also contaminated the shallow water beneath the site with DNAPL containing PAH. EPA issued a ROD in 2002 to address the site contamination; however, the remedy was not implemented due to concerns about the cost-effectiveness.

2.1.6 Administrative Record

The ROD Amendment will become part of the Administrative Record for the Site in accordance with the NCP, 40 CFR Section 300.825(a)(2). The Administrative Record contains documents such as the "Supplemental Field Investigation Report", "Feasibility Study Reassessment", "Proposed Plan", ROD, and this ROD Amendment. In addition, documents attached to or referenced in this ROD Amendment are included in the Administrative Record by reference.

2.1.7 Location of Administrative Record

The administrative record is available to the public for review during regular business hours at the following locations:

Marion City Hall
398 Main Street
Marion LA 71260
318.292.4715

LDEQ Headquarters
Public Records Center
Galvez Building, 1st Floor – Room 127
602 N. Fifth Street
Baton Rouge, LA 70802
(225) 219-3181

EPA Region 6
7th Floor Reception Area
1445 Ross Avenue, Suite 12D13
Dallas, TX 75202-2733
Toll Free (800) 533-3508 or (214) 665-6597
Monday – Friday: 7:30-11:00 am/1:00-4:00 pm

2.2. SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.2.1 Site History

The site is an inactive and abandoned wood treating facility that used creosote in its treatment process. The site is located in a predominately rural area with residential land use located to the southwest of the site across Highway 551. The site elevation is approximately 180 feet above mean sea level, characterized by a generally flat, gently sloping ground surface. The MPTC originally occupied a 10-acre tract of land. Currently, the site and areas of contamination extend over approximately 22 acres.

The MPTC site began operations November 1, 1964, and ceased operations on October 10, 1989, due to bankruptcy. From the beginning of operation, creosote was used exclusively for the wood-preserving operations. Creosote-contaminated process wastewater was generated during wood treatment and disposed of within an on-site, unlined surface impoundment from 1964 until 1985.

2.2.2 Site Contamination

Contaminants detected in soil, sediment, surface water, and ground water include metals and PAHs (creosote-related contaminants). However, the metals detected were not directly related to the creosote wood treatment operations performed at the site and are similar to background, therefore, metals are not considered a chemical of concern (COC). Other types of wood treatment processes (copper chromate arsenate) were not used at MPTC; (TT 2001d).

The Site is contaminated with creosote, which contains PAHs which in turn are comprised of over 100 different chemicals. The baseline human health risk assessment (Tetratech, 2001a) evaluated the site using benzo(a)pyrene (B(a)P) equivalent concentrations in surface soil. B(a)P equivalents are calculated values based on the concentrations of seven carcinogenic PAHs (benzo[a]anthracene, B[a]P, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene). An analysis of the data collected during the Remedial Investigation, Remedial Design Field Investigation, and Supplemental Field Investigation was performed to describe the nature and extent of contamination in sediment, soil, surface water, and ground water.

B(a)P was detected in 111 of 260 surface soil samples with a maximum concentration of 120 milligrams per kilogram (milligram(s) per kilogram (mg/kg)). B(a)P was detected in 3 of 3 sediment samples with a maximum concentration of 410 mg/kg. Six surface water samples from Big Creek and an unnamed tributary contained low concentrations of SVOCs and metals which did not exceed any screening levels. SVOC exceedances of ground water screening criteria were observed in five monitoring wells during the March 2013 sampling event. These wells (MW-2, MW-3, MW-14, MW-14A, and MW-18) are located near the Consolidation Area and former surface impoundment area. Similar to the 2010 observation, the SVOC screening

criteria exceedances for the 2013 sampling event generally did not show significant upward trends in ground water contamination. Monitoring well MW-14 had the highest compound-specific concentration increase due to the presence of DNAPL. However, there was some significant decreases in SVOC concentrations for the following wells: MW-2, MW-3, MW-15, and MW-18. These decreases are noteworthy because monitoring wells MW-2, MW-3, and MW-14 are located within approximately 25 ft of the former impoundments, and MW-15 and MW-18 are located within 25 ft of the outer boundary of the Consolidation Area. Since these wells are all screened in the S2 zone, these results give some indication that that SVOC concentrations in this zone are decreasing. SVOC exceedances of screening criteria were not observed in the ground water collected from the rest of the monitoring wells during the March 2013 sampling event. The wells located in the outer perimeter of the Consolidation Area and former impoundment area did not have detectable levels of SVOCs (MW-1, MW-4, MW-5, MW-7, MW-16, MW-19, MW-20, or MW-21).

The Conceptual Site Model has been refined based on the additional investigations that have been conducted since the 2002 remedial design was completed. Sample locations of observed and calculated creosote or DNAPL in the soil are shown in Figure 3. The Big Creek Exposure Area contains hotspots of contaminated soil/sediment in the Big Creek Exposure Area (Figure 4).

Data analysis indicates the following:

- The geology of the Cockfield Formation underneath the MPTC site generally consists of clay with silt and sand stringers (soil unit C1) from the ground surface to a depth varying from approximately 13 ft bgs to 25 ft bgs, underlain by sand and fine sand with silty clay and lignite (soil unit S1) to a depth varying from approximately 40 to 80 ft bgs (TT 2001b). The C1 clay layer on top reduces infiltration of water to underlying layers. S1 is the shallow water-bearing zone (WBZ) of the Cockfield Aquifer. This sand layer is underlain by another shallow clay and silty clay layer (soil unit C2), followed by a fine sand and sand with silt clay and lignite layer (soil unit S2). S2 is the deeper WBZ. Both S1 and S2 are potential drinking water sources. The deepest layer of the Cockfield Formation is silty clay (soil unit C3), which confines the S2 sand on the bottom. Soil unit C3 is the deepest interval assessed during the Remedial Investigations. Figure 5 identifies the locations of the cross-sections A-A' to E-E' detailed in Figures 6, 7, 8, 9 and 10 which provide visual representations of the Cockfield Formation.

- Residual DNAPL is present in the soil as isolated residual globules (Area B – Residual DNAPL Area on Figure 11. In the absence of percolating surface water or fluctuating ground water levels it is generally immobile. Residual DNAPL at the site spans the Consolidation Area and extends to the outermost borings approximately 150 ft east of the Consolidation Area (near MW-21). A trace of liquid creosote was found during drilling of MW-12 from 44-45.5 ft bgs. The depth to water in MW-12 was about 11 ft bgs. Additional characterization will refine the extent during Remedial Design.

- Free-Phase DNAPL, or DNAPL that holds together in a continuous phase and migrates vertically, is present within Area C - Residual DNAPL Area (Figure 11), east of the Consolidation Area in the subsurface soil and/or ground water (see DNAPL plume below). As with the Residual DNAPL area, the vertical extent will have additional characterization during Remedial Design.

- Surface water samples collected from Big Creek and the unnamed tributary indicated the presence of low concentrations of PAHs (constituent of creosote) and metals in Big Creek. The results of the risk assessments indicate that these concentrations do not exceed any screening level and do not present a risk to human health or the environment.

- PAH contamination is present in sediment, surface soil, and spoil piles in the southern portion of the site near Area D - Big Creek Exposure Area (Figure 11). Previous sampling indicates that contamination may be isolated hot spots of creosote impacted sediments. Additional assessment and characterization will be performed during the remedial design for sediment sample locations that comprise the Big Creek Exposure Area to verify the presence and depth of contamination.

- Geologic cross sections A-A' through E-E' show a DNAPL plume beneath the former surface impoundment and east of the Consolidation Area in the shallower water-bearing zone (S1 WBZ) (Figures 6 through 10). Based on a review of the potentiometric data from the Supplemental Field Investigation (EA 2015), the horizontal hydraulic gradients in both WBZs of the Cockfield Aquifer appear to be relatively low. Ground water flow direction of the S1 WBZ was to the north based on the data collected in March 2011, March 2013, and January 2015. The S1 WBZ water elevation ranged from 159.65 to 161.55 ft above mean sea level across the site in January 2015; similar ranges of ground water elevations were observed during previous monitoring events. Within the S1 WBZ, PAHs have been detected above Maximum Contaminant Levels (MCLs). Concentrations of PAHs appear to be generally decreasing over time. Historically, metals have been detected above MCLs since 2000 and in subsequent sampling events; however metals were not detected above the MCLs in the ground water samples collected in March 2013.

- Vertical migration of the DNAPL from the S1 WBZ is hindered by a clay layer beneath the shallow water bearing zone (Figures 6-10), however, dissolved-phase PAHs have been observed northwest of the former surface impoundment in the deeper water bearing zone (S2 WBZ). Concentrations of PAHs in the S2 WBZ do not exceed MCLs. Concentrations of contaminants are generally declining over time. Historically, metals have been detected above MCLs since 2000 and in subsequent sampling events; however metals were not detected above the MCLs in the ground water samples collected in March 2013. The S2 ground water flow was to the southeast in January 2015 and in previous gauging events.

- The most significant ground water contamination appears to be in the vicinity of the Consolidation Area and former surface impoundment, proximal to observed (explicit and implicit) DNAPL in the subsurface. The monitoring wells outside of this localized area did not have PAH detections during the SFI, providing little evidence of widespread dissolved-phase contamination. Using retarded contaminant seepage values from Table 14 in the SFIR, the migration time of benzo(a)pyrene was calculated to the north fence line from the north margin of the former impoundments. This distance between the impoundments and fence line is approximately 100 feet. The estimated contaminant seepage velocity for benzo(a)pyrene is 0.0019 ft/yr, so the migration time (assuming plug flow) for benzo(a)pyrene to reach the fence line is over 50,000 years (100 ft/0.0019 ft/yr). The immobility of creosote compounds combined with stabilization or source removal and implementation of LTM renders a remedy that is protective for a long period of time. Monitoring wells screened in the S2 formation had concentrations that were orders of magnitude less than the concentrations detected in wells screened in the S1 formation, indicating remedial alternatives should focus on the shallow WBZ (S1). Monitoring wells MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, and MW-13 are screened through both WBZs, which may allow for contaminant migration between S1 and S2. Because they may serve as conduits for contamination migration, they fail to provide useful ground water contamination data with respect to each individual WBZ, and render confused water levels for the purpose of calculating seepage velocity. Available historical data suggests a stable or decreasing plume size. The S2 WBZ water elevations are about 2 to 3 ft higher than those in the S1 WBZ, indicating an upward head gradient.

- The water wells for the Marion public supply water system, located approximately ½ mile southeast of the site, are screened in the Sparta Sand (300–900 feet (ft) below ground surface (bgs)). No other nearby water wells were identified during the remedial investigations. Ground water samples were collected from the City of Marion public supply water wells as part of the remedial investigations. The laboratory testing results indicate that the drinking water from the Marion public supply water wells met MCLs and the water quality criteria established for primary drinking water systems by the Louisiana Department of Health and Hospitals, Office of Public Health. As of 2001, no site-related contaminants have been detected in the City of Marion public supply water wells.

2.2.3 History of Federal and State Investigations and Action

Several Resource Conservation and Recovery Act (RCRA) inspections were conducted by the LDEQ in the 1980s and early 1990s. In particular, during the inspection conducted on September 30, 1992, LDEQ noted the facility was completely abandoned with no evidence of recent activity.

In 1995, the EPA Technical Assistance Team conducted a Removal Site Assessment following a request by the LDEQ. This assessment, and subsequent more detailed site assessments conducted by the EPA Technical Assistance Team through 1995, indicated elevated levels of creosote in soil and sediment samples. A time-critical removal action to provide source control was completed by EPA in 1997. During this removal action, several site structures and tank contents were removed from the site. Sections of surface soil contaminated with creosote near the main facility operations area were consolidated into an area onsite.

In 1999, the site was proposed to the National Priorities List (NPL), and a Remedial Investigation/Feasibility Study (RI/FS) was initiated to define the nature and extent of contamination and to identify remedial alternatives to address the site's contamination problems. The site was added to the NPL in February 2000. During the field investigation of the RI/FS, the EPA built a fence around the site to restrict access to areas where sampling and visual observations had shown the presence or potential presence of creosote-related contamination. The general site features and fenced portions of the site are shown on Figure 2. The EPA's 2001 Remedial Investigation confirmed contamination at the site of soil, sediments, and the shallow upper water-bearing zone (S1 WBZ). The ROD for the Site was issued on June 1, 2002.

NPL Inclusion Proposal Date:	October 22, 1999
NPL Inclusion Final Date:	February 4, 2000
HRS Score:	50.00

2.2.4 Selected Remedy in 2002 ROD

The 2002 ROD fully addressed the threats to human health and the environment posed by conditions at the Site. The 2002 ROD states that the Selected Remedy was the final remedy for the Site, and that the remedy addressed remediation of the Site's contaminants to below drinking water standards. The remedy described in the 2002 ROD for the Site consisted of the following elements:

- The creosote-contaminated soils/sediments near Big Creek Exposure were considered to be "principal threat wastes" because the Chemicals of Concern (COCs) were found at concentrations that pose a significant risk. According to the Human Health Risk Assessment, the upper-bound excess lifetime carcinogenic risk to an individual posed by these materials is upwards of one in ten thousand (4.7×10^{-4}). In other words, if the contaminated soils/sediments at Big Creek Exposure Area are not remediated, as many as 4 additional people out of every 10,000 individuals exposed to the soil could develop cancer because of that exposure.

- Creosote-contaminated soils in the Consolidation Area and the backfilled impoundment area, and soils/sediments in Big Creek Exposure Area were also considered to be "principal threat wastes" because they are source material leaching DNAPL into the ground water.

- The selected response action addressed source materials constituting principal threats at the site by reducing the concentrations of chemicals in contaminated soils/sediments to levels not posing a significant or unacceptable risk to individuals who may use the site.

- The selected response action addressed source materials constituting principal threats at the site by reducing the concentration of chemicals in contaminated deep soils to levels that are not likely to leach further contamination into the ground water, posing a significant or unacceptable risk to individuals who may drink the ground water on site.

- The site cleanup strategy consisted of the excavation and treatment of contaminated soils on the surface of the site, and in areas near the drainage pathway of Big Creek. Treated soils would be used to backfill excavated areas, and the backfilled areas would be regraded and revegetated.

- A second component of the cleanup strategy was the excavation and treatment of contaminated soils under or inside the consolidation areas, the backfilled surface impoundment, and some portions of the drainage pathway of Big Creek. These soils needed treatment to prevent future leaching of contaminants and DNAPL into the ground water. The treated soils would be used to backfill excavated areas, and the backfilled areas would be regraded and revegetated.

- A third component of the cleanup strategy was the recovery of DNAPL from areas outside the excavation boundaries of the consolidation area. This component was to be further evaluated under the remedial design. If DNAPLs were found beyond the excavation boundaries, a recovery system would be designed and installed to collect these liquids and prevent their migration into the groundwater. The component would include monitoring of the groundwater and institutional controls to limit the access to the groundwater near the site.

The expected outcome of the 2002 Selected Remedy was that the site would no longer present an unacceptable risk to human health because the contaminated soil and sediment would be excavated, treated, and used as backfill for the excavated areas. Other hazardous and nonhazardous debris currently on-site would be disposed off-site and the property would be suitable for industrial or recreational land use. In addition, institutional controls, such as a conveyance, would prevent future human exposure to on-site shallow ground water that may be affected by residual contamination. By addressing the unacceptable human health risks in the sediment contamination in the Big Creek, contamination that affects the wetlands and other habitat in the creek would also be addressed, thereby providing environmental and ecological benefits such as wetlands restoration. Ground water monitoring would ensure that the remedy is protective.

2.2.5 Summary of Site Risks

The HHRA Report (TT 2001a) results indicate that the major non-carcinogenic risk is due to (1) ingestion and dermal absorption of arsenic, thallium, dibenzofuran, and naphthalene in ground water by an On-site Adult Resident (HI=11) or an On-site Child Resident (HI=24). Additionally, the Remedial Investigation indicates that all metals concentrations in soil are either below soil screening levels or similar to background concentrations (TT 2001c). Neither arsenic nor thallium was detected in DNAPL samples collected from the site (TT 2001c).

The HHRA results indicate that the major carcinogenic risks are primarily due to (1) ingestion of benzo(a)pyrene in Big Creek Sediments by an Adolescent Trespasser/Recreational visitor (risk=3.9 x 10^{-4}) and (2) ingestion of arsenic in groundwater by an Industrial Worker or by Child or Adult On-site Residents (risk ranges from 1.1 x 10^{-4} to 3.8 x 10^{-4}).

In addition to the non-carcinogenic and carcinogenic risks associated with direct contact with site-related Chemical of Potential Concern (COPCs) in surface sediment (0–0.5 ft bgs), PAHs have been detected at depth in several soil sample locations at MPTC. DNAPL has been detected in only four monitoring wells. Therefore, the potential for leaching of COPCs from contaminated soil and sediment to ground water was also evaluated in the HHRA in order to determine site-specific preliminary remediation goals (PRGs).

The Ecological Risk Assessment (TT 2001b) evaluated a comprehensive suite of upland and aquatic receptors to identify adverse impacts from COPCs identified for the site. No further action is needed to protect the soil invertebrate community, terrestrial plants, mammals, and birds at MPTC.

For aquatic receptors, sediments in low-lying areas of Big Creek should be remediated for protection of benthic invertebrates. Areas that pose a risk to these organisms overlap with the areas identified in the HHRA as posing a significant threat to human health, if exposure were to occur. Sediment treatment that addresses human health risks will also remediate areas that exceed risk levels for benthic invertebrates. No further action is needed to protect the fish community, amphibians, or mammals and birds at MPTC.

Inhalation of vapors from contaminated ground water (vapor intrusion) was not included in the HHRA because the exposure pathway was not deemed to be complete because there are no occupied spaces on-site.

2.3. BASIS FOR THE RECORD OF DECISION AMENDMENT

The 2002 ROD specified excavation and treatment of soils and sediments; using on-site thermal desorption; with off-site disposal of debris in either a RCRA Subtitle C or D landfill; backfill excavated areas and re-vegetate; with a DNAPL recovery system (if required), ground water monitoring and institutional controls to limit access to ground water. Recovered DNAPL would be disposed in an off-site RCRA facility.

The EPA is issuing this ROD Amendment to document the Site conditions that led to the need for a remedy amendment. The Selected Remedy in the 2002 ROD was not implemented.

The following investigations prompted and supported the change to the Selected Remedy and are included in the Administrative Record:

December 2006 – Independent Technical Review
May 2015 – Supplemental Field Investigation
June 2015 – Remedial Alternatives Technical Memorandum, Revision 02
August 2015 – Remedial Alternatives Evaluation Technical Memorandum, Revision 02
September 2015 – Feasibility Study Reassessment Report, Revision 03

Each of the above documents are included in the Administrative Record and are briefly described below:

Independent Technical Review - December 2006

The December 2006, the U.S. Army Corps of Engineers submitted the "Independent Technical Review Report" to EPA. The technical review involved the review of investigation documents and remedial design documents and provided an evaluation of the proposed remedial design, suggested possible areas where cost or schedule saving could be realized, and provided suggestions on alternative remedial measures.

Supplemental Field Investigation - May 2015

The Supplemental Field Investigation Report was submitted to the EPA in May 2015. Fieldwork associated with the Supplemental Field Investigation was conducted from December 2010 through January 2015 and included:

- Multiple ground water sampling and gauging activities
- A subsurface soil investigation utilizing a cone penetrometer testing rig equipped with Tar-Specific Green Optical Scanning Technology (TarGOST®)
- Plugging and abandonment of well MW-14, installation of monitoring well MW-14A, and installation of soil boring FSR-SB-2 for geotechnical characterization.

Remedial Alternatives Technical Memorandum - June 2015

The June 2015, Remedial Alternatives Technical Memorandum, Revision 02 Report provided potential remedial alternatives which were qualitatively developed and assessed against three preliminary screening criteria to determine which remedial alternatives would be considered in the Remedial Alternatives Evaluation Technical Memorandum and the Feasibility Study Reassessment Report. The original remedial alternatives considered for the 2002 ROD were

evaluated along with additional remedies; some were discarded from further consideration, others were included for evaluation for this ROD Amendment.

Remedial Alternatives Evaluation Technical Memorandum - August 2015

The August 2015, Remedial Alternatives Evaluation Technical Memorandum, Revision 02 Report provided an evaluation of the potential remedial alternatives against seven screening criteria to determine which remedial alternatives would be considered in the Feasibility Study Reassessment Report.

Feasibility Study Reassessment Report – June 2015

The June 2016, Feasibility Study Reassessment Report, Revision 05 provided a re-evaluation of potential remedies in areas that are subject to a remedial alternative evaluation. Based on the results of the HHRA (TT 2001a), the Big Creek Exposure area is subject to a remedial alternatives evaluation in order to prevent direct exposure above cleanup levels. The Free-Phase DNAPL and Residual DNAPL Areas are subject to a remedial alternatives evaluation because they contain principal threat wastes that may cause direct exposure above cleanup levels.

2.4. COMPARISON OF PREVIOUS REMEDY AND SELECTED ALTERNATE REMEDY

The EPA organized the Site into two operable units in the 2002 ROD. The two operable units identified were:

- Operable Unit 1: Contamination of the on-site soils
- Operable Unit 2: Removal of contamination from the ground water

This 2016 ROD Amendment redefines Operable Unit 1 as: On-site soils and sediments and DNAPL. A final decision document for cleanup of ground water will be in a future decision document.

The 2002 Remedial Action Objectives were defined as:

- Treating soils that are above acceptable risk levels to prevent contact by receptors.
- Preventing further contamination of ground water by removing soil and sediment contaminant sources above acceptable levels and recovering DNAPL to the greatest extent possible.
- Monitoring the ground water to determine the effectiveness of the source removal.

The 2016 Remedial Action Objectives have been slightly redefined as:

- Prevent industrial worker ingestion and dermal exposure to soils/sediment contaminants of concern exceeding health based cleanup levels.

- Minimize further migration of contaminants of concern from source materials to groundwater.
- Prevent exposure of potential receptors to on-site contaminated groundwater above health based standards until a decision concerning any necessary remedial action for the groundwater is made in the future.

The selected remedy in the 2002 ROD was excavation and treatment using on-site low temperature thermal desorption, off-site disposal of debris, and a DNAPL recovery system, if required. Any water recovered from the DNAPL recovery system was to be treated using an on-site water treatment system with effluent discharged to surface drainage. A ground water monitoring plan was part of the selected remedy.

2.4.1 Key ARARs and Cleanup Levels

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and 40 CFR § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as ARARs, unless such ARARs are waived under CERCLA Section 12l(d)(4), 42 U.S.C. § 962l(d)(4).

The 2002 ROD identified several ARARs for the Site. Please refer to the 2002 ROD for a complete discussion of previously identified Site ARARs.

This 2016 Selected Remedy reviewed and modified the 2002 ARARs based on the selected remedy. Please see Table 2 for a listing of the identified ARARs and "To Be Considered" (TBCs) for this site.

A cleanup level of 42 mg/kg B(a)P equivalent was calculated for the trespasser/recreational visitor. The cleanup level for an on-site industrial worker was calculated as 26 mg/kg B(a)P equivalent. The more protective cleanup level of 26 mg/kg B(a)P equivalent was selected as the cleanup level for soil and sediment in the 2002 ROD and remains the same in this 2016 ROD. The cleanup level determined for soil and sediment in the 2002 ROD was based on a 10^{-4} risk level. This ROD Amendment cleanup level is based on a cumulative lifetime excess cancer risk of 10^{-5} (1 in 100,000 chance of developing cancer as the result of site related exposure) is the risk level selected as the basis for protection of human health for site exposure. This lifetime excess cancer risk level is within the EPA acceptable excess cancer risk range of 10^{-4} to 10^{-6}. The site is well-characterized and site data are extensive, which reduces the overall level of uncertainty in the risk assessment. Factors that support a point of departure from 10^{-6} (1 in 1 million chance of developing cancer as the result of site related exposure) to 10^{-5} include the following:

- Adequate documentation that the total cumulative cancer risk is less than or within the target risk management of 10^{-4} to 10^{-6} (1 in 10,000 people)

- Minimal disturbance to the ecological diversity at 10^{-5} with 1.75 acres for clearing and grubbing versus entire site impact at 10^{-6} which would involve approximately 22 acres of site disturbance

It was determined that removal of all hot spots with B(a)P equivalent above the cleanup level would result in an overall cumulative excess lifetime cancer risk level of 10^{-5} for the site, which is considered protective of human health.

The cleanup level established for surface soil and sediment is also protective of ground water. In the RI Report, LDEQ RECAP was used to calculate chemical-specific values for protection of ground water at the site. The concentrations of the carcinogenic PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-c,d]pyrene) can be combined to yield a B(a)P equivalent concentration of approximately 569 mg/kg. The industrial cleanup action level of 26 mg/kg is an order of magnitude lower than the protection to ground water screening value, and is therefore protective of ground water. The remediation of the Big Creek Exposure Area, triggered by the human health carcinogenic unacceptable risk levels, will address removing the ecological risks (EPA 2002).This remains unchanged from the 2002 ROD.

2.4.2 Expected Outcome of Remedy Amendment

The 2002 ROD expected outcome was to permanently remove the wastes that posed a human health risk based on exposure, leaching potential to the ground water, and risk to ecological receptors. This expectation was based on the contaminated soil and sediment being excavated, treated, and used as backfill for the excavated areas. Other hazardous and nonhazardous debris currently on-site would be disposed off-site and the property would be suitable for industrial or recreational land use. In addition, institutional controls, such as the deed notice, would prevent future human exposure to on-site shallow ground water that may be affected by residual contamination. By addressing the unacceptable human health risks in the sediment contamination in the Big Creek, contamination that affects the wetlands and other habitat in the creek would also be addressed, thereby providing environmental and ecological benefits such as wetlands restoration. Ground water monitoring would ensure that the remedy is protective.

The 2016 expected outcome is that the selected remedy for the contamination in the surface and subsurface soil will be a combination of capping in the Residual DNAPL Area and deep soil mixing with solidification/ stabilization in the Free-Phase DNAPL Area. This will enable the site to be suitable for industrial or recreational land use. Contaminated surface soil and sediment in the Big Creek Exposure Area will be consolidated in or adjacent to the Consolidation Area. Erosion control measures implemented throughout the entire site area will include maintenance of the existing clay cap over the Consolidation Area. Additionally, the existing consolidation area cap will be evaluated to determine how the cap should be modified to be RCRA-equivalent. Monitoring wells that were drilled through both WBZs will be plugged and

abandoned. Long-term monitoring (LTM) sampling will be performed for the shallow (S1) WBZ. The S2 WBZ will be analyzed for PAHs and metals to ensure that concentrations are protective of human health and contaminants do not migrate offsite and that that metals are not mobilized by the selected remedies. A final ground water remedy will be selected in a future decision document.

2.5. DESCRIPTION OF ALTERNATIVES

The purpose of the Feasibility Study Reassessment was to re-evaluate potential remedies for the Site which would more effectively address the contamination at the Site and lead to achievement of the Site's cleanup objectives. Remedial Alternatives for the Site which were evaluated in the Feasibility Study Reassessment are presented below.

COMMON REMEDIAL ALTERNATIVES
The common remedial alternatives described below will be implemented in conjunction with the media-specific alternatives selected in the Amended ROD.
Estimated Capital Cost: $968,000
Estimated O&M and/or Long-term Monitoring Cost: $2,427,000
Estimated Present Worth Cost: $3,395,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

Plugging, Abandonment, and Replacement of Monitoring Wells
Though the amount of DNAPL measured in MW-2 and MW-3 has decreased significantly from 2000 to 2015, the free-phase DNAPL found in these wells provides a continuing source of contamination to ground water. The Feasibility Study Reassessment recommends determining the screen interval of these wells through video assessment. If the screen intervals indicate that the wells are providing conduits for the migration of contamination, the plugging, abandoning, and replacement of MW-2 and MW-3 after DNAPL removal is recommended.

All wells screened through both the S1 and S2 WBZs have the potential of acting as conduits for DNAPL migration and therefore will be plugged and abandoned. These wells include MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12, and MW-13. Moreover, these monitoring wells, which are screened through both WBZs, fail to provide useful ground water analytical data and render inaccurate water levels.

Only wells needed as part of a monitoring program will be replaced. The cost estimate assumes that up to 6 wells will be replaced. These 4-in-diameter wells will be up to 80 ft deep, with as much as 35 ft of slotted polyvinyl chloride (PVC) screen.

General Erosion Control
Erosion control measures are necessary over the Consolidation Area and surrounding areas. The cap over the Consolidation Area will be monitored and cover integrity will be maintained to prevent receptor contact with the consolidated waste. Areas surrounding the Consolidation

Area, including the perimeter slopes, are presently devoid of vegetation and showing signs of erosion from runoff originating from the Consolidation Area. Topsoil will be placed in these areas, graded, and seeded to prevent erosion of surface soil and potential damage to the engineered cap, thereby, preventing exposure to consolidated waste materials. In addition, a determination may be made to upgrade the existing cap to a RCRA-equivalent cap (a new RCRA-equivalent cap is included in Selected Alternative R-3: Capping described later).

The cost estimate for general erosion control is based on a calculated area of 68,200 ft^2 within the Consolidation Area for cap maintenance and 184,700 ft^2 of erosion control for the areas surrounding the Consolidation Area. The cap maintenance budget includes monthly inspections and maintenance to be performed as-needed. The cost does not include upgrading the existing cap to RCRA-equivalent if it is determined to be warranted (the cost of a new RCRA-equivalent cap is included in Selected Alternative R-3: Capping described later).

Areas outside the Consolidation Area will require site clearing, pre- and post-construction surveying, a water channel ditch, and riprap and rock lining. Hydroseeding with mulch and fertilizer will be performed after 6-in of topsoil are placed and graded over the general erosion control area. Surface drainage will be provided to prevent future erosion. Drainage ditches will be lined with riprap revetment.

S2 Ground Water

The S2 WBZ does not require a remedial alternatives evaluation. However, this WBZ should be monitored to verify that PAH concentrations are protective of human health and contaminants do not migrate offsite and that metals are not mobilized by the selected remedies. The cost estimate assumes long-term monitoring of PAHs and metals in the S2 WBZ will be performed once a year for the first two years and once every five years for the following 25 years. The cost estimate includes the cost of reporting and analysis associated with each sampling event.

SOIL IN RESIDUAL DNAPL AREA REMEDIAL ALTERNATIVES

An active treatment of the residual DNAPL area was not investigated during the feasibility study (1) as an EPA removal action previously created and capped the consolidation area, (2) the impact to ground water has been shown to be decreasing since the removal action indicating that the residual DNAPL has not acted as an ongoing source, and (3) the residual DNAPL is generally considered to be immobile due to soil tension holding onto the creosote. The following were identified as potential alternatives for the remediation of the Residual DNAPL Area at the MPTC site:

- Alternative R-1: No Further Action
- Alternative R-2: Limited Action
- Alternative R-3: Capping **(Selected Alternative)**
- Alternative R-4: Excavation and Offsite Disposal/Offsite Incineration

Table 4-2 in the Feasibility Study Reassessment describes how each of the alternatives meets the RAO. The Residual DNAPL Area is approximately 58,000 ft^2. Approximately 48,000 ft^2 of the Residual DNAPL Area is within the capped Consolidation Area. The following alternatives apply to the 10,000 ft^2 of the area that lies outside the Consolidation Area.

Alternative R-1: No Further Action (NFA)
As required by the NCP (40 CFR § 300.430 (e)(6), the alternatives must include the NFA alternative. This is to be used as the baseline alternative against which the effectiveness of all other remedial alternatives are judged. Under NFA, no Remedial Actions will be conducted at the site. All contaminants will remain in place and will be subject to environmental influences. Furthermore, no action will be taken to prevent unauthorized access or development at the site. No conveyance notices to inform interested parties regarding the site conditions will be implemented.

Estimated Capital Cost: $0

Alternative R-2: Limited Action
Limited action utilizes Institutional Controls (ICs) and Engineered Controls (ECs), as well as common remedial alternatives to achieve RAOs. Common remedial alternatives are discussed above. IC instruments used include building/construction restriction, excavation restriction, ground water use restriction, and a combination thereof. ECs are instruments such as fencing or signage that are used to minimize access to contaminated areas or areas that may pose a physical hazard. Because all alternatives include leaving material above the PRGs onsite, ICs and ECs will need to be included to isolate these materials from contact or completing a pathway.

An estimate for implementing ICs was included in the cost estimate. This estimate includes the cost of preparing the required documentation, consulting with the appropriate agencies and parties involved, and legal fees associated with obtaining the IC. ECs implemented include up to four 30-in by 30- in signs that can go onto sign posts in front the of the main gate fence or on the fence itself. The site is currently fenced, but the cost for repairing and/or replacing up to 2,100 ft of fence along the perimeter was included in the cost estimate.

Estimated Capital Cost: $71,000
Estimated O&M and/or Long-term Monitoring Cost: $0
Estimated Present Worth Cost: $71,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

Alternative R-3: Capping (Selected Alternative)
Alternative R-3 addresses the soil media contamination in the Residual DNAPL Area by extending the existing Consolidation Area cap to cover the portions of Area B that extend to the east and west of the Consolidation Area (Figure 12). In addition to preventing receptor contact to contaminated surface soil, this alternative also reduces infiltration. Reducing infiltration will limit the ability for water to leach and transport COCs (i.e., PAHs) through the vadose zone into

the underlying ground water. ECs and ICs will be implemented because contaminated material will remain onsite.

The area to be capped will include the Residual DNAPL area that is outside of the capped Consolidation Area (10,000 ft^2), as well as a 30-foot buffer around the perimeter of the newly capped area to prevent infiltration from the perimeter (36,000 ft^2) and to provide an area for the long-term maintenance of the cap. The 46,000 ft^2 clay cap includes a 2-ft thick clay layer and a 6-in layer of top soil separated by a geosynthetic liner. The cost for the cap also includes a 1-ft sand layer for drainage and geotextile filter layer that will be placed under the topsoil. The new cap for the additional area was designed to be RCRA-equivalent. Additional investigation will determine if the cap will be designed as a RCRA-C or RCRA-D cap and to perform leach testing of the consolidation material to determine is materials in the consolidation area remain a source material. A vegetative cover will be placed on the clay cap to reduce erosion and degradation of the cover material. Surface drainage will be provided to prevent future erosion. The riprap and rock lining within and/or along the drainage ditch will provide an additional barrier for erosion control during rainfall. This alternative will be used in conjunction with all common remedial alternatives, ECs, and ICs.

Estimated Capital Cost: $821,000
Estimated O&M and/or Long-term Monitoring Cost: $1,133,000
Estimated Present Worth Cost: $1,954,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

Alternative R-4: Excavation and Offsite Disposal/Offsite Incineration
The purpose of Alternative R-4 is to remove the contaminated soil located outside of the capped Consolidation Area. The removed soil can either be transported for offsite disposal or offsite incineration.

Disposal requirements for excavated material are dependent on whether or not the material is classified as a hazardous waste. Waste is classified as hazardous based on two factors: (1) its toxicity characteristics, as determined by the Toxic Characteristic Leaching Procedure (TCLP) analytical test, (2) and whether it qualifies as a listed waste. The contaminated soil at MPTC is considered hazardous since creosote is a listed waste. As a result, the excavated material will be land disposal restricted and require treatment prior to disposal.

The depth of excavation will be 10 ft bgs, which is the approximate depth to water in the Residual DNAPL Area outside of the Consolidation Area. Approximately 3,700 yd^3 of contaminated soil will be excavated and transported to a disposal or incineration facility. Alternative R-4A includes transportation to and disposal at Chemical Waste Management's Subtitle C landfill in Lake Charles, Louisiana. Alternative R-4B includes transportation to and incineration at a facility in Port Arthur, Texas. Both alternatives include costs for backfill and

grading. Hydroseeding is included in the common remedial alternatives. These alternatives will be used in conjunction with ECs, ICs, and common remedial alternatives.

Estimated Capital Cost: $8,386,000 to $10,376,000 (R-4A/R-4B respectively)
Estimated O&M and/or Long-term Monitoring Cost: $0
Estimated Present Worth Cost: $8,386,000 to $10,376,000 (R-4A/R-4B respectively)
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

SURFACE AND SUBSURFACE SOIL IN FREE-PHASE DNAPL AREA REMEDIAL ALTERNATIVES
The following remedial alternatives were identified as potential alternatives for the remediation of the Free-Phase DNAPL Area:

- Alternative F-1: NFA
- Alternative F-2: Limited Action
- Alternative F-3: Select Capping
- Alternative F-4: Deep Soil Mixing with Stabilization and Solidification **(Selected Alternative)**

Alternatives F-1 and F-2 are as described previously in Alternative R-1 and R-2, respectively. Table 4-2 in the Feasibility Study Reassessment describes how each of the alternatives meets the RAOs. The Free-Phase DNAPL Area is approximately 16,700 ft^2. All of the alternatives for remediation of surface and subsurface soil in the Free-Phase DNAPL Area will require additional investigation activities (i.e. soil borings) during the design phase. This investigation will refine area and volume of free-phase DNAPL requiring treatment in order to cost-effectively implement the selected alternative.

Alternative F-3: Select Capping
The purpose of Alternative F-3 is to cap the area identified as the Free-Phase DNAPL Area. Costs for six soil borings down to 45 ft bgs and PAH analysis for up to nine soil samples from each boring are included in the cost estimate for the purpose of delineating the cap area. ECs and ICs will be implemented because contaminated material will remain onsite.

Alternative F-3 addresses the soil media contamination in the Free-Phase DNAPL Area by capping the portions of Area B that extend to the east and west of the Consolidation Area to limit infiltration. In addition to preventing receptor contact to contaminated surface soil, this alternative also reduces infiltration. Reducing infiltration will limit the ability for water to leach and transport COCs (i.e., PAHs) through the vadose zone into the underlying ground water. ECs and ICs will be implemented because contaminated material will remain onsite.

The area to be capped will include the Free-Phase DNAPL area that is outside of the capped Consolidation Area (16,700 ft^2), as well as a 30-foot buffer around the perimeter of the newly capped area to prevent infiltration from the perimeter (15,840 ft^2). The 32,540 ft^2 clay cap was

designed to be RCRA-equivalent and will include a 2-ft thick clay layer and a 6-in layer of top soil, separated by a geosynthetic liner. The cost for the cap also includes a 1-ft sand layer for drainage and geotextile filter layer that will be placed under the topsoil. A vegetative cover will be placed on the clay cap to reduce erosion, degradation of the cover material, and for aesthetics. Surface drainage will be provided to prevent future erosion. The riprap and rock lining within and/or along the drainage ditch will provide an additional barrier for erosion control during rainfall. This alternative will be used in conjunction with all common remedial alternatives, ECs, and ICs. The components included in this cost estimate for capping are described previously in Alternative R-3: Capping.

Estimated Capital Cost: $732,000
Estimated O&M and/or Long-term Monitoring Cost: $2,314,000
Estimated Present Worth Cost: $3,046,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

Alternative F-4: Deep Soil Mixing with Solidification/Stabilization (Selected Alternative)
Alternative F-4 utilizes stabilization/solidification for the surface and subsurface soil in the Free-Phase DNAPL Area. The stabilization/solidification alternative will be used to bind the DNAPL in the soil/ground water matrix such that it can no longer act as a continuing source of contamination to ground water. Treatability tests (i.e., pilot study tests) will be required to determine the site-specific requirements at the site. ECs and ICs will be implemented because contaminated material will remain onsite.

Costs for 6 soil borings down to 45 ft bgs, with up to 5 samples from each boring, were included in the cost estimate for Free-Phase DNAPL Area delineation. Additionally, up to 8 samples from 2 of the soil borings will be submitted for bench-scale testing. Synthetic Precipitation Leaching Procedure (SPLP) SVOC analysis, Unconfined Compressive Strength (UCS) testing, and permeability testing costs are included for the bench-scale study. The purpose of the bench scale test is to determine the reduction in COC leachability possible (SPLP) with stabilization and the reduction in permeability possible with solidification. UCS testing will ensure the strength of the mixed soil matches or exceeds that of surrounding soil (typically 50 pounds per square inch). The results of the bench scale test in conjunction with the cleanup levels (reduction in leachability of COCs versus reduction in permeability of ground water) will determine the pilot test for the treatability study and full-scale parameters for solidification/stabilization.

The pilot test cost for the treatability study targeting up to 175 yd3 in a designated test area are included in the cost estimate. The cost estimate assumes a final design soil mixture of 10 percent Type I Portland Cement, 4 percent powder activated carbon, and 11 percent water. This design mixture was used for another wood-treating site similar to MPTC. However, based on the results of the treatability study and the cleanup levels, a different design soil mixture may be selected, possibly reducing costs. The procurement, design, testing, and reporting associated with the treatability study may take up to 6 months to complete.

Upon conclusion of the treatability study, the full-scale solidification/stabilization will commence. The costs for the full-scale application are based on the assumption that the area requiring treatment is 16,700 ft2 and the depth is 45 ft bgs (in place volume of 28,000 yd^3). The first 2 ft of surface soil will be excavated and stockpiled as in the treatability study. The final design soil mixture used in the treatability study will also be used for the full-scale application, unless determined otherwise based on the treatability study results. Costs for topsoil placement and grading are also included in the estimate. The cost of hydroseeding is included in the common remedial alternatives.

Estimated Capital Cost: $9,704,000
Estimated O&M and/or Long-term Monitoring Cost: $0
Estimated Present Worth Cost: $9,704,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

SEDIMENT AND SURFACE SOIL BIG CREEK EXPOSURE AREA REMEDIAL ALTERNATIVES
The following remedial alternatives were identified as potential alternatives for the remediation of the Big Creek Exposure Area:

- Alternative B-1: NFA
- Alternative B-2: Limited Action
- Alternative B-3: Consolidation and Capping **(Selected Alternative)**
- Alternative B-4: Excavation and Offsite Disposal/Offsite Incineration.

Alternatives B-1 and B-2 are as described previously in Alternative R-1 and R-2, respectively. Table 4-2 in the Feasibility Study Reassessment describes how each of the alternatives meets the RAO. Additional investigation will be required for the design phase of all of the alternatives for remediation of sediment and surface soil in the Big Creek Exposure Area such that the area and volume of media requiring treatment will be defined to cost-effectively implement the selected alternative. Note that the Big Creek Area is inclusive of surface soil hot spots and spoil piles that were noted in historical documents.

Alternative B-3: Consolidation and Capping (Selected Alternative)
Alternative B-3 addresses the soil media contamination in the Big Creek Exposure Area by consolidating the material and capping the impacted material. Surface soil and sediment (0 to 2 ft bgs) along the Big Creek and identified soil hot-spots would be included in the material to be moved. Testing the consolidated material will be conducted to determine if a Land Disposal Restriction will require treatment prior to consolidation under the cap.

The cost estimate for this alternative is presented as Alternative B-3 (consolidation and capping under the cap already included in Alternative F-3). The cost estimate assumes approximately 200 yd^3 of contaminated surface soil and sediment will be excavated and consolidated under a clay cap that will include a 2-ft thick clay layer and a 6-in layer of top soil, separated by a

geosynthetic liner. An incremental cost per cubic yard for up to 200 additional cubic yards is included in the cost estimate to account for additional material that may be encountered. The cost for the cap also includes a 1-ft sand layer for drainage that will be placed under the topsoil. A vegetative cover will be placed on the clay cap to reduce erosion and degradation of the cover material. ECs and ICs will be implemented because contaminated material will remain onsite.

Estimated Capital Cost: $180,000
Estimated O&M and/or Long-term Monitoring Cost: $0
Estimated Present Worth Cost: $180,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

Alternative B-4: Excavation and Offsite Disposal/Offsite Incineration
Alternative B-4 addresses the soil media contamination in the Big Creek Exposure Area by excavation and disposal or incineration of excavated soil offsite. Testing the consolidated material will be conducted to determine if a Land Disposal Restriction will require treatment prior to offsite disposal or offsite incineration.

The cost estimate assumes the contaminated material will be classified as hazardous waste. Approximately 200 yd^3 of contaminated surface soil and sediment will be excavated and transported to a disposal or incineration facility. An incremental cost per cubic yard for up to 200 additional cubic yards is included in the cost estimate to account for additional contaminated material that may be encountered. Alternative B-4A includes transportation to and disposal at Chemical Waste Management's Subtitle C landfill in Lake Charles, Louisiana. Alternative B-4B includes transportation to and incineration at a facility in Port Arthur, Texas. Both alternatives include costs for backfill, and grading (if appropriate) over the excavated area. The cost of hydroseeding is included in the common remedial alternatives.

Estimated Capital Cost: $1,000,000 to $1,535,000 (B-4A and B-4B, respectively)
Estimated O&M and/or Long-term Monitoring Cost: $0 (B-4A and B-4B)
Estimated Present Worth Cost: $1,000,000 to $1,535,000 (B-4A and B-4B, respectively)
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: N/A

SHALLOW (S1) GROUND WATER REMEDIAL ALTERNATIVES
The following remedial alternatives were identified as potential alternatives for the remediation of the shallow WBZ (S1) ground water:

- Alternative GW-1: NFA
- Alternative GW-2: Limited Action with Long-term Monitoring (LTM) **(Selected Alternative)**
- Alternative GW-3: Limited Action with MNA
- Alternative GW-4: ISCO

Alternative GW-1 is as described previously in Alternative R-1: No Further Action. Table 4-3 in the Feasibility Study Reassessment describes how each of the alternatives meets the RAOs.

Alternative GW-2: Limited Action with LTM (Selected Alternative)
Limited action for ground water includes implementing ground water restrictions or other ICs to prevent: (1) future use of ground water at the MPTC site that poses an unacceptable risk to human health, or (2) mobilization of contaminants hydraulically.

LTM will be conducted to verify that the plume is not migrating appreciably and that COC concentrations are not increasing. LTM will demonstrate protectiveness of the other remedy components.

The cost estimate assumes that ground water monitoring will be conducted quarterly for the first two years to set a baseline for newly installed monitoring wells, and twice annually thereafter to evaluate migration of contaminants offsite that would pose an unacceptable risk. Ground water samples will be analyzed for TAL metals and PAHs; indicator parameters measured during well purging will include dissolved oxygen, oxidation-reduction potential, pH, conductivity, and alkalinity. The cost estimate includes the cost of reporting and analysis associated with each sampling event.

Estimated Capital Cost: $71,000
Estimated O&M and/or Long-term Monitoring Cost: $945,000
Estimated Present Worth Cost: $1,016,000
Estimated Construction Timeframe: N/A
Estimated Time to Achieve RAOs: 30 years

Alternative GW-3: Limited Action with MNA
Limited action for ground water is discussed under Alternative GW-2.
MNA allows natural processes to achieve site-specific remedial objectives. The "natural attenuation processes" that are at work in such a remediation approach include physical, chemical, or biological processes that, under favorable conditions, reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the ground water. Natural processes that occur under MNA may include biodegradation (aerobic or anaerobic), dispersion, or dilution.

The cost estimate assumes that MNA ground water sampling will be performed quarterly for the first two years to demonstrate the natural attenuation of contamination in the ground water, and twice-annually thereafter. Ground water samples will be analyzed for TAL metals and PAHs, as well as MNA parameters, including chloride, nitrate, nitrite, sulfate, ferrous, ferric iron, and/or others. Indicator parameters measured during well purging will include dissolved oxygen, oxidation-reduction potential, pH, conductivity, and alkalinity. The cost estimate includes the cost of reporting and analysis associated with each sampling event.

The effectiveness of MNA will need to be demonstrated using a weight of evidence approach.

Primary evidence such as plume stability, reduction in COC concentrations, and favorable geochemical conditions can be obtained through an MNA program. Additional evidence such as biodegradation modeling and/or molecular biological tools (e.g., quantitative polymerase chain reaction and stable isotope probing) may be used for additional evidence as needed.

Estimated Capital Cost: $71,000
Estimated O&M and/or Long-term Monitoring Cost: $1,166,000
Estimated Present Worth Cost: $1,237,000
Estimated Construction Timeframe: N/A
Estimated Time to Achieve RAOs: 30 years

Alternative GW-4: In Situ Chemical Oxidation
Alternative GW-4, ISCO, utilizes chemical oxidants such as permanganate, persulfate, peroxide, and ozone to oxidize contaminants in the ground water. Oxidants can be injected into WBZs of the Cockfield Aquifer via direct push technology or through permanent injection wells. This technology will treat the ground water contamination, reducing the potential for future human exposure in areas of treatment and offsite migration. The ISCO will likely be most effective at the outer boundary of observed ground water contamination while the source area is addressed through a free-phase DNAPL alternative. Ground water monitoring will be conducted quarterly for the first two years, and then twice annually to evaluate migration of contaminants offsite that would pose an unacceptable risk.

For cost estimation purposes, the chemical oxidant reagents used were RegenOxTM and ORC Advanced®, supplied by Regenesis. Thirty-five (35) injection wells will be drilled to cover the 12,900 ft^2 area of the S1 WBZ dissolved-phase PAH plume. The cost for this alternative includes up to three injection events to target the ground water contamination, performed 6 months apart. Each injection event may take up to 2 weeks.

Estimated Capital Cost: $1,924,000
Estimated O&M and/or Long-term Monitoring Cost: $945,000
Estimated Present Worth Cost: $2,869,000
Estimated Construction Timeframe: N/A
Estimated Time to Achieve RAOs: 30 years

2.6. COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. Threshold criteria are requirements that each alternative must meet to be eligible for selection and involve Overall Protection and Human Health and the Environment, and Compliance with ARAR's. Primary balancing criteria are used to weigh major trade-offs among alternatives and involve Long Term Effectiveness and Permanence, Reduction of Toxicity, Mobility, and Volume through Treatment, Short-term Effectiveness, Implementability, and Cost. Two criteria, called Modifying criteria – State Acceptance and Community Acceptance – are fully assessed after comments are obtained on

the Proposed Plan and Administrative Record and are fully addressed in this ROD Amendment. Modifying criteria are of equal importance to the balancing criteria. This section of the ROD Amendment profiles the relative performance of each alternative against seven of the nine criteria except State Acceptance and Community Acceptance which are addressed in Part 3 of this ROD Amendment.

The nine evaluation criteria are discussed below.

1. **Overall Protection of Human Health and the Environment** *addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls*.

2. **Compliance with Applicable or Relevant and Appropriate Requirements** *Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and 40 CFR § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as ARARs, unless such ARARs are waived under CERCLA section 121(d)(4), 42 U.S.C. §9621(d)(4).*

3. ***Long-term Effectiveness and Permanence*** *refers to expected residual risk and the ability to maintain reliable protection of human health over time, once cleanup levels have been met.*

4. ***Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment*** *refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.*

5. ***Short-term Effectiveness*** *addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during implementation.*

6. ***Implementability*** *considers the technical and administrative feasibility of a remedy such as relative availability of goods and services and coordination with other governmental entities.*

7. ***Cost*** *includes estimated capital and operation and maintenance costs as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.*

8. ***State/Support Agency Acceptance*** *considers whether the State agrees with U.S. EPA's analyses and recommendations of the RI/FS and the Proposed Plan.*

9. ***Community Acceptance*** *considers whether the local community agrees with U.S. EPA's analyses and Selected Alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.*

Detailed discussions of each of the nine criteria compared to each areas alternative are provided below.

Overall Protection of Human Health and the Environment

Residual DNAPL Area

Alternative R-1 (NFA) will not ensure protection of human health or the environment because COC concentrations exceeding human health and ecological risk values will remain onsite. Alternative R-2 (limited action) will include erosion control and institutional and engineering controls to limit access to impacted material; therefore, these measures are considered protective. The remaining alternatives, including R-3 (capping) and R-4 (excavation and offsite disposal/offsite incineration), will provide overall protection of human health and the environment because they either cover or remove the contaminated soil, preventing receptor contact to COCs above risk levels.

Free-Phase DNAPL Area

Alternative F-1 (NFA) will not ensure protection of human health or the environment, but the alternative F-2 (limited action) will be protective of human health and the environment in the Free-Phase DNAPL Area. The remaining alternatives, including F-3 (select capping), and F-4 (deep soil mixing with stabilization/solidification), will provide overall protection of human health and the environment because they either cover or treat the contaminated soil, preventing receptor contact to COCs above acceptable risk levels.

Big Creek Exposure Area

Alternative B-1 (NFA) in the Big Creek Exposure Area will not ensure protection of human health or the environment. Alternative B-2 (limited action) will be protective of human health, but will not be protective of benthic invertebrates. The remaining alternatives, including B-3 (consolidation and capping), and B-4 (excavation and offsite disposal/offsite incineration), will provide overall protection of human health and the environment because they either cover or remove the contaminated soil, preventing receptor contact to COCs above acceptable risk levels.

Shallow (S1) Ground Water

Alternative GW-1 (NFA) will not ensure protection of human health or the environment. Alternative GW-2 (limited action with LTM) and Alternative GW-3 (limited action with MNA) will reduce risk to human health because it includes implementation of ICs. However, achieving ground water RAO with free-phase DNAPL remaining in place is problematic. Therefore, Alternatives GW-2 and GW-3 should be used in conjunction with a soil treatment alternative for

the Free-Phase DNAPL Area. Alternative GW-4 (ISCO) will reduce the human health and environmental risk by converting the COCs into innocuous substances.

Compliance with ARARs

Residual DNAPL Area

There are no chemical-specific ARARs for soil contamination. Control measures will be taken during construction to prevent adverse impacts in the floodplain, loss of wetlands, threats to fish and wildlife resources, or from stormwater runoff. Therefore, all of the alternatives will comply with location-specific ARARs. Control measures implemented during construction will also allow all of the alternatives to comply with action-specific ARARs.

Free-Phase DNAPL Area

There are no chemical-specific ARARs for soil contamination. Alternatives F-1 (NFA), F-2 (limited action), and F-3 (select capping) may not meet the ground water protective subsurface soil concentration requirements set forth by the TBCs (i.e., EPA RSLs and LDEQ RECAP values), but alternative F-4 (deep soil mixing with solidification/stabilization) will. Control measures will be taken during construction to prevent adverse impacts in the floodplain, loss of wetlands, threats to fish and wildlife resources, or from stormwater runoff. Therefore, all of the alternatives will comply with location-specific ARARs. Control measures implemented during construction will also allow all of the alternatives to comply with action-specific ARARs.

Big Creek Exposure Area

There are no chemical-specific ARARs for soil contamination. Alternatives B-1 (NFA) and B-2 (limited action) may not meet the ground water protective subsurface soil concentration requirements set forth by the TBCs (i.e., EPA RSLs and LDEQ RECAP values), but alternatives B-3 (consolidation and capping) and B-4 (excavation and offsite disposal/offsite incineration) will. The consolidated soil/sediments will be tested and treated if necessary to comply with LDR . Control measures will be taken during construction to prevent adverse impacts in the floodplain, loss of wetlands, threats to fish and wildlife resources, or from stormwater runoff. Therefore, all of the alternatives will comply with location-specific ARARs. Control measures implemented during construction will also allow all of the alternatives to comply with action specific ARARs.

Shallow (S1) Ground Water

Alternatives GW-1 (NFA), GW-2 (limited action with LTM), and GW-3 (limited action with MNA) will not comply with the chemical-specific ARARs because B(a)P concentrations in ground water may continue to exceed the MCL. Alternative GW-4 (ISCO) will comply with ARARs. Control measures implemented during construction will allow all of the alternatives to comply with location- and action-specific ARARs.

Long-term Effectiveness

Residual DNAPL Area Alternative

R-4 (excavation and offsite disposal/offsite incineration) is the most effective long-term alternative because the impacted material is removed from the site. Alternative R-3 (capping) is not as effective long-term because although it prevents receptor contact with soil above human health and environmental risk levels, the contaminated material is still present onsite and in contact with ground water. Long-term monitoring of the ground water will determine the effectiveness of Alternative R-3 capping prevention of water infiltration that could mobilize the residual creosote. Alternative R-2 (limited action), which utilizes erosion control, ICs, and ECs to limit exposure also prevents receptor contact with soil above human health and environmental risk levels, but does not remove impacted material from the site. Alternative R-1 is the least effective.

Free-Phase DNAPL Area

Alternative F-4 (deep soil mixing with stabilization/solidification) is the most effective long-term alternative because it chemically and physically treats the COCs in the soil. Alternative F-3 (select capping) is not as effective as the previous alternative because untreated contaminated soil remains present onsite. Any future erosion or disruption of the cap may reinstate the human health and environmental risks. Alternative F-2 (limited action), which utilizes ICs and ECs to limit exposure, is more effective than the alternative F-1 (NFA).

Big Creek Exposure Area

Alternative B-4 (excavation and offsite disposal/offsite incineration) is most effective long-term because the impacted material is removed from the site. Alternative B-3 (consolidation and capping) is not as effective long-term because although it prevents receptor contact with surface and subsurface soils above human health and environmental risk levels, the contaminated material is still present onsite. Alternative B-2 (limited action), which utilizes ICs and ECs to limit exposure, is more effective than alternative B-1 (NFA).

Shallow (S1) Ground Water

Alternative GW-3 (ISCO) is more effective than alternatives GW-2 (limited action with LTM) and GW-3 (limited action with MNA) because it treats the COCs in the water, reducing their effective than alternative GW-1 (NFA).

Reduction of Toxicity, Mobility, or Volume through Treatment

Residual DNAPL Area

Alternative R-4 (excavation and offsite disposal/offsite incineration) is ranked highest because it can possibly destroy contaminated material if the incineration option is implemented. This alternative is irreversible and reduces the volume of contaminated material onsite. Alternatives R-2 (limited action) and R-3 (capping) rank lower than alternative R-4 because their treatments are not irreversible and contaminated materials remain onsite. Alternative R-1 (NFA) is ranked

last because it involves contaminated material remaining onsite and does not reduce mobility, toxicity, and/or volume.

Free-Phase DNAPL Area

Alternative F-4 (deep soil mixing with stabilization/ solidification) is ranked highest because it is irreversible and reduces mobility. Alternative F-3 (select capping) is ranked second because although it may reduce mobility of the COCs by limiting rainfall from percolating through the soil, it is not irreversible and does not treat contaminated material. Alternatives F-2 (limited action) and F-1 (NFA) are ranked last and equal because they are not irreversible, do not destroy or treat contaminated material, and do not reduce toxicity and mobility of contaminated material.

Big Creek Exposure Area

Alternative B-4 (excavation and offsite disposal/offsite incineration) is ranked highest because it can possibly destroy contaminated material if the incineration option is implemented. This alternative is irreversible and reduces toxicity and volume of contaminated material onsite. Alternative B-3 (consolidation and capping) ranks lower than alternative B-4 because although it reduces mobility of the COCs by limiting rainfall from percolating through the soil, the treatment is not irreversible and contaminated materials remain onsite. Alternatives B-1 (NFA) and B-2 (limited action) are ranked last and equal because both involve contaminated material remaining onsite and do not reduce mobility, toxicity, and/or volume.

Shallow (S1) Ground Water

Alternative GW-4 (ISCO) ranks the highest because it treats the contaminated ground water and reduces toxicity by converting the COCs into innocuous substances; thereby reducing the volume of contaminated ground water. This alternative is also irreversible. LTM would be conducted to verify that the plume is not migrating appreciably and that COC concentrations are not increasing. MNA allows natural processes to achieve site-specific remedial objectives. The “natural attenuation processes” that are at work in such a remediation approach include physical, chemical, or biological processes that, under favorable conditions, reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the ground water. Natural processes that occur under MNA may include biodegradation (aerobic or anaerobic), dispersion, or dilution. GW-2 and GW-3 are ranked equally in their ability to reduce the toxicity through mobility, mobility or volume.

Short-term Effectiveness

Residual DNAPL Area

Alternative R-2 (limited action) is ranked highest because it involves the least construction, which reduces the potential for adverse impacts to workers, the community, and the environment. Alternative R-3 (capping) requires more construction than R-2 does, leading to more potential for adverse community, worker, and environmental impacts. R-4 (excavation and offsite disposal/offsite incineration) will require movement of larger volumes and handling

of contaminated soil more so than alternative R-3, increasing the potential risk of harmful exposure for workers and the community, as well as the environment. Alternative R-1 (NFA) alternative is ranked last because although it does not have any adverse impacts, it does not achieve the RAO.

Free-Phase DNAPL Area

Alternative F-2 (limited action) is ranked the highest because it has the least adverse impact on the community, workers, and environment, and takes the least amount of time to achieve the RAO. This alternative is followed by alternative F-3 (select capping) because it will require heavy construction equipment and will disrupt soil which will increase the potential risk of harmful exposure for workers and the community, as well as the environment. Alternative F-4 (deep soil mixing with stabilization/solidification) is ranked next because it involves use of hazardous chemicals and materials, leading to more potential for adverse community, worker, and environmental impacts. Alternative F-1 (NFA) is ranked last because although it does not have any adverse impacts, it does not achieve the RAO.

Big Creek Exposure Area

Alternative B-2 (limited action) is ranked the highest because it has the least adverse impact on the community, workers, and environment, and takes the least amount of time to achieve the RAO. This alternative is followed by alternatives B-3 (consolidation and capping) and B-4 (excavation and offsite disposal/offsite incineration), which are ranked equally. Alternatives B-3 and B-4 will require heavy construction equipment and will disrupt soil, increasing the potential risk of harmful exposure for workers and the community, as well as the environment. Alternative B-1 (NFA) is ranked last because although it does not have any adverse impacts, it does not achieve the RAO.

Shallow (S1) Ground Water

Alternative GW-2 (limited action with LTM) and alternative GW-3 (limited action with MNA) are ranked the highest because they have the least adverse impact on the community, workers, and environment. Alternative GW-3 (ISCO) will require use of more heavy equipment and disrupt the soil structure more than alternatives GW-2 and GW-1 (NFA) will, increasing the potential risk of harmful exposure for workers and the community, as well as the environment. Alternative GW-1 is ranked last because although it does not have any adverse impacts, it does not achieve the RAOs.

Implementability

Residual DNAPL Area

Alternative R-1 (NFA) will be the easiest to implement. Alternative R-2 (limited action) will be easier to implement than R-3 (capping) because of the large volume of clay material that will need to be acquired for the cap. Implementation of Alternative R-4 (excavation and offsite disposal/offsite incineration) will be similar in difficulty to implementation of the Alternative R-3 (capping).

Free-Phase DNAPL Area

Alternative F-1 (NFA) would be the easiest to implement. Alternative F-2 (limited action) alternative would follow because it relies on ICs and ECs, which are easier to implement than an intrusive remedy. Alternative F-3 (capping) will be easier to implement than F-4 (deep soil mixing with stabilization/solidification) because of large volumes of chemicals and mixing equipment that will be required.

Big Creek Exposure Area

Alternative B-1 (NFA) would be the easiest to implement. Alternative B-2 (limited action) alternative would follow because it relies on ICs and ECs, which are easier to implement than an intrusive remedy. Alternatives B-3 (consolidation and capping) and B-4 (excavation and offsite disposal/offsite incineration) are ranked equally because both are technically feasible, although the Big Creek Exposure Area terrain will prove difficult to access.

Shallow (S1) Ground Water

Alternative GW-1 (NFA) would be the easiest to implement. Alternative GW-2 (Limited action with LTM) and GW-3 (Limited action with MNA) would follow because it relies on ICs, which are easier to implement than an intrusive remedy. Alternative GW-2 (Limited Action with LTM) is slightly easier to implement than Alternative GW-3 (Limited Action with MNA) because MNA requires a demonstration using a weight of evidence approach whereas LTM only requires field sampling. Alternative GW-4 (ISCO) will be the most difficult to implement although it is technically feasible; it will require more resources and more extensive monitoring than the other ground water alternatives.

Cost

Residual DNAPL Area

Alternative R-1 (NFA) will be the most cost effective. Alternative R-2 (limited action) will be more cost effective than R-3 (capping) because only ICs would be required. Implementation of Alternative R-4 (excavation and offsite disposal/offsite incineration) is significantly more costly than Alternative R-3 (capping).

Free-Phase DNAPL Area

Alternative F-1 (NFA) will be the most cost effective. Alternative F-2 (limited action) will be more cost effective than F-3 (capping) because only ICs would be required. Implementation of Alternative F-4 (deep soil mixing with stabilization/solidification) is significantly more costly than Alternative R-3 (capping).

Big Creek Exposure Area

Alternative B-1 (NFA) will be the most cost effective. Alternative B-2 (limited action) will be more cost effective than B-3. Alternative B-4 (excavation and offsite disposal (B-4A) or excavation and offsite incineration (B-4B) are substantially more costly.

Shallow (S1) Ground Water

Alternative GW-1 (NFA) will be the most cost effective. Alternative GW-2 (Limited action with LTM) and GW-3 (Limited action with MNA) are more costly because they relies on ICs, which are easier to implement than an intrusive remedy along with long-term monitoring. Alternative GW-2 (Limited Action with LTM) is slightly more cost effective than Alternative GW-3 (Limited Action with MNA) because MNA requires a demonstration using a weight of evidence approach whereas LTM only requires field sampling. Alternative GW-4 (ISCO) will be the most costly as it will require more resources and more extensive monitoring than the other ground water alternatives. The detailed costs are not discussed here for brevity but are included in the Feasibility Study Reassessment in the Administrative Record.

2.6.1 Treatment Components

The Selected Remedy in the 2002 ROD is presented in 2.2.4 and is summarized below:

- The site cleanup strategy consisted of the excavation and treatment of contaminated soils on the surface of the site, and in areas near the drainage pathway of Big Creek. Treated soils would be used to backfill excavated areas, and the backfilled areas would be regraded and revegetated.

- Another component of the cleanup strategy was the recovery of DNAPL from areas outside the excavation boundaries of the consolidation area. This component was to be further evaluated under the remedial design. If DNAPLs were found beyond the excavation boundaries, a recovery system would be designed and installed to collect these liquids and prevent their migration into the groundwater. The component would include monitoring of the groundwater and institutional controls to limit the access to the groundwater near the site.

This 2016 Selected Remedy contains the following components:

- Common Elements (Area A on Figure 11)
    - Plugging, Abandonment, and Replacement of Monitoring Wells
    - General Erosion Control
    - S2 Ground Water Monitoring
- Residual DNAPL Area – Capping (Area B on Figure 11)
- Free-Phase DNAPL Area - Deep Soil Mixing with Solidification/Stabilization (Area C on Figure 11)
- Big Creek Exposure Area - Consolidation and (Area D on Figure 11)

The stabilization/solidification alternative will be used to bind the DNAPL in the soil/ground water matrix such that it can no longer act as a continuing source of contamination to ground water. Treatability tests (i.e., pilot study tests) will be required to determine the design soil mixture of solidification/stabilization at the site. The mixture of determined reagents and

contaminated materials will need to meet the requirements of both the Toxic Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure. Common additives may include, but are not limited to, Portland cement, fly ash, and activated carbon.

2.6.2 Containment or Storage Components

The remedy selected in the 2002 ROD was to excavate and treat the existing Consolidation Area then use the treated soils to backfill the excavated areas.

This 2016 Selected Remedy addresses the soil media contamination in the Residual DNAPL Area by extending the existing cap over the Consolidation Area to the east and west along with a 30-ft buffer around the perimeter of the new capped area. In addition to preventing receptor contact to contaminated surface soil, this alternative also reduces infiltration. Reducing infiltration will limit the ability for water to leach and transport COCs (i.e., PAHs) through the vadose zone into the underlying ground water. The RCRA-equivalent cap may include a clay layer and a layer of top soil, possibly separated by a geosynthetic liner (to be designed during remedial design). A vegetative cover will be placed on the soil or clay cap to reduce erosion, degradation of the cover material, and for aesthetics. ECs and ICs will be implemented because contaminated material remains onsite.

The soil/sediment media contamination in the Big Creek Exposure Area, which includes surface hot spots and spoil piles, will need to be consolidated under the cap constructed for the Residual DNAPL or Free-Phase DNAPL Area.

2.6.3 Institutional Control Components

Creosote impacted soil will remain onsite in the consolidation area. The contaminated shallow water is not used as a drinking water source, though is considered to be a potential source of drinking water. Area residents and commercial operations are provided potable water through the City of Marion public water supply system. The Selected Remedy will provide for the further protection of human health through the implementation of institutional controls. ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use. ICs are generally used in conjunction with, rather than in lieu of, engineering measures such as waste treatment or containment; can be used during all stages of the cleanup process to accomplish various cleanup-related objectives; and should be "layered" (i.e., use multiple ICs) or implemented in a series to provide overlapping assurances of protection from contamination.

ICs (i.e. deed notices or restrictive covenants) should be put in place to provide notice to property owners and prospective purchasers that contaminated water from the shallow aquifer should not be used and that a repository of creosote impacted soil is located onsite. Restrictions should be placed to prevent the installation of water supply wells in those areas.

Restrictions should also be used to protect components of the remedy (i.e. digging restrictions into the stabilized source areas) including permanent monitoring wells.

The LDEQ Risk Evaluation Corrective/Action Program (RECAP) Section 2.17 requires the placement of ICs (i.e., conveyance) on affected property in different circumstances as part of completing a response action. The fundamental purpose of an IC at this Site is to provide a permanent notice to subsequent owners/operators of affected properties that chemicals of concern are present in the onsite repository and in the ground water beneath the property above human health based standards. A copy of the LDEQ RECAP regulatory guidance is available in the Administrative Record as well as online at http://www.deq.louisiana.gov/RECAPfinal.pdf.

Based on the LDEQ RECAP, the IC would consist of either a conveyance notification or other legal control:

> **Conveyance Notification.** Institutional controls will usually require a legal instrument to be recorded in the parish conveyance records for the subject property. This legal instrument shall clearly state the notice or restriction imposed on the site; the description of the site; and a scaled site map showing the affected soil and groundwater zones. A conveyance notification shall be required under the following site conditions.
>
> However, other legal controls may be implemented at the site such as a zoning ordinance by a local government which prevents the installation of groundwater wells and use of existing wells for potable or other purposes. If such a local ordinance is developed, the following must be submitted to the Department: (1) a copy of the ordinance restricting the stated actions at the site; and (2) a scaled map showing the horizontal and vertical extent of contamination of soils or groundwater and the legal boundaries of all properties on which soils or groundwater exceed the RECAP standard. If for any reason the ordinance that is being used as an institutional control changes, the Department reserves the right to evaluate the use of the changed ordinance as an institutional control. Changes or variances to the ordinance must be submitted by the owner/operator/responsible person of the affected site to the Department at least 30 days prior to the scheduled action date.

This 2016 Selected Remedy includes the following institutional controls that will be completed by the property owner either in a conveyance per LDEQ RECAP or other legal controls as outlined above:

- Prevent residential land use
- Prevent digging in areas that could encounter contaminated media that has been left on-site and as shown on the property plat map. Excavations will be prohibited or guidelines will be provided for how and where to perform excavations

- Implement ground water restrictions to prevent: (1) future use of ground water at the MPTC site and (2) mobilization of contaminants hydraulically

2.7. EVALUATION OF PREVIOUS REMEDY AND SELECTED ALTERNATE REMEDY

Table 1 provides a comparative analysis of the 2002 ROD selected remedy and the 2016 alternate remedy under the nine-part criteria.

The Selected Alternate Remedy costs are detailed in the FSR which is contained in the Administrative Record. The Selected Alternate Remedy pertinent details are:

Estimated Capital Cost: $11.7 million
Estimated O&M and/or Long-term Monitoring Cost: $4.5 million
Estimated Present Worth Cost: $2,869,000
Estimated Construction Timeframe: 1 year
Estimated Time to Achieve RAOs: 1 year

2.8. SUPPORT AGENCY COMMENTS

The LDEQ, the support agency, has been consulted and provided the opportunity to comment on the Proposed Plan and this ROD Amendment in accordance with 40 CFR §§ 300.435(c)(2) and 300.435(c)(2)(i) and CERCLA § 121(f), 42 U.S.C. § 9621(f). The LDEQ has concurred with this ROD Amendment.

2.9. STATUTORY DETERMINATIONS

The EPA has determined that the remedy amendment complies with the statutory requirements of CERCLA Section 121, 42 U.S.C. § 9621, and, to the extent practicable, the NCP; is protective of human health and the environment; complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action (unless a statutory waiver is justified); is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

2.9.1 Protection of Human Health and the Environment

The remedy amendment will meet revised Remedial Action Objectives (RAOs) as well as provide overall protection of human health and the environment by covering, removing, or treating the contamination, preventing receptor contact to COCs above risk levels.

2.9.2 Compliance with ARARs

Section 121(d) of CERCLA and the NCP §300.430(f)(l)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA §121(d)(4). The selected soil remedial alternative will meet their respective ARARs from Federal and State laws. The selected remedial alternatives will meet substantive requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAPS) relevant to particulate matter and air pollutants. Control measures will be taken during construction to prevent adverse impacts in the floodplain, loss of wetlands, threats to fish and wildlife resources, or from storm water runoff. Control measures implemented during construction will also allow all of the alternatives to comply with action-specific ARARs. Therefore, all of the alternatives will comply with location- and action-specific ARARs. Table 2 lists the ARARs and TBCs associated with MPTC.

2.9.3 Permanent Solutions and Alternative Treatment to the Maximum Extent Practicable

The remedy amendment represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practical manner at the Site. The EPA has determined that the selected remedy amendment provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, while also considering the statutory preference for treatment as a principal element, and state and community acceptance.

2.9.4 Statutory Preference for Treatment

This remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment) by physically treating the DNAPL Free-Phase Area with deep soil solidification/stabilization.

2.9.5 Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

2.10. PUBLIC PARTICIPATION

The EPA published a public notice in the Bernice Banner newspaper on July 5, 2016, announcing the public comment period for the Amendment to the 2002 Record of Decision for the Marion Pressure Treating Company Site. The thirty-day public comment period began on July 11, 2016, and ended on August 9, 2016. During the comment period, EPA held a public meeting on July 20, 2016, at the Marion Volunteer Fire Station at 111 Gayle Street in Marion, Louisiana. The public meeting was held in a fully accessible facility.

The Administrative Record for this ROD Amendment was made available to the public at the following information repository locations:

Marion City Hall
398 Main Street
Marion LA 71260
(318) 292.4715

LDEQ Headquarters
Public Records Center
Galvez Building, 1st Floor – Room 127
602 N. Fifth Street
Baton Rouge, LA 70802
(225) 219-3181

EPA Region 6
7th Floor Reception Area
1445 Ross Avenue, Suite 12D13
Dallas, TX 75202-2733
Toll Free (800) 533-3508 or (214) 665-6597
Monday – Friday: 7:30-11:00 am/1:00-4:00 pm

The public participation requirements set out in 42 U.S.C. § 9617, CERCLA § 117, 40 CFR §300.435(c)(2)(ii), have been met for this remedy amendment. This ROD Amendment will become part of the Administrative Record (40 CFR §300.825(a)(2)), which has been developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k), and which is available for review at the information repository locations listed in this ROD Amendment. As required by 40 CFR §300.435(c)(2)(i)(B), a Notice of Availability and a brief description of the ROD Amendment will be published in the local paper.

PART 3. RESPONSIVENESS SUMMARY

3.1. STAKE HOLDER COMMENTS AND AGENCY RESPONSES

The Responsiveness Summary provides information about the views of the public and the support agency (i.e., LDEQ) regarding the remedial alternatives as well as general concerns about the Site submitted during the public comment period. The concerns of the community should be considered when selecting a remedial alternative. Community acceptance, one of the nine evaluation criteria for Superfund remedial alternatives, considers whether the local community agrees with EPA's analyses and Preferred Alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

The Proposed Plan of Action for this Site was issued on July 11, 2016. Copies of the Administrative Record file were made available for public review at the Marion City Hall in Marion, Louisiana, the LDEQ office in Baton Rouge, Louisiana, and the EPA office in Dallas, Texas. In addition, copies of the Proposed Plan fact sheet were sent to all recipients on the Site mailing list.

The public comment period for the Proposed Plan was held from July 11, 2016, to August 9, 2016. A public meeting was held in Marion, Louisiana on July 20, 2016, to present the preferred alternative in the Proposed Plan and take comments from the public. A transcript of the comments received during the public meeting can be found in the Administrative Record. LDEQ and EPA reviewed the written and verbal comments submitted during the public comment period and determined that no significant changes to the remedy as originally identified in the Proposed Plan are necessary or appropriate. The Responsiveness Summary summarizes comments from the local government officials received during the public comment period and presents LDEQ's and EPA's responses. There were no comments received from the general public.

Comment 1:
Is our drinking water supply impacted? Are you monitoring the contamination from the prior operations to see if it is impacting our drinking water? When a new monitoring well is drilled, does it impact the drinking water aquifer? How deep are the existing monitoring wells? Wells were destroyed in a recent logging operation, could they contaminate the drinking water aquifer? How do you seal the wells?

LDEQ and EPA Response 1:

- The drinking water supply for the area users is not impacted
- EPA will continue to monitor the water quality for both shallow aquifers
- EPA ensures that all new monitoring wells are installed so that they do not affect drinking water zones.

The deepest monitoring well at the MPTC site is 88 ft bgs and located in the Cockfield Formation. The drinking water supply wells are located in the underlying Sparta Sand Formation and are reported to be 624 and 895 ft bgs and are located upgradient of the MPTC site. The Cook Mountain Formation exists between the Cockfield Formation and the Sparta Sand Formation and has a massive silty clay bed about 200-300 feet think that retards the downward movement of water into the Sparta Sand. The deepest soil unit assessed during the remedial investigation was a silty clay (soil unit C3) at the site which prevents the downward movement of the DNAPL. All of the monitoring wells are currently periodically monitored. After the remedial action is completed, ongoing monitoring will be required as part of the Five-Year Reviews. When a monitoring well is drilled, it does not impact the underlying drinking water in the Sparta Sand because it does not penetrate an underlying clay unit and it is cemented at the surface and fitted with a locked cap to prevent any contamination from the surface from entering the monitoring well. Based on information obtained during the public meeting about monitoring wells being destroyed during a recent logging event, LDEQ visited the site on August 4, 2016 in the company of Mr. Jimmy Caldwell (Superintendent of Public Works for Marion, LA), and determined that the reported destroyed monitoring wells had actually been plugged and abandoned in a prior event.

Comment 2:
How was my health impacted during the operation of the pressure treating plant and could it be affecting me or my family's health now? Could my children have been impacted if our children played in puddles of water with creosote in it? Could the creosote impact us now that we are older and our immune systems not as strong?

LDEQ and EPA Response 2:
EPA works closely with the Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate health effects from Superfund sites. ATSDR conducts a Public Health Assessment for each site. The Public Health Assessment for Marion Pressure Treating Company was published December 27, 2002. In addition, the ATSDR Toxicity Profile for Wood Creosote, Coal Tar Creosote, Coal Tar, Coal Tar Pitch, and Coal Tar Pitch Volatiles (https://www.atsdr.cdc.gov/ToxProfiles/tp85.pdf) discussed the potential harm to children as the result of creosote exposure. ATSDR noted that children who played on soil contaminated with creosote had more skin rashes than children who played in uncontaminated areas, and that children exposed to creosote probably will have a longer potential latency period which could result in children having a greater risk of developing cancer.

Only one study was located that examined effects of exposure to coal tar creosote in children (Agency for Toxic Substances and Disease Registry 1994). This was a survey of inhabitants of a housing development that had been built on part of an abandoned creosote wood treatment plant. In this study, increased incidence of skin rashes compared to unexposed controls was the only health effect reported in children (less than 11 years of age) exposed to coal tar creosote. The incidence of rashes in different age groups varied, but did not show any definite trend. Data from studies of adult humans occupationally exposed to coal tar creosote indicate that

cancer is likely to be the most severe adverse effect of coal tar exposure, although there is also evidence of skin and eye irritation (see Chapter 2 and Section 3.2 for more details). Studies of animals after inhalation, oral, or dermal exposure to coal tar creosote confirm cancer as a likely outcome of coal tar exposure and suggest that there may also be adverse effects to the lungs, liver, spleen, thymus, skin, and eyes (see Chapter 2 and Section 3.2 for more details). However, the concentrations of coal tar used in animal studies are higher than could be expected from proximity to a hazardous waste site and so it is not clear how relevant some of these systemic effects are to children. Children exposed to creosote will probably have a longer potential latency period and may therefore be at greater risk of developing cancer from these substances than individuals exposed as adults. No reports of adverse developmental effects on humans after exposure to coal tar were found in the literature. No adverse developmental outcomes were detected in a survey of inhabitants of a housing development built on an abandoned creosote factory site, which was known to be contaminated with creosote (Agency for Toxic Substances and Disease Registry 1994).

Remediation of Big Creek Exposure Area will result in a site-wide lifetime excess cancer risk of less than 10^{-5}. The majority of the site (64 percent) already meets the lifetime excess cancer risk of 10^{-6}. This is protective of human health including sensitive populations such as the elderly and children.

Comment 3:
How much creosote DNAPL contamination is present?

LDEQ and EPA Response 3:
There is approximately 28,000 yd^3 of DNAPL impacted soil (approximately 1.7 acres) that will be treated by the deep soil mixing with solidification/stabilization.

Comment 4:
Will fracking cause the DNAPL to sink faster and impact our drinking water?

LDEQ and EPA Response 4:
Any area oil/gas production occurs very deep and will not impact the shallow aquifer at the site. The remedy will not use fracking as part of the construction.

Comment 5:
Why is there EPA action on this site now and not previously when the first Record of Decision was completed? Has EPA procured funding to clean up the site? When will you have funding?

LDEQ and EPA Response 5:
The 2002 selected remedy was not implemented due to concerns about the cost-effectiveness of the selected remedy.

EPA does not currently have funding approved for the construction. The timing of this will be determined following a nation priority approach. EPA expects that the remedy selected in this ROD Amendment will allow for a more favorable evaluation for funding since the remedy provides a more cost-effective approach to address the long-term risks at the site.

In August 1995, EPA established a National Risk-Based Priority Panel of program experts to evaluate the risk at National Priorities List sites with respect to human health and the environment. The Agency uses these evaluations to establish funding priorities for all new cleanup construction projects in the Superfund program. This national approach is intended as a way for each Region to list its priority projects and rand these projects against priority projects from other Regions, ensuring that scare resources are allocated to the projects posing the most risk to human health and the environment.

This system allows for an evaluation of projects based on the following principles:

- Protection of human health;
- Protection from significant environmental threats; and
- Potential human health or environmental threats based upon current site conditions.

Five criteria and associated weighting factors are used to compare projects based on common criteria. These include risks to human population exposed, contaminant stability, contaminant characteristics, threat to a significant environment, and program management considerations.

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FIGURES

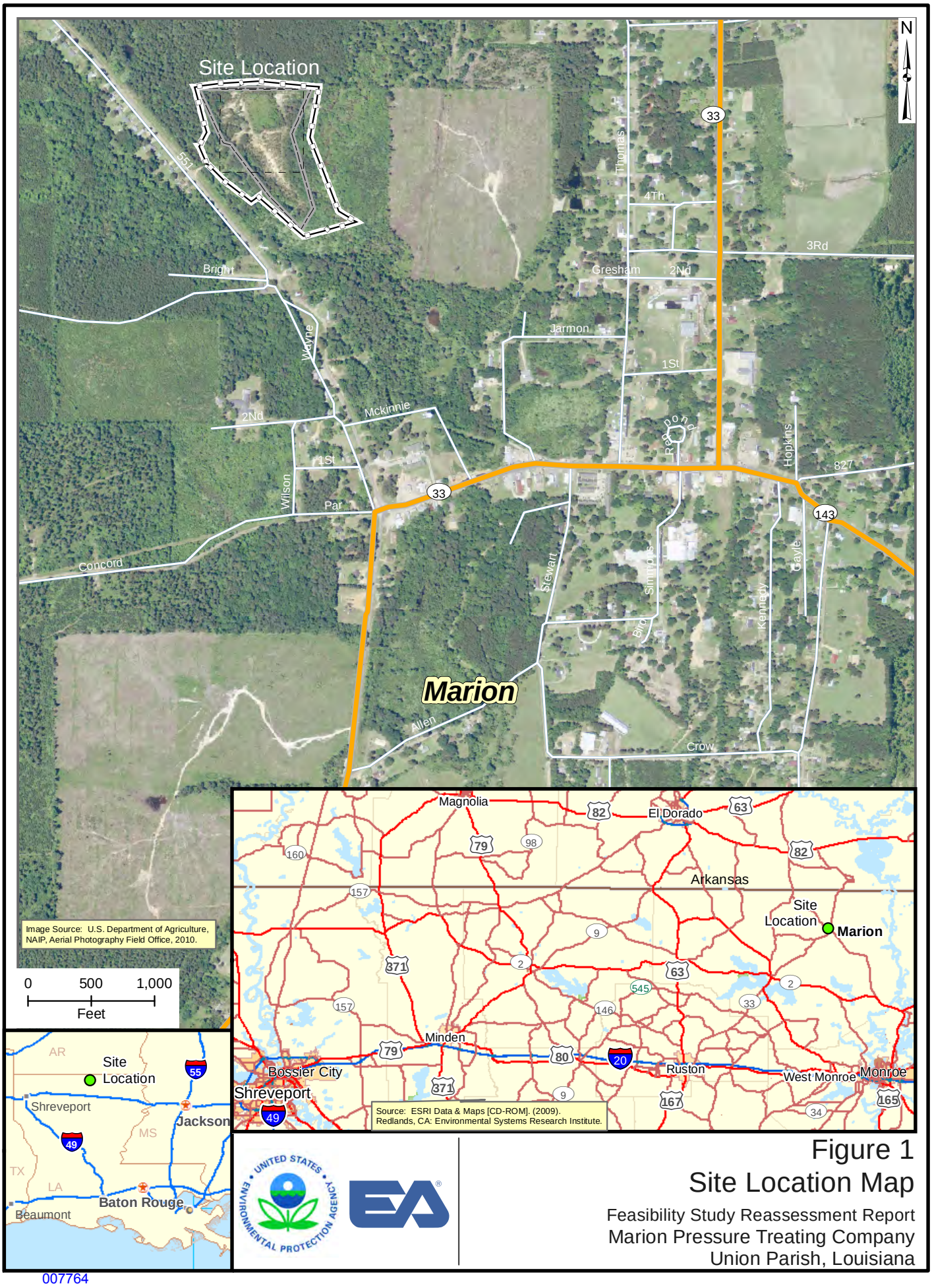

Figure 1
Site Location Map

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

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Legend:

- Operational Boundary
- 10-Acre Tract
- Fence
- Dirt road
- Building
- OE Overhead Electrical
- Exposed Water Line
- Culvert
- Stream, Intermittent
- Pond, Intermittent
- Former Surface Impoundment
- Capped Consolidation Area
- Former Process Area
- Tanker Trailer
- Waste Pile
- Publically Owned Treatment Works Sump

0 100 200
Feet

Image Source: U.S. Department of Agriculture, NAIP, Aerial Photography Field Office, 2010.

Figure 2
Site Layout Map

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

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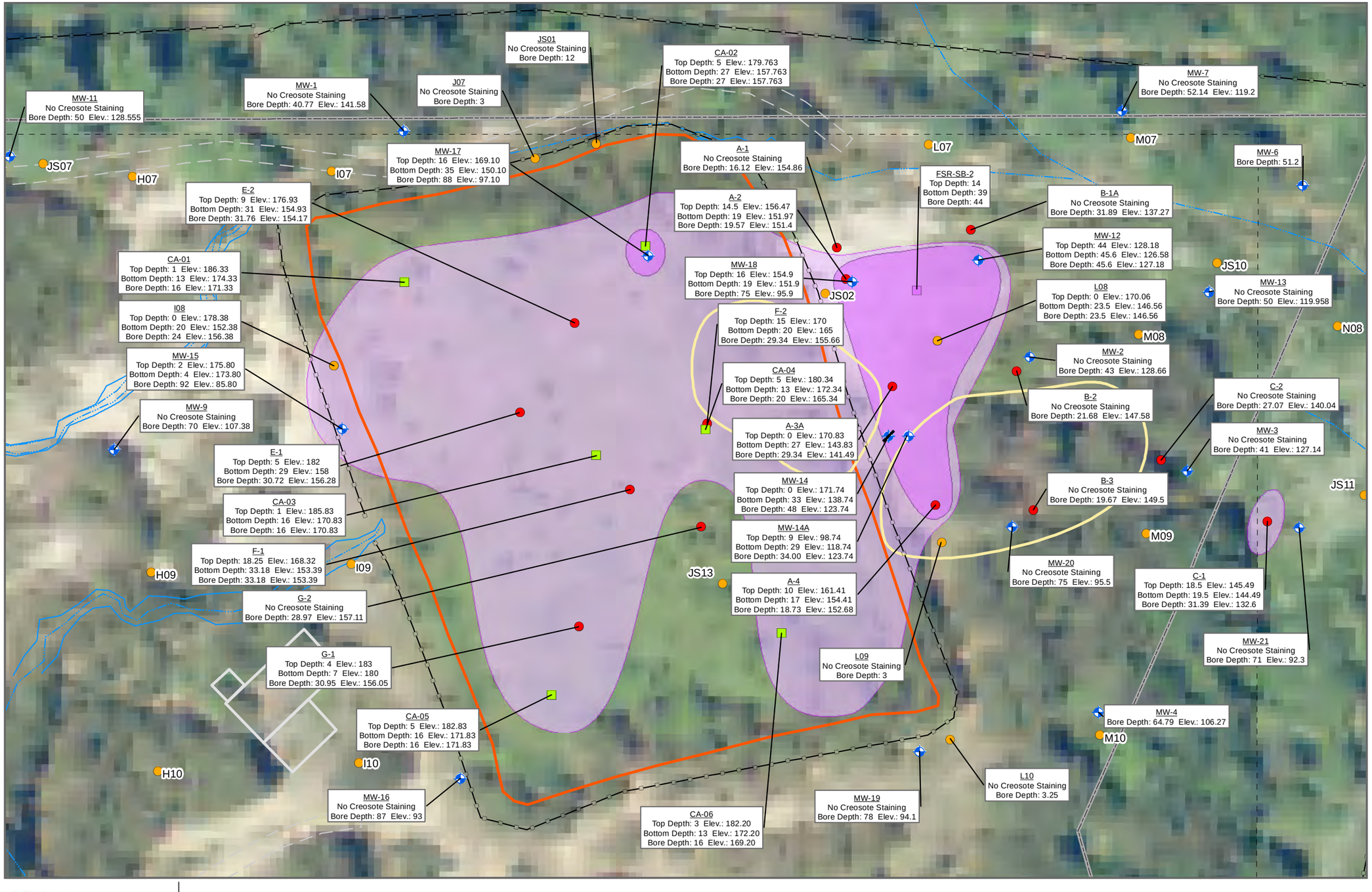

N

0 25 50
Feet

Legend:

- Bore Location (2013)
- Bore Location (2010)
- Bore Location (2002)
- Bore Location (2000)
- Monitor Well Location
- Plugged and Abandoned Monitor Well
- Operational Boundary
- 10-acre Tract
- Fence
- Dirt Road
- Building
- Stream, Intermittent
- Pond, Intermittent
- Capped Consolidation Area
- Former Surface Impoundment
- Observed Free-Phase DNAPL
- Areal Extent of Residual DNAPL*

NOTES:

Location Designation
Top Depth: "Top of DNAPL*"
Bottom Depth: "Bottom of DNAPL*"
Bore Depth: "Total Depth of Boring"

* Presence of DNAPL is based on observed or calculated presence of DNAPL.

Depths are displayed feet below ground surface.

Elevations are displayed in feet above mean sea level.

DNAPL - Dense non-aqueous phase liquid
Elev. - Elevation

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Image Source: USDA-FSA-APFO NAIP MrSID Mosaic, USDA/FSA - Aerial Photography Field Office, 2010

Figure 3
Observed and Calculated Area of Creosote/DNAPL in Soil

007766

2011-07-22 r:\federallepa\rac ii\0062-marion fsr\gis\mxds\figx_creosote25.mxd EA-Dallas jschwentz

N

0 30 60

Feet

Legend:

- Soil Sample Location
- Sediment Sample Location
- Operational Boundary
- 10-acre Tract
- Fence
- Dirt road
- Stream, Intermittent
- Pond, Intermittent
- Capped Consolidation Area
- Former Surface Impoundment
- Waste Pile
- Treatment Area

NOTES:

"**Sample Identification - Sample depth**"
Results

Sample depth in inches
B(a)p eq.- Benzo(a)pyrene equivalent
PRG - Preliminary remediation goal

PRGs:
Industrial Worker: 26 mg/kg
Trespasser/
Recreational Visitor: 42 mg/kg

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Image Source: USDA-FSA-APFO NAIP MrSID Mosaic, USDA/FSA - Aerial Photography Field Office, 2010

Figure 4
Big Creek Exposure Area

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N

0 25 50
Feet

1 inch = 100 feet

Legend:

- Bore Location (2013)
- Bore Location (2010)
- Bore Location (2002)
- Bore Location (2000)
- Monitor Well Location
- Temporary Well Location
- Plugged and Abandoned
- Operational Boundary
- Fence
- Dirt road
- Building
- Stream, Intermittent
- Pond, Intermittent
- Capped Consolidation Area
- Former Surface Impoundment
- Tanker Trailer
- Cross-Section Transect

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Image Source: 2008-2009 Texas Orthoimagery Program, Texas Strategic Mapping Program, TNRIS, 2009.

Figure 5
Cross-Section Location Map

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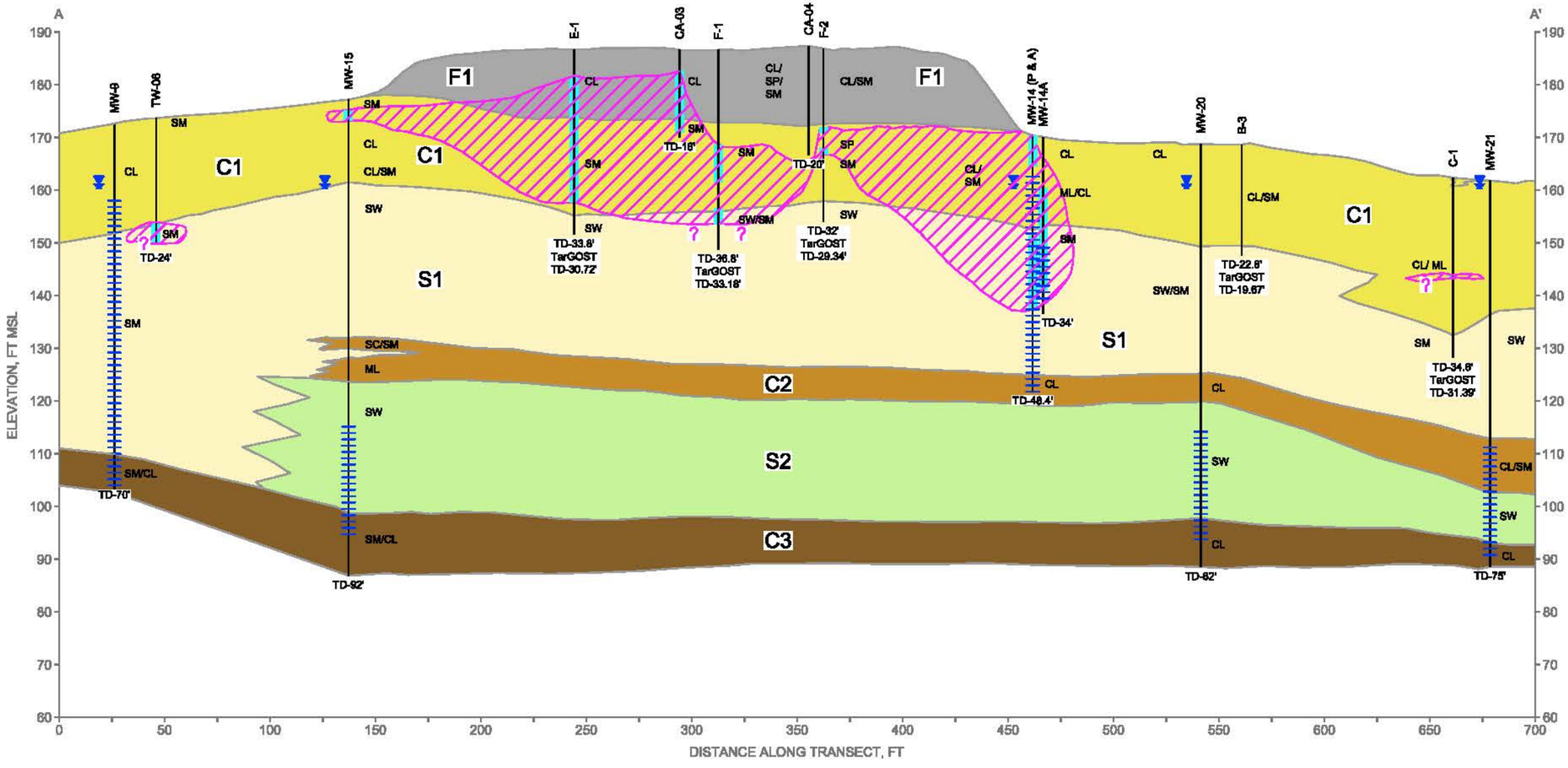
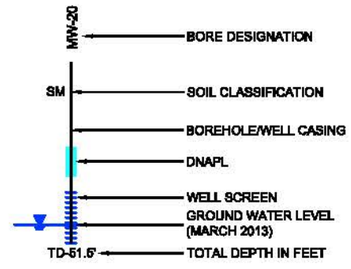


0 30 60
FEET

LEGEND

- F1 - Consolidation cap fill - silty clay and fine sand
- C1 - Clay to silty clay (CL) to silty sand (SM) with clay sand (SC) and silty sand (SP)
- S1 - Fine sand (SP/SW) to silty sand (SM) Well graded lignite present with minor clayey sand (SC)
- C2 - Clay (CH) to silty clay (CL) with silty sand (SM) to sandy silt (ML) to clayey silt (ML) with minor clayey sand (SC)
- S2 - Fine sand, well graded (SW)
- C3 - Silty clay (CL) with silty sand (SM)
- Extent of observed DNAPL



NOTES

FT.MSL - Feet above mean seal level
DNAPL - Dense non-aqueous phase liquid
FT - Feet
P & A - Plugged and abandoned
* - DNAPL has been present at the bottom of W-14; however, based on well construction, it is assumed to have flowed down the well. M-14 has since been plugged and abandoned.

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Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Figure 6
A-A' Cross-Section

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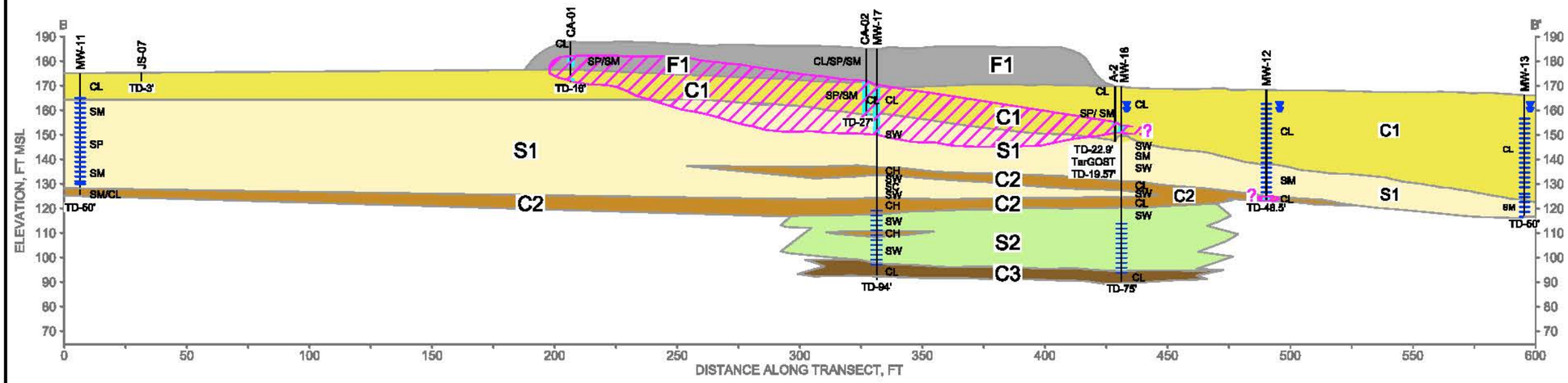
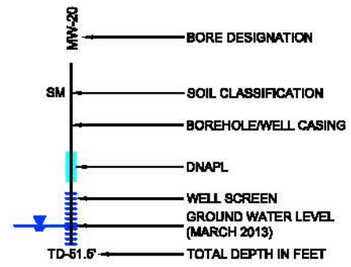


0 20 40

FEET

LEGEND

- F1 - Consolidation cap fill - silty clay and fine sand
- C1 - Clay to silty clay (CL) to silty sand (SM) with clay sand (SC) and silty sand (SP)
- S1 - Fine sand (SP/SW) to silty sand (SM) Well graded lignite present with minor clayey sand (SC)
- C2 - Clay (CH) to silty clay (CL) with silty sand (SM) to sandy silt (ML) to clayey silt (ML) with minor clayey sand (SC)
- S2 - Fine sand, well graded (SW)
- C3 - Silty clay (CL) with silty sand (SM)
- Extent of observed DNAPL



NOTES

FT.MSL - Feet above mean sea level
DNAPL - Dense non-aqueous phase liquid
FT - Feet

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007770

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Figure 7
B-B' Cross-Section

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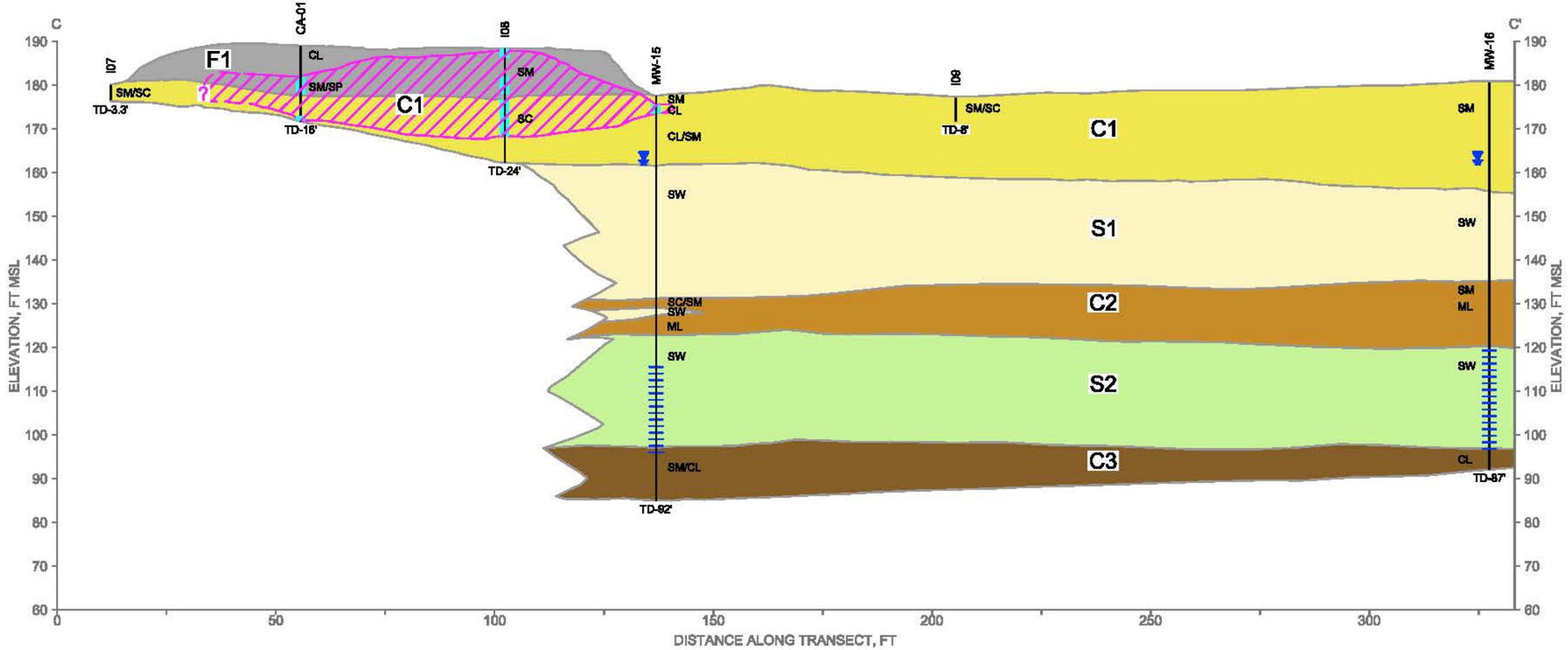
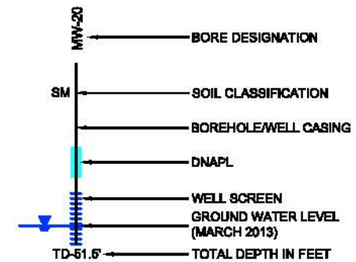


0 15 30
FEET

LEGEND

- F1 - Consolidation cap fill - silty clay, silt and fine sand
- C1 - Clay to silty clay (CL) to silty sand (SM) with clay sand (SC) and silty sand (SP)
- S1 - Fine sand (SP/SW) to silty sand (SM) Well graded lignite present with minor clayey sand (SC)
- C2 - Clay (CH) to silty clay (CL) with silty sand (SM) to sandy silt (ML) to clayey silt (ML) with minor clayey sand (SC)
- S2 - Fine sand, well graded (SW)
- C3 - Silty clay (CL) with silty sand (SM)
- Extent of observed DNAPL



NOTES

FT.MSL - Feet above mean sea level
DNAPL - Dense non-aqueous phase liquid
FT - Feet

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Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Figure 8
C-C' Cross-Section

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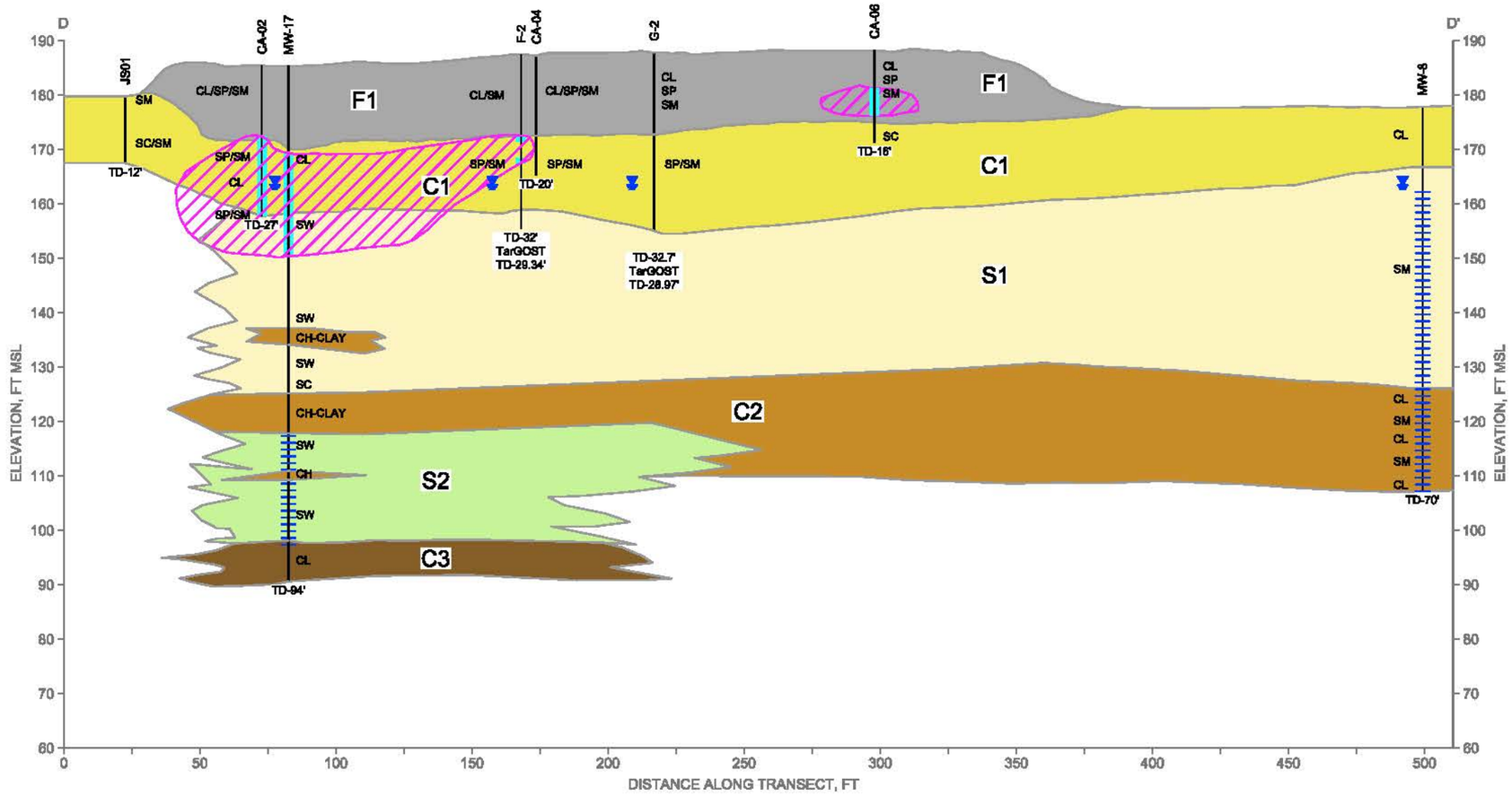
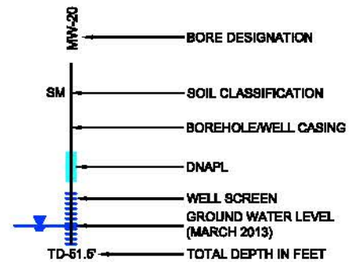


0 25 50
FEET

LEGEND

- F1 - Consolidation cap fill - silty clay, silt and fine sand
- C1 - Clay to silty clay (CL) to silty sand (SM) with clay sand (SC) and silty sand (SP)
- S1 - Fine sand (SP/SW) to silty sand (SM) Well graded lignite present with minor clayey sand (SC)
- C2 - Clay (CH) to silty clay (CL) with silty sand (SM) to sandy silt (ML) to clayey silt (ML) with minor clayey sand (SC)
- S2 - Fine sand, well graded (SW)
- C3 - Silty clay (CL) with silty sand (SM)
- Extent of observed DNAPL



NOTES

FT.MSL - Feet above mean sea level
DNAPL - Dense non-aqueous phase liquid
FT - Feet

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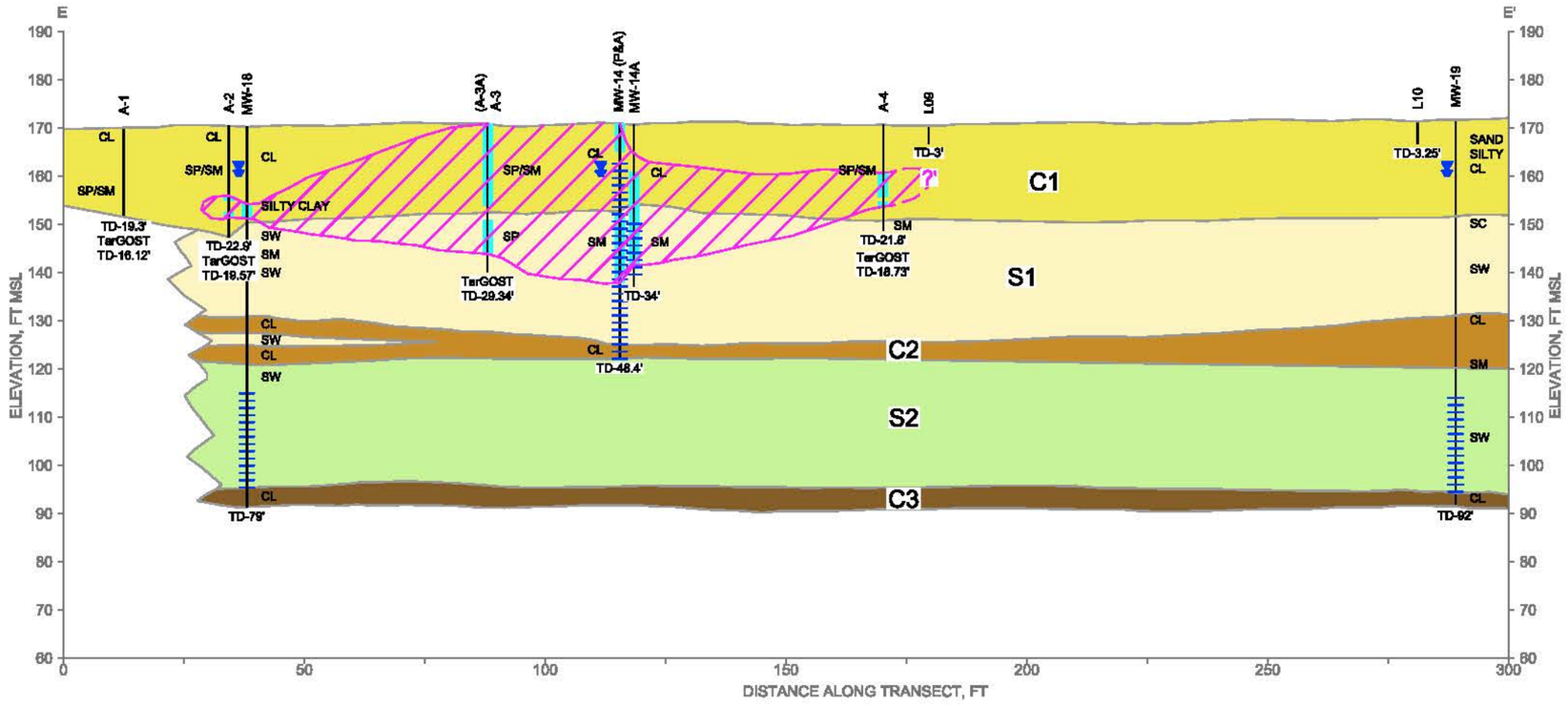
Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

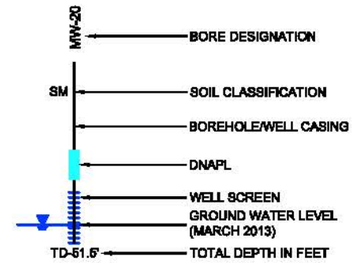
Figure 9
D-D' Cross-Section



0 15 30
FEET

LEGEND

- C1 - Clay to silty clay (CL) to silty sand (SM) with clay sand (SC) and silty sand (SP)
- S1 - Fine sand (SP/SW) to silty sand (SM) Well graded lignite present with minor clayey sand (SC)
- C2 - Clay (CH) to silty clay (CL) with silty sand (SM) to sandy silt (ML) to clayey silt (ML) with minor clayey sand (SC)
- S2 - Fine sand, well graded (SW)
- C3 - Silty clay (CL) with silty sand (SM)
- Extent of observed DNAPL



NOTES

FT.MSL - Feet above mean sea level
DNAPL - Dense non-aqueous phase liquid
FT - Feet
P&A - Plugged and abandoned

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Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Figure10
E-E' Cross-Section

N

0 50 100
Feet

Legend:

Monitoring Well

- S1 Formation
- S1,S2 Formation
- S2 Formation
- S1 Formation - Plugged and Abandoned
- Operational Boundary
- 10-Acre Tract
- Fence
- Dirt Road
- Stream, Intermittent
- Pond, Intermittent
- Capped Consolidation Area
- Former Surface Impoundment
- Waste Pile
- Area A - Erosion Control Area
- Area B - Residual DNAPL Area
- Area C - Free-Phase DNAPL Area
- Area D - Big Creek Exposure Area

NOTE:
Consolidation Area has already been treated by capping.

Feasibility Study Reassessment Report
Marion Pressure Treating Company
Union Parish, Louisiana

Image Source: USDA-FSA-APFO NAIP MrSID Mosaic, USDA/FSA - Aerial Photography Field Office, 2010

Figure 11
Areas of Interest

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007774

N

0 50 100

Feet

Legend:

- Operational Boundary
- 10-Acre Tract
- Fence
- Dirt Road
- Stream, Intermittent
- Pond, Intermittent
- Capped Consolidation Area
- Waste Pile
- Area B - Residual DNAPL Area
- Area C - Free-Phase DNAPL Area
- Area D - Big Creek Exposure Area
- Proposed Cap

NOTE:
Consolidation Area has already been treated by capping.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EA

Marion Pressure Treating Company
Union Parish, Louisiana

Image Source: USDA-FSA-APFO NAIP MrSID Mosaic, USDA/FSA - Aerial Photography Field Office, 2010

Figure 12
Proposed Cap

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TABLES

Table 1: Comparative Analysis between 2002 ROD and 2016 Amended ROD

Evaluation Criteria	2002 ROD Selected Remedy	2016 Proposed Alternate Remedy
Overall Protection of Human Health and the Environment	The 2002 ROD selected remedy will be protective of human health and environment. Low temperature thermal desorption is expected to remove contaminants from the soil, preventing exposure to on-site receptors. ICs would be implemented to limit human exposure to ground water.	The alternate remedy will be protective of human health and the environment. All components of the remedy prevent the completion of exposure pathways because they cover, remove, or treat contamination. Additionally, site-wide erosion control measures will mitigate the deterioration of the cap and possible exposure of the contamination in the subsurface soil. ICs will be implemented to limit human exposure to soil and ground water.
Compliance with the Applicable or Relevant and Appropriate Requirements	The selected remedy would not comply with ARARs because ground water concentrations would continue to exceed Maximum Contaminant Levels.	The selected remedy will comply with ARARs for soils and sediments. Compliance for ARARs for ground water will be determined in a future decision document.
Long-term Effectiveness and Permanence	The selected remedy would achieve long-term effectiveness and permanence by removing contaminants from the soil and recovering DNAPL, reducing migration of contaminants into ground water.	The alternate remedy will achieve long-term effectiveness and permanence by physically treating the Free-Phase DNAPL area and capping the other contaminated soil and sediment to prevent exposure. Soil remedies will reduce ground water contamination. ICs will rely on compliance with access and drilling restrictions into perpetuity.
Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment	The selected remedy would achieve reduction of toxicity, mobility, and volume of contaminants by treating the excavated soil via low temperature thermal desorption. The treatment would be irreversible and limited residuals would remain on-site after treatment.	The alternate remedy will achieve reduction of toxicity, mobility, or volume in the Free-Phase DNAPL area and in ground water because the Free-Phase DNAPL area will be physically treated. The remaining contaminated areas will not achieve reduction of toxicity, mobility, or volume because contaminant will not be treated or removed.

Table 1: Comparative Analysis between 2002 ROD and 2016 Amended ROD

Evaluation Criteria	2002 ROD Selected Remedy	2016 Proposed Alternate Remedy
Short-term Effectiveness	The selected remedy would involve excavation of contaminated soils, and thus presents a potential for short-term exposure to construction workers. The alternative would also present a short-term risk to the nearby residents and on-site workers due to the increased handling required for soil preparation and additional emissions from the on-site thermal activities to be performed. Short-term risk to workers associated with normal construction hazards can be reduced through appropriate controls and adherence to proper health and safety protocols.	The alternative remedy will present short-term risks to the community during construction activities and transport of equipment and materials. Workers can potentially be exposed to contaminated media during construction activities. Work around heavy equipment will carry potential risk to workers. Risks can be mitigated through standard construction practices and permitting.
Implementability	The selected remedy would be difficult to implement due to the remote site location, lack of infrastructure, and high utility demand.	The alternate remedy is technically feasible, although procuring the clay for the cap may be costly due to lack of local availability.
Cost	$22,088,000 *($29,955,000 in 2016 dollars)*	$16,249,000
State/Support Agency Acceptance	The LDEQ concurred on the remedy.	The LDEQ supports the proposed alternative remedy.
Community Acceptance	The remedy was accepted by the community.	Community supports the proposed alternative remedy.

TABLE 2
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
MARION PRESSURE TREATING COMPANY SITE

Requirement	Citation (If Available)	Description	Applicability
Chemical-Specific			
Federal Safe Drinking Water Act, Primary Drinking Water Standard (MCLs)	40 CFR 141,143	Establishes health-based standards for public water systems. It is applicable where contaminated ground water is or may be used for drinking water.	CERCLA requires that MCL for inorganics and organics be considered "relevant and appropriate" for ground water remediation.
Clean Water Act	40 CFR 131	Water Quality Criteria. These criteria set in-stream contaminant concentration levels for the protection of human health and wildlife.	ARAR applies because the ground water at the site is contaminated above levels that pose a threat to human health and wildlife.
EPA's Regional Screening Levels (RSLs)	"Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites" (EPA 2015)	Establishes screening levels for chemical contaminants in soil, water, and air.	TBC applies because many of the COPCs found at MPTC have RSLs (even if they do not have MCLs).
LDEQ RECAP Screening Values	"Risk Evaluation/Corrective Action Program" (RECAP; LDEQ 2003)	Establishes screening standards for chemical contaminants in soil and water.	TBC applies because many of the COPCs found at MPTC have RECAP screening values (even if they do not have MCLs).
Location-Specific			
Floodplain Management	Executive Order 11988; 40 CFR 6 and Appendix A	Requires federal agencies to evaluate the potential affects of actions they may take in a floodplain to avoid adverse impacts in a floodplain.	ARAR/TBC may apply if parts of the site are within a 100-year floodplain. A flood zone location map is not available for MPTC.
Protection of Wetlands Order	Executive Order 11990; 40 CFR 6 and Appendix A	Mandates that federal agencies and potentially responsible parties avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and avoid support of new construction on wetlands if a practicable alternative exists.	ARAR/TBC applies because parts of the site may be considered wetlands.
Fish and Wildlife Coordination Act	16 USC § 661 et seq., 16 USC § 742 a, 16 USC § 2901	Requires adequate provisions for protection of fish and wildlife resources	ARAR applies because treatment or construction activities will be performed near a creek and wildlife refuge.
Action-Specific			
Air			
National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR 61	Establishes specific emissions levels allowed for toxic air pollutants	ARAR may apply because even though activities at MPTC are not expected to constitute a major stationary source of any federally regulated air pollutant, remediation activities performed may change air quality.
Emission Standards For Particulate Matter	LAC 33: III Chapter 13	Remedial cleanup actions resulting in the generation of airborne particulate matter from the excavation of contaminated soils, earth moving, and regrading must be evaluated.	ARAR may apply because excavation of contaminated soils, earth moving, and regrading are activities that are a part of the excavation and disposal/treatment remedial alternative.
General Regulations on Control of Emissions and Emission Standards	LAC 33: III Section 905	States air pollution control facilities should be installed whenever practically, economically, and technically feasible even though the ambient air quality standards in the affected area are not exceeded.	ARAR may apply for the excavation and desorption or *in situ* thermal treatment remedial alternatives, where air pollutants may be emitted.
Waste			
Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste	40 CFR 261; LAC 33:V:1103	Provides the criteria for identifying a characteristic or listed waste. Solid waste is a hazardous waste if it exhibits any of the characteristics of ignitability, corrosivity, reactivity, and toxicity or if it is a listed waste. Applicable to off site waste disposal.	ARAR applies for excavated soil or waste produced during treatment or construction activities.
Standards Applicable to Generators of Hazardous Waste	40 CFR 262; LAC 33:V:1107	Provides requirements for preparation of waste manifests, waste packaging, labeling and handling.	The preamble to the NCP & EPA guidelines call for manifesting of transportated waste.
Guidance for CERCLA Compliance with RCRA during a CERCLA remedial action	40 CFR 264.2.3.2	Jurisdisctional requirements for RCRA Subtitle C applicability which regulates the treatment, storage, and disposal of hazardous waste.	Applies to the consolidation/solidification of the DNAPL free-phase area because “Treatment” means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous or less hazardous.
Land Disposal Restrictions	40 CFR 268.40(a); LAC 33: V Chapter 22	Restricts the land disposal of most hazardous wastes, and specified specific treatment standards that must be met before these wastes can be land disposed.	ARAR applies for possible offsite disposal of excavated soil or waste produced during treatment or construction activities.
Monitoring well construction	LAC 56: I Chapter 3	Provides construction standards for monitoring well installation	TBC applies for alternatives where additional monitoring wells may be required.

TABLE 2
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
MARION PRESSURE TREATING COMPANY SITE

Requirement	Citation (If Available)	Description	Applicability
Monitoring well abandonment	LAC 56: I Chapter 5	Provides standards for the proper plugging and abandonment of existing wells.	TBC applies to alternatives where monitoring well abandonment is proposed.
Transportation of Hazardous Materials	49 CFR Part 171	Hazardous materials that may be transported cannot be transported in interstate and intrastate commerce, except in accordance with the requirements of 49 CFR Part 171, Subpart C.	ARAR applies because hazardous materials may be transported during treatment or construction.
Action-Specific (continued)			
Solid Waste Regulation	LAC 33: VII Subpart 1	Establishes standards that govern the storage, collection, processing, recovery and reuse, and disposal of solid waste. It also implements a management program that will protect the air, ground water, surface water, and the environment from pollution from solid wastes and, thus, eliminate the potential threat to human health from such pollution.	ARAR applies because treatment or construction activity at the MPTC site may produce solid waste.
Remediation Activities			
Worker Health and Safety For Remedial Action	40 CFR 300.150, 29 CFR 1910.120	Requires assurance of the health and safety of workers during the remedial action.	ARAR applies because remedial action will be performed.
Inactive and Abandoned Hazardous Waste Substance Site Remediation	LAC 33: IV Chapter 5	Regulates remedial actions, role of PRP in remedial actions, minimum remediation standards and risk evaluation, corrective action, selection of final remedy, and inspections by the department.	ARAR applies because remediation activities will be performed at an inactive and abandoned hazardous waste site.
Water Discharge			
National Pollutant Discharge Elimination System	40 CFR 122-125	Provides conditions that must be incorporated into National Pollutant Discharge Elimination System permits. Applicable to discharge of storm water from the Site.	ARAR applies because water may be discharged from the site during remedial activities.
Underground Injection Control Program	40 CFR 144	Provides minimum requirements for Class 5 injection wells. Applicable to alternative where reagents will be injected below the water table.	ARAR would apply to the remedial alternatives which includes injecting amendments.
Erosion and Sediment Control	LAC 33:IX.2511	Establishes requirements for stormwater discharges from construction activities.	An ARAR would apply if remedial actions result in soil disturbances over threshold criteria. Compliance is associated with substantive requirements of this regulation.
Louisiana Pollutant Discharge Elimination System	LAC 33: IX Subpart 2	Regulates permit applications, permitting conditions, criteria and standards for technology-based treatment requirement, toxic pollutant effluent standards and prohibitions, and sampling procedures.	ARAR applies because water may be discharged from the site during remedial activities.

NOTES:
ARAR - Applicable or relevant and appropriate requirement
CERCLA - Comprehensive Environmental Response, Compensation & Liabilities Act
CFR - Code of Federal Regulations
COPC - Contaminant of potential concern
LAC - Louisiana Administrative Code
LDEQ - Louisiana Department of Environmental Quality
MCL - Maximum Contaminant Level
MPTC - Marion Pressure Treating Company
PRP - Primary responsible party
RCRA - Resource Conservation and Recovery Act
RECAP - Risk Evaluation/Corrective Action Program
RSL - Regional Screening Level
TBC - To be considered
USC - United States Code