RECORD OF DECISION

KERR-MCGEE CHEMICAL CORP – COLUMBUS

SUPERFUND SITE
OPERABLE UNIT 3

COLUMBUS, LOWNDES COUNTY, MISSISSIPPI

EPA ID: MSD990866329

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SUPERFUND DIVISION
ATLANTA, GEORGIA

RECORD OF DECISION

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ACRONYMS AND ABBREVIATIONS

AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
CFR	Code of Federal Regulations
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSM	conceptual site model
DNAPL	Dense Non-Aqueous Phase Liquid
ECA	Environmental Cost Account
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
HSWA	Hazardous and Solid Waste Amendments
IRIS	Integrated Risk Information System
ISS	In-situ Stabilization
KMCC	Kerr-McGee Chemical Corporation
mg/kg	Milligram per Kilogram
NCP	National Contingency Plan
O&M	Operation and Maintenance
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PRP	Potentially Responsible Party
PCP	Pentachlorophenol
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SWMU	Solid Waste Management Units
TBC	To-Be Considered

PART 1: DECLARATION

1.0 SITE NAME AND LOCATION

Kerr-McGee Chemical Corp – Columbus Superfund Site

2300 14th Avenue North in Columbus, Lowndes County, Mississippi

Superfund Site Identification Number MSD990866329

2.0 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for Operable Unit 3 (OU3) of the Kerr-McGee Chemical Corp – Columbus Superfund Site (Site) in Columbus, Mississippi. Based on comments on the combined Proposed Plan for OU3 (Southern Former Main Plant Area) and OU5 (Northern Former Main Plant Area), EPA reevaluated the scope of this decision, and this ROD will address only OU3 and will not address OU5. OU3 includes contaminated soil, wood treating chemicals present as dense, nonaqueous-phase liquid (DNAPL), and contaminated groundwater in the Southern Former Main Plant Area and the adjacent "3.7-acre parcel" (Figure 4). The selected OU3 remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Action of 1980 (CERCLA), 42 United States Code (USC) § 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 Code of Federal Regulations (CFR) Part 300 et seq., as amended. This decision is based on the administrative record (AR) file for the Site.

The EPA is the lead agency for site activities. Mississippi Department of Environmental Quality is the support agency. In accordance with 40 CFR Part 300.430(f)(2), the Mississippi Department of Environmental Quality has provided input during the remedial investigation (RI) and feasibility study (FS). The Mississippi Department of Environmental Quality concurs with the selected remedy.

3.0 ASSESSMENT OF SITE

The response action selected in this Record of Decision (ROD) is necessary to protect public health or welfare or the environment from actual or threated releases of hazardous substances into the environment. The hazardous substances in OU3 include the following contaminants of concern (COCs) associated with the releases of wastes from historical wood preserving operations including but not limited to creosote, pentachlorophenol (PCP), benzo[*a*]pyrene, naphthalene, dioxins, and furans.

4.0 DESCRIPTION OF SELECTED REMEDY

The selected OU3 remedy includes the following major components to address contaminated soil, wood treating chemicals present as dense, nonaqueous-phase liquid (DNAPL), and contaminated groundwater in the Southern Former Main Plant Area and to address soil contamination and DNAPL in the aquifer in the adjacent "3.7-acre parcel" (Figure 4):

- Barrier Wall Isolation of Source Areas
- Phytoremediation to maintain groundwater levels with temporary groundwater extraction and treatment within barrier wall
- Engineered Soil Cover
- Institutional Controls

The combined OU3 and OU5 Proposed Plan issued in October 2023 for this ROD included an interim remedy for OU5. During the public comment period for the OU3 and OU5 Proposed Plan, the EPA received a request to select and implement an alternative for OU5 that was not considered in the proposed plan (i.e., excavate and remove contaminated soil that exceed the construction worker scenario). After careful consideration, the EPA has determined that the requested remedy change is one that public could not have been reasonably anticipated based on information in the original Proposed Plan [see NCP at 40 CFR 300.430(f)(3)(ii)(B)]. As a result, the EPA will address OU5 separately in a future ROD. This ROD presents the selected remedy for OU3.

The EPA's Site strategy has been to address immediate cleanup needs by reducing exposure pathways to nearby residents with removal or remedial actions and to use an operable unit strategy to work from the simplest to the most complex challenges at the site. This OU3 cleanup decision follows actions to address exposure in residential yards (OU2) and the soil-only contamination in OU1. After the OU3 cleanup, most of the acreage impacted by the Site will be addressed and suitable for compatible reuse. The overall cleanup strategy for OU3 is to control the source of groundwater contamination (namely DNAPL below the water table) through containment and to prevent human exposure to contaminated surface and subsurface soils. The source control components of the OU3 remedy will support the eventual restoration of groundwater outside the containment area to its beneficial use as a potential source of drinking water, which will be the subject of a future cleanup decision. Institutional controls are in place that serve to limit Site use and exposure. The Multistate Trust's ownership pursuant to the Settlement Agreement serves as an "enforcement tool with institutional control components" which limits the use of the property and requires EPA and State approval prior to a property transfer. This remedy specifies institutional controls to ensure continued protection of the remedial components and of human health. Prior to the sale or transfer of Multistate Trust property, additional institutional controls will be implemented, the details of which will be selected in a future decision document issued by the EPA.

The EPA considers the remaining mobile DNAPL and residual DNAPL located in the "OU3 primary source area" and the "OU3 secondary source area" to pose a principal threat since some of the COCs present such as PCP, dioxins/furans are highly toxic and could present a

significant risk to human health in the event of exposure and DNAPL serves as an on-going source of COCs into groundwater. The EPA considers the OU3 contaminated surface and subsurface soils outside of the source areas to pose a relatively low-level threat.

Since 1991, more than 46,000 gallons of DNAPL and more than 92.6 million gallons of groundwater were removed from the aquifer by the groundwater extraction system that was constructed for RCRA corrective action purposes under a Resource Conservation and Recovery Act (RCRA) Hazardous and Solid Waste Amendments (HSWA) permit issued in 1995 and conveys treated wastewater to an National Permit Discharge Permitted System (NPDES) publicly owned treatment works (POTW), namely the Columbus Light & Water sanitary sewer system for secondary treatment at the wastewater treatment plant. The Multistate Trust sought termination of the HSWA permit from EPA in 2019. The EPA approved the termination because the facility was placed on the NPL in 2011. The Multistate Trust operates the groundwater extraction system under the oversight of EPA's Superfund Program. The State issued water pollution control permit number MSP090021 to the Multistate Trust that allows the treated wastewater to be sent to the POTW (the permit was previously held by Tronox LLC and the Kerr McGee Chemical Corporation).

The operation of the extraction system constituted treatment to permanently and significantly reduce the volume and mobility of DNAPL at the Site. This selected remedy complements the previous removal, treatment, and disposal of DNAPL because the reduction in volume and mobility makes source control measures easier to implement. The extraction system will continue to be operated and discharges managed by the POTW under the water pollution control permit until the barrier wall and engineered soil cover are functioning as intended, after which, supplemental groundwater pumping and treatment and discharge to the POTW (if needed) to maintain water levels would be part of the remedial action.

While the selected remedy does not include treatment of remaining principal threats as a major component, the Feasibility Study evaluated a range of alternatives, including alternatives that rely on treatment to address remaining principal threats, alternatives that combine treatment and engineering controls, and alternatives that rely mostly on engineering controls. This selected containment approach was selected as the best balance of trade offs with implementability, long-term effectiveness and short-term effectiveness as the most decisive factors.

5.0 STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121 and to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, complies with federal and state environmental requirements that are applicable or relevant and appropriate to the remedial action (unless justified by a waiver), is cost effective, and utilizes permanent solutions and alternative treatment technologies (or resource recovery technologies) to the maximum extent practicable. The selected remedy partially satisfies the statutory preference for treatment as a principal element of the remedy, to the extent practicable (i.e., reduces the toxicity, mobility or volume of hazardous substances,

pollutants or contaminants as a principal element through treatment) with limited treatment of contaminated shallow groundwater within the containment area.

Because hazardous substances will remain at the Site above levels that allow for unlimited use and unrestricted exposure, the EPA will review the remedial action no less than every five years, per CERCLA Section 121(c) and the NCP at 40 CFR 300.430(f)(4)(ii) until the levels of COCs allow for unrestricted use of soil and groundwater with unlimited exposure to these media. If results of the five-year reviews reveal that remedy integrity is compromised and protection of human health and the environment is insufficient, then additional remedial actions will be evaluated by the EPA and MDEQ.

6.0 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. The Site's administrative record (AR) file (https://semspub.epa.gov/src/collection/04/AR67483) provides more information.

- Contaminants of concern (COCs) and their respective concentrations (Section 5).
- Baseline risk represented by the COCs (Section 7).
- COC cleanup levels and the basis for these levels (Section 8).
- How source materials constituting principal threats are addressed (Section 11).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 6).
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Section 6).
- 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 10).
- Key factor(s) that led to selecting the remedy (Section 12).

7.0 AUTHORIZING SIGNATURE

CAROLINE FREEMAN

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Caroline Y. Freeman, Director
Superfund & Emergency Management Division
U.S. Environmental Protection Agency, Region 4

PART 2: THE DECISION SUMMARY

1.0 SITE NAME, LOCATION AND BRIEF DESCRIPTION

The Kerr-McGee Chemical Corp – Columbus Superfund Site (Site) is in Columbus, Mississippi. The Site's Superfund Site Identification Number is MSD990866329. The EPA is the lead agency for site activities and Mississippi Department of Environmental Quality is the support agency. This remedial action will be funded in part by the Multistate Environmental Response Trust (Multistate Trust), using funds from the potentially responsible party (PRP) and will be funded in part by EPA from the federal Superfund trust fund (fund-lead).

The Site covers about 90 acres and is generally bounded by U.S. Highway 82 to the north, Moss Street and a railroad right of way to the east, Tuffy Lane to the south, and 21st Street North and 22nd Street North to the west (Figure 1). The Kerr-McGee Chemical Corporation (KMCC) wood-treating facility was shut down in 2003, and most former structures on the property were demolished or dismantled. Two structures are still present on the Former Main Plant Area: the former office building (currently referred to as the "Community Resource Building") located in the northwest corner; and the groundwater treatment building, located in the center. Other features remaining at the former KMCC facility include the closed former surface impoundments (one of which was regulated under the Resource Conservation and Recovery Act of 1980, as amended or RCRA); several concrete pads and foundations; groundwater monitoring wells; abandoned utility lines; and the wells, trenches, and conveyance infrastructure of the groundwater extraction and DNAPL recovery system (Figure 8). A fence restricts access to the Site. The fence encloses the former KMCC facility property. The former KMCC facility property is owned by the Multistate Trust.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 History of Site Activities

The T.J. Moss Tie Company built the wood-treating facility and operated it until 1963. Construction of the facility began in August 1928 and finished in February 1929. KMCC acquired the property in 1963 and continued wood-treating operations until the facility closed in 2003. Manufactured products included railroad wooden cross ties, switch ties and preserved timbers. Preservatives used in the operation included creosote, creosote coal tar solutions and pentachlorophenol (PCP).

During wood-treating operations, untreated lumber was received and sorted at the facility. It was later seasoned, either by natural air drying, which required the wood to be stacked in a drying yard for up to 12 months, or by artificial seasoning using the Boulton process. Wood allowed to dry naturally was stored in the Northern Former Main Plant Area's (OU5) green tie storage areas and in the Pine Yard (OU1). The Boulton drying process involved subjecting green lumber to heated creosote under a vacuum, which boiled the sap water out of the wood. After seasoning, the wood was then pressure-treated in a cylinder, or retort, in the Southern Former Main Plant Area (OU3). The pressure-treating process involved filling a cylinder with a treating

solution (e.g., creosote or PCP) and applying pressure to force the treating solution into the wood. Treated wood was taken out of the retort chamber by rail for drying. Prior to construction of a concrete drip track in 1988, excess preservative was allowed to drip onto bare soil before the treated wood was moved to other locations at the former KMCC facility for storage prior to shipment off site. The concrete drip track was constructed in 1988 to capture the excess wood treating chemicals.

Historically, the primary wood-treating process operations, primary treated wood storage areas, drip tracks, and surface impoundments were all located within OU3. The Northern Former Main Plant Area, to be addressed as part of OU5, was used for wood storage and operations not directly associated with the wood-treating process.

The historical wood treating processes in OU3 used RCRA listed hazardous wastes F032 (pentachlorophenol-based) and F034 (creosote-based) as specified in 40 CFR § 261.31. In addition, the former surface impoundments [Aeration Impoundment (SWMU 28) and Sedimentation Impoundment (SWMU 29) which have been closed under RCRA] located in the western portion of the Former Main Plant Area contained RCRA listed waste K001 which was released into the subsurface and are suspected sources of groundwater contamination.

In 2003, the volume of wood storage was reduced significantly. By 2004, no wood storage or manufacturing activities were on site, as indicated by aerial photographs. Structures were visible on site through at least 2007. All above-grade structures, other than the current office and operation and maintenance buildings, appeared to have been demolished by 2010.

2.2 History of Investigations and Cleanup Actions

Multiple remedial and removal actions at the Site have been completed since 1986. The

following investigations and cleanups occurred at the Site prior to 2020:

- 1986: Surface Impoundment Closure – surface impoundments, identified as “Aeration Impoundment” and “Sedimentation Impoundment” – were operated under Resource Conservation and Recovery Act (RCRA) Interim Status Standards until closure finished in 1986. The bottom sediment sludge associated with the impoundments was a K001 RCRA-listed hazardous waste.
- 1990 to Present: A groundwater extraction and treatment and DNAPL recovery system operates at the Former Main Plant Area that was constructed for RCRA corrective action purposes under a HSWA permit issued in 1995 and conveys treated wastewater to a POTW, namely the Columbus Light & Water sanitary sewer system for secondary treatment at the wastewater treatment plant under water pollution control permit number MSP090021.
- 2005: Ditch Sediment Removal – interim measures removed sediment impacted by polycyclic aromatic hydrocarbons (PAHs) in the ditch system along the eastern site boundary.
- 2006 to 2007: Ditch Sediment Removal – impacted soil was found during a municipal drainage improvement project that began at Propst Park, about 2,200 feet southeast of the Site, at the eastern end of 7th Avenue North.

- 2010 to 2011: Hunt School Removal Action – removal evaluations and actions were conducted by Tetra Tech on behalf of the EPA from October 2010 to May 2011. Removal actions were conducted to address PAHs at Hunt Intermediate School, at a residential property and at Maranatha Faith Center.
- The EPA finalized the Site's listing on the Superfund National Priorities List in September 2011. All operations and maintenance (O&M) activities, compliance monitoring, and inspections of the closed surface impoundments and the groundwater extraction and treatment system are now subject to applicable CERCLA requirements.
- 2014 to 2015: 14th Avenue Ditch Improvement Project – the Multistate Trust performed the excavation necessary to construct the new 14th Avenue North ditch and provide a clean work area for the City of Columbus to construct a new concrete-lined drainageway.
- 2016: Residential Yard Removal – soil was removed from the backyard of a residential property on 17th Avenue North where benzo(a)pyrene concentrations exceeded regional residential removal management levels.
- 2016: 7th Avenue North Storm Drainage Ditch Removal Action – this removal action to address PAH-contaminated ditch sediments and soils was implemented along the north side of 7th Avenue North, between the Maranatha Faith Center and North 28th Street.
- 2018 to 2022: The OU1 remedial action to make a portion of the Pine Yard available for community-supported redevelopment in as timely a manner as possible was completed in 2021.
- The EPA issued the ROD for OU1 in May 2019, selecting a soil excavation and institutional controls remedy, and approved the OU1 remedial action completion report and addendum in April 2022.
- In 2019, the Multistate Trust sought termination from EPA of the HSWA permit. The EPA approved the termination because the facility was placed on the NPL in 2011. The Multistate Trust operates the groundwater extraction system under the oversight of EPA's Superfund Program. The State issued water pollution control permit number MSP090021 to the Multistate Trust that allows the treated wastewater to be sent to the POTW (the permit was previously held by Tronox LLC and the Kerr McGee Chemical Corporation).
- 2020 to 2021: Stormwater Ditch Removal Action – this removal action to address PAH-contaminated ditch sediments in the Southeastern Ditch was implemented between Moss Street and Waterworks Street. The EPA issued the Time Critical Removal Action Memorandum in December 2019 and approved the removal action completion report in 2022.
- 2020 to present: The EPA issued the ROD for OU2 in September 2020. The OU2 remedial action is substantially complete and addressed privately-and State-owned residential and commercial properties in the vicinity of the former KMCC facility with surface soils (up to 2 feet below ground surface (ft bgs)) that exceeded cleanup levels for dioxins and furans.

2.3 History of Enforcement Activities

- KMCC submitted a RCRA Part A permit application in 1981 that notified the EPA of the presence of solid waste management units (SWMUs), including two hazardous waste surface impoundments containing RCRA-listed hazardous waste (K001).
- In 1989, KMCC entered into a Consent Order with the Mississippi Commission on Environmental Quality that required completion of a groundwater assessment and submittal of an addendum to the previously submitted RCRA Part B permit application.
- A State of Mississippi Hazardous Waste Management Permit (permit HW-90-329-01) was issued to KMCC in September 1990. The permit identified 15 SWMUs and areas of concern that required a RCRA facility investigation. The permit expired in September 2000. The permit was renewed effective June 2001, for a term of 10 years. The permit expired again in May 2011 and was not reissued.
- The EPA issued the hazardous and solid waste amendments part of the RCRA permit to KMCC in August 1995. The HSWA part required that the facility investigate releases of hazardous waste or hazardous constituents and take appropriate corrective action for such releases. The HSWA part of the permit expired in August 2005. KMCC submitted a letter to the EPA in April 2005 requesting renewal of the HSWA part of the RCRA permit. In June 2019, the EPA approved a request to terminate the permit as a Class 1 modification given the active and long-term oversight of the investigation and associated cleanup by the Superfund Program.
- Permit HW-90-329-01 transferred to Tronox in 2005 and then to Greenfield Environmental Multistate Trust, LLC, not individually but solely in its representative capacity as Trustee of the Multistate Environmental Response Trust, in February 2011. As noted previously, this permit expired in May 2011 and was not reissued.
- The Multistate Environmental Response Trust operates under the Tronox Consent Decree and Environmental Settlement Agreement (Settlement Agreement) and the Multistate Environmental Response Trust Agreement (Multistate Trust Agreement. The Settlement Agreement requires the Trust to seek EPA and State approval for work plans and budget ceilings for environmental actions at the Site. Environmental actions include the investigation and cleanup under CERCLA as well as operations, maintenance, and regulatory compliance for the Groundwater Recovery and Treatment System, Water Pollution Control Permit, Groundwater Monitoring, and managing the closed hazardous waste surface impoundment.

3.0 COMMUNITY PARTICIPATION

The EPA approved the OU3 and OU5 Feasibility Study Report ("OU3 and OU5 FS Report" or "FS Report") in May 2023 and provided the FS Report to the community group's technical advisor on October 17, 2023. The EPA emailed the Proposed Plan to the public and the technical advisor on October 17, 2023. The EPA updated the public on the Sitewide RI Reports, the OU3 and OU5 FS Report, and other Superfund actions through community notification flyers, presentations and updates in accordance with the EPA's Community Involvement Plan for the Site, available at: https://semspub.epa.gov/work/04/11114976.pdf.The EPA has also updated

the Site's profile page to provide information to the community (www.epa.gov/superfund/kerr-mcgee-chemical-columbus). The Administrative Record was published on October 5, 2023 at https://semspub.epa.gov/src/collection/04/AR67483. The EPA published a public notice in the Columbus Dispatch on October 19, 2023.

The EPA held a 60-day public comment period from October 16, 2023 through December 18, 2023. The EPA held a public meeting on October 26, 2023, to present the Proposed Plan for OU3 and OU5 and answer questions from meeting attendees. The initial 30-day public comment period on the Proposed Plan was held from October 16, 2023, to November 16, 2023 and the EPA received a request to extend the comment period for an additional 30 days. In response to the request from the public, the EPA extended the comment period to December 18, 2023. Comments received by the EPA during the public comment period are summarized and addressed in the Responsiveness Summary, which is a part of this ROD.

During the public comment period for the OU3 and OU5 Proposed Plan, the EPA received a request to select and implement an alternative for OU5 that was not considered in the proposed plan (i.e., excavate and remove contaminated soil that exceed the construction worker scenario). After careful consideration, the EPA has determined that the requested remedy change is one that public could not have been reasonably anticipated based on information in the original Proposed Plan [see NCP at 40 CFR § 300.430(f)(3)(ii)(B)]. Based on public comments on the Proposed Plan, the EPA reevaluated the sitewide approach and has removed OU5 from this ROD.

4.0 SCOPE AND ROLE OF THE OPERABLE UNIT OR RESPONSE ACTION

Due to its size and complexity, the EPA divided the Site into OUs. This ROD addresses OU3.

- OU1: Pine Yard unsaturated contaminated soils. The OU1 cleanup was conducted pursuant to the Site's 2019 OU1 ROD. The remedial action was substantially completed in 2022, with the exception of the contamination underneath an access road that leads to OU4. The EPA has decided to address this area as a part of OU4 cleanup.
- OU2: Residential/commercial properties with site-related contamination above cleanup levels. The remedial action is ongoing pursuant to the Site's 2020 ROD.
- OU3: Soil, DNAPL, and groundwater at the Southern Former Main Plant Area and a 3.7-acre parcel that contains soil contamination and DNAPL in the aquifer. OU3 is the subject of this ROD (Figure 4).
- OU4: The area of the Pine Yard where deeper contamination is present and where the access road through OU1 is present (Figure 2).
- OU5: Soil at the Northern Former Main Plant Area, outside of the process area, which does not contain DNAPL contamination.
- OU6: Groundwater contamination and the restoration of groundwater to beneficial use (including vapor intrusion from groundwater).
- OU7: Wetlands in the northeast portion of the Pine Yard.

The EPA's site strategy has been to address immediate cleanup needs by reducing exposure pathways to nearby residents with removal or remedial actions and to use an operable unit

strategy to work from the simplest to the most complex challenges at the site. The OU3 remedial action comes after other response actions to address exposure in residential yards (OU2) and addressing the soil-only contamination in OU1. After the OU3 cleanup, most of the acreage impacted by the Site will be addressed and suitable for compatible reuse. The overall cleanup strategy for OU3 is to control the source of groundwater contamination (DNAPL below the water table) and to prevent human exposure to contaminated soils. Source control will support the eventual restoration of groundwater to its beneficial use as a potential source of drinking water, which will be the subject of a future OU6 cleanup decision.

The OU3 cleanup strategy supports the overall Site enforcement strategy and will likely be one of the final actions taken by the Multistate Trust before the remainder of the Site becomes "fund-lead", with investigation and cleanup of OU4, OU5, OU6, and OU7 performed using government funds.

5.0 SITE CHARACTERISTICS

5.1 Conceptual Site Model

A conceptual site model (CSM) is a three-dimensional picture of site conditions that illustrates contaminant sources, release mechanisms, exposure pathways, migration routes and potential human and ecological receptors. The CSM documents current and potential future site conditions and is supported by maps, cross sections and site diagrams that illustrate what is known about human and environmental exposure through contaminant release and migration to potential receptors.

The FS Report includes diagrams that summarize how contamination moves from sources to environmental media and to potential human receptors and ecological receptors. Figure 11 illustrates a conceptual site exposure model summarizing the potential exposure pathways to soils for receptors in OU3.

5.2 Overview of the Site

The former KMCC facility is about 90 acres (Figure 1). There are no known sites of archaeological or historical importance on the Former Main Plant Area, the 3.7-Acre Parcel, or the Pine Yard. The Site is underlain by two Class IIB primary water-bearing units, the alluvial aquifer and the Eutaw Formation (Figure 3). The shallowest water-bearing unit is the alluvial aquifer, with depth to groundwater typically between about 3 feet and 8 feet below ground surface in wells in OU3.

The groundwater flow direction in the alluvial aquifer is southeasterly. Pumping of recovery trenches in the Southern Former Main Plant Area (OU3) locally affects groundwater flow direction in the alluvial aquifer, as discussed below.

The alluvial aquifer is underlain by the Upper Eutaw Formation, which consists primarily of fine silty sand that is less permeable than the alluvial aquifer. A lower relative hydraulic conductivity of the Upper Eutaw Formation limits vertical migration of site contaminants (DNAPL and

dissolved-phase contaminants) from the alluvial aquifer to the Upper Eutaw Formation. The groundwater flow direction of the Upper Eutaw Formation is to the southeast.

Potable water is supplied by Columbus Light & Water via four public water supply wells. The wells are located about 200 feet to 750 feet east of the Pine Yard. These wells are completed within the Coker Formation, more than 800 feet below ground surface. Site-related groundwater contamination is limited to the shallow aquifer. KMCC facility operations did not affect the water supply wells.

A groundwater and DNAPL recovery system is present in the Southern Former Main Plant Area (OU3) (Figures 4 and 8) which was constructed to contain the dissolved plume for RCRA corrective action purposes under a HSWA permit issued in 1995 and conveys treated wastewater to the POTW, namely the Columbus Light & Water sanitary sewer system for secondary treatment at the wastewater treatment plant under water pollution control permit number MSP090021.

The Multistate Trust sought termination from the EPA of the HSWA permit in 2019. The EPA approved the termination because the facility was placed on the NPL in 2011. The Multistate Trust operates the groundwater extraction system under the oversight of the EPA's Superfund Program. A water pollution control permit number MSP090021, which was previously held by Tronox LLC and the Kerr McGee Chemical Corporation has been issued to the Multistate Trust that allows the treated wastewater to be sent to the POTW. The recovery system, installed by KMCC and operated now by the Multistate Trust involves:

- Removal of groundwater via level-activated pumps installed in recovery wells and in sumps connected to recovery trenches.
- Treatment of groundwater through physical separation of DNAPL.
- Discharge of the separated groundwater stream to the Columbus Light & Water sanitary sewer system for secondary treatment at the wastewater treatment plant.
- Storage and disposal of recovered DNAPL.

The recovery system, as originally constructed in 1990, included 12 recovery wells (RW1–RW7 and RW9–RW13) and three recovery trenches (Trench 1a, Trench 1b and Trench 2). Groundwater and DNAPL is pumped to a pipeline that conveys the stream to the groundwater treatment building. Treated groundwater is then discharged to the sanitary sewer system, pursuant to Mississippi water pollution control permit number MSP090021. The separated DNAPL is stored in a tank before being taken to an off-site facility for disposal.

The full recovery system (i.e., all 12 wells and three recovery trenches and sumps) operated until 2003, when it was modified to include pumping from 10 of the recovery wells. Based on a system evaluation, the recovery system operation was further modified to pumping from wells RW11 and RW12 to provide hydraulic control at the southeast end of the former KMCC facility and pumping of Trenches 1a and 1b via sumps MH1 and MH2 to provide DNAPL recovery and hydraulic control in the vicinity of the former process area where the largest DNAPL impacts are located.

The system was temporarily shut down in June and July 2020 due to leaks and the poor condition of aging conveyance piping. In order to prevent future leaks, an interim, above-ground conveyance system was constructed that conveys extracted groundwater from MH1 and MH2 (Trenches 1a and 1b) to the groundwater treatment building. Extraction from wells RW-11 and RW-12 was discontinued at this time in accordance with the approved work plan. The groundwater extraction system was reactivated in August 2021. Through October 2022, pumping from sumps MH1 and MH2 produced about 23 gallons per minute (compared to an estimated 36 gallons per minute when all 12 recovery wells were in use).

From December 2003 to August 2009, available records from KMCC suggest the system extracted 92.6 million gallons of groundwater and recovered 19,000 gallons of DNAPL. From October 2018 to October 2019, the system generated 2,500 gallons of DNAPL per 11.8 million gallons of water. These data indicate a very low DNAPL recovery efficiency – 0.0002 gallon of DNAPL per gallon of groundwater.

5.3 Sampling Strategy

Multiple investigations have been conducted at the Site dating back to the 1988 RCRA facility investigation. Sampling related to OU3 includes TarGOST and soil borings, surface soil (0-2 feet bgs), subsurface soil (2-8 feet bgs) and groundwater. The Phase II RI Report presents a comprehensive evaluation of the data collected up until 2017 to characterize environmental conditions at the former KMCC facility. Additional supplemental soil data were collected in OU3 in 2019.

5.4 Known or Suspected Sources of Contamination

The historical operations and waste management activities that were potential sources of contamination to media in OU3 are labelled in Figure 4 and include:

- The wood-treating-related processes in the Southern Former Main Plant Area (OU3) that included, but were not limited to, retorts, sumps, drip collection tanks, work tanks and a drip track/pad.
- The tank farm in the Southern Former Main Plant Area (OU3) that included storage tanks, sap tank, vapor tank and sump, and sumps associated with chemical unloading.
- The creosote recovery and wastewater treatment systems, including the primary and secondary oil-water separators.
- The two surface impoundments, Aeration Impoundment (SWMU 28) and Sedimentation Impoundment (SWMU 29), which have been closed under RCRA in the western part of the Former Main Plant Area (OU3).
- Based on anecdotal reports from former plant employees, a fire prior to the shutdown in KMCC operations, reportedly destroyed a building in the Former Main Plant Area known to have stored PCP. Smoke and debris from the fire may have contributed to a release of dioxins and furans to the air.

5.5 Nature and Extent of OU3 Contamination

5.5.1 Soils

Consistent with the location of former operations at the Site, visible evidence of creosote-related impacts was recorded during a 2017 trenching investigation across much of the Southern Former Main Plant Area (OU3). The creosote-related impacts and stained soils in OU3 were observed where wood-treating operations, drip tracks, and treatment solution storage tanks were located. Creosote was observed in unsaturated soil typically as dried, asphalt-like materials (Figure 10). Debris (e.g., treated wood timbers) is frequently present at shallow depths. Soil samples were collected from OU3 during sampling investigations performed by KMCC and the Multistate Trust between August 1996 and April 2019 (Table 2-1 of the FS). The data show a distribution of COCs in the Former Main Plant Area that is consistent with the observations from the 2017 trenching study.

As shown in Figure 9, sample results show that COCs are present in surface soils in multiple locations within OU3 at concentrations that exceed the screening levels for industrial/commercial worker exposures. The exceedances of the PAH industrial/commercial screening levels occur sporadically in surface soils across much of OU3. COC concentrations in subsurface soil samples (2–8 ft bgs) exceed the screening levels. Although the subsurface soil data set is more limited than the surface soil data set, the available data indicate that the exceedances are more isolated in subsurface soils than in surface soils.

5.5.2 DNAPL

RI soil boring and TarGOST investigations in 2017 found DNAPL and related contamination (e.g., stained soils, isolated observations of residualized DNAPL) below the groundwater table beneath much of OU3. Two general DNAPL source areas were identified in OU3 based on the observed distribution of DNAPL-related impacts – the primary source area and the secondary source area:

- Primary Source Area (Figure 5): The majority of the DNAPL-related impacts are on the southwest side of OU3 in the alluvial aquifer beneath the former process area and the 3.7-acre parcel. DNAPL-related impacts are most frequently observed beneath the former process area and occur discontinuously across the full thickness of the alluvial aquifer. The groundwater extraction system wells and trenches are in the primary source area. At present, there is no evidence of a significant contiguous pool of DNAPL. The 3.7-acre parcel was not used for site operations, and there is no evidence of DNAPL-related impacts in overlying soils. DNAPL-related impacts beneath the 3.7-acre parcel are observed primarily at depth in the alluvium aquifer. As a result, the DNAPL-related impacts at depth in the 3.7-acre parcel are likely the result of historical southerly migration of DNAPL at depth from the former process area. Collectively, discontinuous DNAPL-related impacts were observed across an estimated 269,400 cubic yards of soil in the primary source area.
- Secondary Source Area (Figure 6): DNAPL-related contamination was also observed in soil and TarGOST borings east of the former process area and the primary source area.

These DNAPL-related impacts are more limited than the impacts observed in the primary source area, occurring as isolated pockets of stained soils and residualized DNAPL. The secondary source area spans an estimated area of 5.5 acres and encompasses a total volume of 221,800 cubic yards of alluvial soils.

5.5.3 Groundwater

Groundwater contamination in OU3 is present mostly in the immediate vicinity of the subsurface DNAPL impacts. Figure 7 shows the groundwater plume levels in the shallow alluvial aquifer. The influence of the groundwater recovery system both in removing DNAPL source material and extracting groundwater is responsible for the current distribution of contamination in the aquifer. The mobility of COCs in groundwater is also limited due to the chemical characteristics of the COCs (e.g., low solubility, high partitioning coefficients). The potential exposure of humans through vapor intrusion will be addressed in this decision document. Longer term, the goal of restoring groundwater to beneficial use under OU3 will be addressed by a future decision document for OU6 (groundwater).

5.5.4 Contaminants of Concern

The contaminants of concern (COCs) are characterized by low solubility and a strong affinity for organic matter in soils. As a result, the COCs strongly associate with the solid phase (i.e., soils, sediments, suspended particulates in surface water) and have very limited potential for transport in water. The COCs are nonvolatile under typical environmental conditions, with the exception of naphthalene, which has low to moderate volatility. Many of the COCs are subject to degradation via abiotic and biotic (e.g., microbial) processes; however, the rate of degradation is often slow. Tables 1 and 2 include OU3 sampling results.

Table 1. OU3 Surface Soils (0-2 feet bgs)

Analyte	Number of Samples	Median (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)
Arsenic	17	6.5	1.8	269
Benzo[*a*]anthracene	80	2.63	0.0043	1360
Benzo[*a*]pyrene	80	2.335	0.0055	510
Benzo[*b*]fluoranthene	80	5.315	0.007	753
Dibenzo[*a,h*]anthracene	80	0.585	0.0082	39.4
Naphthalene	80	0.363	0.0006	1440
Carbazole	18	0.3	0.033	3870
Pentachlorophenol	74	1.35	0.047	750
Dibenzofuran	16	0.21	0.026	1490

Analyte	Number of Samples	Median (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)
TEQdf	24	0.000389	0.0000279	0.0044
Notes TEQdf = toxicity equivalent concentrations of dioxins and furans				

Table 2. OU3 Sub-Surface Soils (2-8 feet bgs)

Analyte	Number of Samples	Median (mg/kg)	Minimum (mg/kg)	Maximum (mg/kg)
Arsenic	2	44.85	28.5	61.2
Benzo[*a*]anthracene	30	8.15	0.0043	1420
Benzo[*a*]pyrene	30	3.7	0.0055	685
Benzo[*b*]fluoranthene	30	7.145	0.007	1100
Dibenzo[*a,h*]anthracene	30	0.8155	0.0082	95
Naphthalene	30	23.5	0.00889	3030
Carbazole	2	18.7	10.4	27
Pentachlorophenol	25	1.92	0.048	780
Dibenzofuran	2	46.05	42.1	50
TEQdf	2	0.000344	0.0003	0.00039
Notes TEQdf = toxicity equivalent concentrations of dioxins and furans				

5.5.5 Amount of Waste to be Addressed

Although the DNAPL and DNAPL-related impacts are discontinuous and do not constitute a contiguous DNAPL pool, they represent a source of COCs to groundwater across an estimated area of 12.2 acres and span a volume of 490,000 cubic yards of soils.

5.5.6 Concentrations of COCs

Section 7.1 describes contaminant concentrations.

5.5.7 RCRA Hazardous Waste and Affected Media

The historical wood treating related processes in OU3 resulted in the releases of RCRA listed hazardous waste F032 (pentachlorophenol-based) and F034 (creosote-based) as specified in

40 CFR § 261.31 *Hazardous wastes from non-specific sources* that includes "wastewaters…process residuals, preservative drippage, and spent formulations from wood preserving processes." These listed wastes do not include RCRA listed waste K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol. DNAPL and highly contaminated soil removed from the ground with elevated concentrations of PCP would likely exhibit the toxicity characteristic if PCP concentrations exceed the specified regulatory level (based on the TCLP) and thus deemed toxicity characteristic waste (D037) under 40 CFR § 261.24 *Toxicity characteristic*. Such DNAPL and highly contaminated soil in the former production areas as may also be deemed as F034 and/or F032 depending on the presence of regulated RCRA hazardous constituents. Soil contaminated with these RCRA constituents would be viewed as containing RCRA wastes F032/F034 unless determined by the EPA to "no longer contain" per its policy. In addition, the former surface impoundments [Aeration Impoundment (SWMU 28) and Sedimentation Impoundment (SWMU 29) which have been closed under RCRA] located in the western portion of the Former Main Plant Area contained RCRA listed waste K001 which was released into the subsurface and are suspected sources of groundwater contamination.

If soils or other waste is to be disposed off-site, it would be characterized to determine whether constitutes RCRA hazardous waste (contains RCRA Listed hazardous waste or is considered RCRA toxicity characteristic waste) and managed in accordance with identified ARARs.

5.6 Location and Potential Routes of Migration

5.6.1 Lateral and Vertical Extent of Contamination

Evidence of DNAPL-related impacts has been documented within the shallow alluvial aquifer beneath the primary source area. The DNAPL-related impacts are discontinuous, and data obtained to date provide no evidence of a significant contiguous pool of DNAPL. DNAPL impacts observed within the secondary source area are more limited than those in the primary source area, occurring as isolated pockets (or "stringers") of DNAPL-related contamination scattered both laterally and vertically within the shallow alluvial aquifer.

5.6.2 Potentially Affected Populations

The risk assessment evaluated several receptor groups that may use the OU3 property currently or in the future, including:

- Trespasser (teenager, adult) – current and future.
- Indoor workers – future.
- Construction, excavation, or maintenance worker (adult) – future.
- Hypothetical resident (child, adult) – future.

No ecological receptors have been identified.

5.7 Groundwater Contamination

5.7.1 Affected Aquifers

The Site is underlain by two Class IIB primary water-bearing units, the alluvial aquifer and the Eutaw Formation (Figure 3). The shallowest water-bearing unit is the alluvial aquifer, with depth to groundwater typically between about 3 feet and 8 feet below ground surface in wells in OU3. Both aquifers are considered EPA Class IIB per EPA's 1986 guidance Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy.

Naphthalene groundwater concentrations in the alluvial aquifer exceed vapor intrusion screening levels by several orders of magnitude, indicating a potential inhalation risk to a future resident or indoor worker through the vapor intrusion pathway.

The alluvial aquifer is underlain by the Upper Eutaw Formation, which consists primarily of fine silty sand that is less permeable than the alluvial aquifer. A lower relative hydraulic conductivity of the Upper Eutaw Formation limits vertical migration of site contaminants (DNAPL and dissolved-phase contaminants) from the alluvial aquifer to the Upper Eutaw Formation.

5.7.2 Affected Groundwater

The groundwater flow direction in the alluvial aquifer is southeasterly. Pumping of recovery trenches in the Southern Former Main Plant Area (OU3) locally affects groundwater flow direction in the alluvial aquifer, as discussed below. The groundwater flow direction of the Upper Eutaw Formation is to the southeast.

5.7.3 Surface Contamination Interconnections

Particulate-bound COCs can be mobilized from the soil surface through wind or water erosion: rainfall and stormwater flow can erode surface soils and transport associated COCs to ditches that drain from the Site, and high winds can mobilize COCs in dust associated with surface soils. The flat topography of the Site limits the potential for runoff volumes and velocities sufficient to erode surface soils. Further, much of the Site surface soil is hard packed as a result of decades of industrial activity, which further limits the potential for water or wind erosion. As a result, the potential for COC transport from soils in the Former Main Plant Area via these mechanisms is low.

COCs in the unsaturated zone soils can be mobilized to groundwater as a result of dissolution into and downward transport with infiltrating rainwater. Although COC concentrations in surface soils exceed soil screening levels protective of groundwater drinking water quality, the Site data indicate that soil leaching is not a significant source of COCs to groundwater compared to the contribution of residual DNAPL contamination.

5.7.4 Non-Aqueous Phase Liquids

The discontinuous nature of observed DNAPL-related impacts at the Site indicates that much of the DNAPL is in a state of residual saturation and is no longer migrating. This conclusion is consistent with the understanding that the majority of the DNAPL is likely related to creosote

releases that took place over several decades and the fact that Site operations ended 18 years ago.

5.7.5 Groundwater Model and Assumptions

The FS Report presents the groundwater modeling performed to support the Feasibility Study and the analysis of hydraulic control by phytoremediation under Remedial Alternatives 3 and 4. A numerical flow model was developed as screening-level tool based on the conceptual site model and available Site investigation data. As a screening-level tool, simplifying assumptions include: each layer is considered homogeneous with respect to aquifer properties, and has a uniform saturated thickness of 14 ft for the alluvial aquifer and 75 ft for the Upper Eutaw.

6.0 CURRENT AND POTENTIAL FUTURE USES

The current and reasonably anticipated future land uses of the Site form the basis for the exposure assumptions that are used for the risk assessment. They are considered in the development of remedial objectives and remedial alternatives, and in the selection of the appropriate remedial action.

The former KMCC facility property is currently owned by the Multistate Trust. Nearby land use is mixed and includes industrial, commercial, and residential land uses.

Two structures are still present on the Former Main Plant Area: the former office building (currently referred to as the “Community Resource Building”) located in the northwest corner; and the groundwater treatment building, located in the center. Other features remaining at the former KMCC facility include the closed former surface impoundments; several concrete pads and foundations; groundwater monitoring wells; abandoned utility lines; and the wells, trenches, and conveyance infrastructure of the DNAPL recovery system. The Pine Yard has no structures present. Public access to the Former Main Plant Area, the 3.7-Acre Parcel, and the Pine Yard is restricted by fencing that encloses the entirety of each portion of the former KMCC facility.

The current zoning for the Former Main Plant Area (OU3) is primarily light industrial (I-2) and heavy industrial (I-3), with the exceptions of a 3.7-acre parcel that is primarily zoned general agricultural (A-1) and an approximately 30- to 150-ft-wide strip on the western Site boundary that is zoned single family residential (R-1).

Determining future land use includes input from stakeholders like the community and the property owner, the Multistate Trust. One of the Multistate Trust’s responsibilities is to ultimately sell or transfer the Site to an entity that can assume long-term responsibility for the Site and implement reuses that are protective of and beneficial to the community. As a result, there is some uncertainty about the future land use of OU3 and the rest of the Trust’s property. For the purposes of estimating risks in OU3, the EPA used the reasonably anticipated future land use of industrial or commercial. Based on community input on land uses, the EPA anticipates that in the future, the community may support recreational land uses such as walking trails in OU3. Industrial or commercial workers spend more time on a site than

someone using a walking trail, so the EPA expects that the industrial/commercial land use assumption will also be protective for people using walking trails.

6.1 Groundwater Uses

Potable water is supplied by Columbus Light & Water via four public water supply wells. The wells are located about 200 feet to 750 feet east of the Pine Yard. These wells are completed within the Coker Formation, more than 800 feet below ground surface. Site-related groundwater contamination is limited to the shallow aquifer. KMCC facility operations did not affect the water supply wells.

Groundwater use in OU3 is currently restricted while the Site is owned by the Multistate Trust by the Settlement Agreement, which serves as an "enforcement tool with institutional control components".

7.0 SUMMARY OF SITE RISKS

Risk assessments were conducted to determine the current and future effects of contaminants on human health and the environment. The results of the risk assessment provide the basis for taking action and identify contaminants and exposure pathways that need to be addressed by the remedial action.

The Multistate Trust conducted risk assessments to evaluate the potential human health and ecological risks from exposure to chemicals detected at OU3. The August 2018 Human Health Risk Assessment (2018 HHRA) evaluated current exposure to trespassers and potential exposure to residents, indoor workers, outdoor workers, and construction workers. The 2018 HHRA considered all soil data collected at the Site through 2017. Additional soils data were collected in 2019 to refine the 2018 HHRA. The OU3 and OU5 FS Report presents the 2019 results and incorporates them with the results of the 2018 HHRA.

7.1 Human Health Risk Assessment

The human health risk assessment estimates what risks the Site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

The human health risk assessment uses a four-step process to assess site-related human health risks.

- Hazard Identification uses the analytical data collected to identify the contaminants of potential concern (COPCs) at the Site for each medium.
- Exposure Assessment estimates the magnitude of actual and/or human exposures, the frequency and duration of the exposures, and the pathways by which humans are potentially exposed.
- Toxicity Assessment determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposures (dose) and severity of adverse health effect (response).

- Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

7.1.1 Hazard Identification

The HHRA considered soil and groundwater data collected during the RI and supplemental sampling in 2019.

OU3 surface and subsurface soil contaminants include arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, naphthalene, carbazole, pentachlorophenol, dibenzofuran, and dioxins. Groundwater contamination in OU3 exceeds MCLs.

7.1.2 Exposure Assessment

The 2018 HHRA evaluated exposures to surface (0 feet to 2 feet below ground surface) and subsurface soils (2 feet to 8 feet below ground surface) separately to inform site management decisions for soils from these two depth intervals more clearly.

The HHRA evaluated exposure to trespassers under current conditions, and potential exposures of residents, indoor workers, outdoor workers, and construction workers to soils and groundwater under future use conditions.

7.1.3 Toxicity Assessment

The toxicity assessment summarizes the health effects that may be associated with exposure to the COPCs selected for the risk assessment and identifies doses that may be associated with those effects. It involves evaluating the potential for a constituent to cause an increase in the incidence of adverse effects in exposed individuals and quantitatively characterizing the chemical dose and the incidence of adverse health effects in the exposed receptor. The potential toxicological effects induced by a given dose of a chemical are classified as either non-cancer effects or cancer effects. Toxicity values typically employed to carcinogenic hazards include reference doses for oral and dermal exposures and reference concentrations for inhalation exposures; oral and dermal cancer slope factors and inhalation unit risks are typically toxicity values were used to calculate potential effects for these two types of effects. Following EPA guidance, an age-dependent adjustment factor was applied when evaluating early-life exposures to mutagenic chemicals. Toxicity criteria were selected according to EPA's standard hierarchy and are presented in Appendix D of the 2018 HHRA.

7.1.4 Risk Characterization

The EPA considers two types of risk: cancer risk and noncancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound probability, for example, a "1 in 10,000 chance". In other words, for every 10,000 people that could be exposed, one extra cancer may occur because of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For noncancer health effects, the EPA calculates a "hazard index". The key concept is that a "threshold level" (measured as a hazard index of less than 1) exists below which noncancer health effects are no longer predicted. A CERCLA response action is generally

warranted when cancer risk is greater than 1 x 10^{-4} or when noncancer health effects are greater than a hazard index of 1.

The OU3 and OU5 FS Report summarizes the results from the 2018 HHRA, updated with data from 2019 sampling. The contaminants posing unacceptable risks for outdoor workers in surface soil are arsenic, dioxins and furans (expressed as toxicity equivalent concentrations of dioxins and furans TEQ_{df}), carcinogenic PAHs, pentachlorophenol, carbazole, and dibenzofuran. There are unacceptable risks for construction workers from exposure to OU3 subsurface soils contaminated with arsenic, benzo[a]pyrene, naphthalene, pentachlorophenol, dibenzofuran, and TEQ_{df}. Table 3-2 from the OU3 and OU5 FS Report presents the exposure point concentrations used in the 2018 HHRA and the new data collected in 2019. The maximum concentrations detected in 2019 were: arsenic, 269 mg/kg; TEQ_{df}, 2,270 ng/kg or 0.00227 mg/kg; benzo[a]pyrene, 120 mg/kg; and pentachlorophenol, 41.7 mg/kg. The OU3 and OU5 FS Report concludes that in OU3, there are unacceptable risks for residents, outdoor workers, and construction workers from exposure to OU3 surface soils contaminated with the OU3 COCs (arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, naphthalene, carbazole, pentachlorophenol, dibenzofuran, and dioxin). Risk levels and hazard indexes are summarized below.

Table 3. Risk Levels and Hazard Indexes for OU3 (Southern Former Main Plant Area) Soils (from OU3 and OU5 FS Report)

Receptor	Excess Lifetime Cancer Risk	Noncancer HI
Resident	$2x10^{-3}$	50
Outdoor Worker	$2x10^{-4}$	4
Indoor Worker	$1x10^{-4}$	1
Construction Worker (Surface)	$3x10^{-5}$	10
Construction Worker (Subsurface)	$4x10^{-5}$	10
Trespasser	$4x10^{-5}$	1

Note: For the resident, the noncancer HI for the child, which is higher than that for the adult, is shown.

The HHRA also evaluated the potential future resident or worker exposure to groundwater based on ingestion of and dermal contact with tap water and inhalation of volatiles from tap water. The HHRA concluded that exposure to COCs in groundwater via these pathways would result in an unacceptable risk. Numerous COCs were identified for groundwater in the HHRA, with naphthalene identified as the primary COC based on contribution to cumulative risk. Naphthalene concentrations more than 30,000 µg/L are present in OU3, exceeding EPA's tap water regional screening level (0.12 µg/L) beneath the primary source area and much of the secondary source area. Pentachlorophenol concentrations more than 3 mg/L in OU3 exceed the

federal Safe Drinking Water Act Primary Drinking Water Standards Maximum Contaminant Level (MCL) of 1 mg/L.

The HHRA used EPA's VISL Calculator to evaluate risks to indoor workers based on the vapor intrusion pathway. The HHRA estimated a noncancer HI of 2 for indoor workers, mostly due to potential exposure to naphthalene.

7.2 Ecological Risk Assessment

The 2020 sitewide baseline ecological risk assessment identified no ecological habitat within the Former Main Plant Area.

7.3 Basis for Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The hazardous substances in OU3 include the following contaminants of concern (COCs) associated with the releases of wastes from historical wood preserving operations including but not limited to creosote, pentachlorophenol (PCP), benzo[*a*]pyrene, naphthalene, dioxins, and furans.

8.0 REMEDIAL ACTION OBJECTIVES

RAOs are specific goals to protect human health and the environment. They address contaminated media, exposure pathways and are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific, risk-based levels.

The FS identified four RAOs to address OU3 and OU5. After reevaluating the sitewide approach, EPA has removed OU5 from this ROD. Therefore, RAO 1 from the FS and Proposed Plan which was specific to OU5 has been removed.

This ROD identifies the following three RAOs for the OU3 remedial action:

- RAO 1: Prevent exposure of outdoor and construction workers via inhalation, incidental ingestion and/or dermal adsorption to COCs in OU3 surface and subsurface soils above cleanup levels.
- RAO 2: Prevent the migration of COCs from OU3 surface soils through stormwater runoff or wind dispersion of fugitive dust.
- RAO 3: Prevent COCs in OU3 source areas (containing DNAPL and residual contamination) from migrating to the groundwater outside of OU3 source areas.
  This RAO will be achieved by maintaining (on average) a lower elevation water table inside the OU3 source area than outside.
- RAO 4: Prevent exposure of future building occupants to indoor air vapors via vapor intrusion (from groundwater or soil gas) containing Site COCs at concentrations that exceed EPA's acceptable risk range of 1×10^{-4} and 1×10^{-6} or have a non-carcinogenic risk greater than an HI of 1.

Groundwater restoration is not an objective for this OU3 remedy, but this source control remedial action will improve groundwater quality outside of OU3 and will contribute to the eventual restoration of groundwater contaminated by the Site, which will be the subject of a future remedy.

8.1 Cleanup Levels

The anticipated future land use for OU3 is industrial/commercial or other uses consistent with cleanup levels based on industrial/commercial exposure assumptions. Because industrial or commercial workers spend more time on a site than someone using a walking trail, the EPA expects that the industrial/commercial cleanup levels will also be protective for people using walking trails. Cleanup levels for OU3 surface soils are listed in Table 4. The EPA is selecting cleanup levels for commercial/industrial exposure to surface soil, construction worker exposure to subsurface soils, and a cleanup level for surface soil used as fill dirt or cover soil. The cleanup levels in Table 4 are to be used to determine the extent or "cut lines" of actions in OU3. The cleanup levels in Table 5 are to be used in determining appropriate back fill or cover soil – these lower concentrations are based on a cancer risk level of 1×10^{-6} for carcinogenic PAHs and will result in a lower residual risk level post-remediation for the anticipated future land uses.

- The cleanup levels for TEQdf are based on an HI of 1, which corresponds to cancer risk level of approximately 1×10^{-5}, which is within EPA's range of acceptable cancer risk. For commercial/industrial exposure to surface soil, the TEQdf cleanup level is 0.00072 mg/kg. At this Site, there is also a site-specific cleanup level for construction worker exposure to subsurface soils of 0.00023 mg/kg that was developed based on a target non-cancer risk at an HI of 1.
- The cleanup level for arsenic is 30 mg/kg and corresponds to a cancer risk level of 1×10^{-5}. The site-specific background for arsenic is 8 mg/kg. A cleanup level for arsenic based on a 10^{-6} cancer risk level would be 3 mg/kg, which is below background concentrations. Consistent with EPA guidance, Role of Background in the CERCLA Cleanup Program, cleanup levels generally should not be set at values below natural or anthropogenic background.
- The cleanup levels for carcinogenic PAHs and pentachlorophenol are based on site-specific risk-based calculations using the exposure pathways for outdoor and construction workers. Consistent with the cleanup levels selected in OU1, a cancer risk level of 1×10^{-5} was used to calculate the Table 4 cleanup levels for carcinogenic PAHs to be used in determining the extent of actions or "cut lines".
- Soil used as fill dirt or cover soil placed at the surface must meet the more stringent cover soil cleanup levels in (Table 5) which are based on a cancer risk level of 1×10^{-6} for carcinogenic PAHs, an HI of 1 for TEQdf to protect future construction workers, and a cancer risk level of 1×10^{5} for arsenic due to background concentrations.

Table 4. OU3 Cleanup Levels

OU3 Cleanup Levels[1]				
	Surface Soil		Subsurface Soil	
Soil COC	Value (mg/kg)	Basis	Value (mg/kg)	Basis
Arsenic[2]	30	ELCR = 1 x 10^{-5}	96	HI=1 Construction worker
Benzo[*a*]anthracene[1]	210	ELCR = 1 x 10^{-5}	--	--
Benzo[*a*]pyrene[1]	21	ELCR = 1 x 10^{-5}	24	HI=1 Construction worker
Benzo[*b*]fluoranthene[1]	210	ELCR = 1 x 10^{-5}	--	--
Naphthalene[1]	170	ELCR = 1 x 10^{-5}	540	HI=1 Construction worker
Carbazole[3]	960	see note	--	--
Pentachlorophenol[1]	40	ELCR = 1 x 10^{-5}	200	HI=1 Construction worker
Dibenzofuran	1,000	HI=1 Outdoor worker	250	HI=1 Construction worker
TEQdf [4]	0.00072	EPA policy	0.00023	Site Specific HI=1 Construction worker

Notes:

ELCR = excess lifetime cancer risk HI = hazard index

mg/kg = milligrams per kilogram

TEQdf = toxicity equivalent concentrations of dioxins and furans

1. The cleanup levels for carcinogenic PAHs and PCP are site-specific risk-based calculations using the exposure pathways and for outdoor and construction workers. Consistent with the cleanup levels selected in OU1, a cancer risk level of 1 x 10^{-5} was used to calculate the cleanup levels for carcinogenic PAHs.
2. The site-specific background for arsenic is 8 mg/kg. A cleanup level for arsenic based on a 10^{-6} cancer risk level would be 3 mg/kg, which is below background concentrations. Consistent with EPA guidance, Role of Background in the CERCLA Cleanup Program, cleanup levels generally should not be set at values below natural or anthropogenic background.
3. Carbazole has not been classified by the EPA for carcinogenicity and there is no cancer slope factor for carbazole in the EPA's Integrated Risk Information System (IRIS). The evaluation of carbazole as a potential carcinogen in the risk assessment was developed using a Tier 3 toxicity value, and as such is uncertain, and not typically considered in cleanup level development. The development of the cleanup level for carbazole at this site errs on the side of caution for the protection of human health.
4. The cleanup levels for TEQdf are based on an HI of 1, which corresponds to cancer risk level of approximately 1 x 10^{-5}, which is within EPA's range of acceptable cancer risk. For commercial/industrial exposure to surface soil, the TEQdf cleanup level is 0.00072 mg/kg. At this Site, there is also a site-specific cleanup level for construction worker exposure to subsurface soils of 0.00023 mg/kg that was developed based on a target non-cancer risk at an HI of 1.

Table 5. OU3 Soil Cover Cleanup Levels

OU3 Soil Cover Cleanup Levels		
	Soil Cover	
Soil COC	Value (mg/kg)	Basis
Arsenic[1]	30	ELCR = 1 x 10^{-5}
Benzo[*a*]anthracene[2]	21	ELCR = 1 x 10^{-6}
Benzo[*a*]pyrene[2]	2.1	ELCR = 1 x 10^{-6}
Benzo[*b*]fluoranthene[2]	21	ELCR = 1 x 10^{-6}
Dibenzo[a,h]anthracene[2]	2.1	ELCR = 1 x 10^{-6}
Naphthalene[2]	17	ELCR = 1 x 10^{-6}
Pentachlorophenol[2]	4	ELCR = 1 x 10^{-6}
Dibenzofuran	250	HI=1 Construction worker
TEQ_{df} [3]	0.00023	Site Specific HI=1 Construction worker

Notes:

ELCR = excess lifetime cancer risk HI = hazard index

mg/kg = milligrams per kilogram

TEQdf = toxicity equivalent concentrations of dioxins and furans

1. The cover soil cleanup levels are based on a cancer risk level of 1 x 10^{-5} for arsenic due to background concentrations.
2. The cover soil cleanup levels are based on a cancer risk level of 1 x 10^{-6} for carcinogenic PAHs and Pentachlorophenol.
3. The cleanup levels for TEQdf are based on an HI of 1, which corresponds to cancer risk level of approximately 1 x 10^{-5}, which is within EPA's range of acceptable cancer risk. For commercial/industrial exposure to surface soil, the TEQdf cleanup level is 0.00072 mg/kg. At this Site, there is also a site-specific cleanup level for construction worker exposure to subsurface soils of 0.00023 mg/kg that was developed based on a target non-cancer risk at an HI of 1.

9.0 DESCRIPTION OF ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1) mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ treatment as a principal element to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d)(2) of CERCLA, 42 U.S.C. § 9621(d) further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

The FS Report details how possible response actions and technologies were identified, screened, and assembled into the remedial action alternatives. The first step screened remediation technologies based on technical implementability. For OU3, nine remediation technologies were identified:

- DNAPL Recovery
- Engineered Soil Cover
- RCRA Cap
- Vertical Barrier Wall
- Phytoremediation
- In Situ Treatment
- Removal and Disposal
- Institutional Controls
- Monitoring

The OU3 and OU5 FS Report then combined and grouped the remediation technologies into 10 remedial alternatives, including the “No Action” alternative (Alternative 1). These alternatives provide a range of options for achieving the RAOs and complying with ARARs. Remedial Alternatives included:

- Alternative 1: No Action
- Alternative 2: DNAPL Recovery and Engineered Soil Cover
- Alternative 3: Downgradient Barrier Wall, Phytoremediation, and Engineered Soil Cover
- Alternative 4: Barrier Wall Isolation of Source Areas, Phytoremediation, and Engineered Soil Cover
- Alternative 5: In Situ Stabilization of Source Areas and Engineered Soil Cover
- Alternative 6: In Situ Stabilization of Former Drip Track Soils, Removal and Disposal of Surface Soils and Source Area Soils
- Alternative 7: Bio-oxidation of Source Areas and Engineered Soil Cover
- Alternative 8: Steam Enhanced Extraction of Source Areas and Engineered Soil Cover
- Alternative 9: Removal of Surface Soils and Source Area Soils
- Alternative 10: RCRA Cap over Source Areas and Engineered Soil Cover.

OU3 Remedial Action Alternatives

Of the 10 remedial alternatives, the FS Report retained six remedial alternatives for detailed evaluation for OU3. This ROD summarizes the detailed evaluation of remedial alternatives from the FS Report and maintains their numbering to correspond with the FS Report. OU3 Remedial Alternatives retained for detailed evaluation included:

- Alternative 1: No Action
- Alternative 3: Downgradient Barrier Wall, Phytoremediation, and Engineered Soil Cover
- Alternative 4: Barrier Wall Isolation of Source Areas, Phytoremediation, and Engineered Soil Cover
- Alternative 5: In Situ Stabilization of Source Areas and Engineered Soil Cover
- Alternative 9: Removal of Surface Soils and Source Area Soils
- Alternative 10: RCRA Cap over Source Areas and Engineered Soil Cover.

Terminology used to describe and differentiate the alternatives are described further below:

- Capital costs are those expenditures that are required to construct a remedial alternative.
- Operational & maintenance (O&M) costs are those post-construction costs necessary to ensure or verify the continued effectiveness of a remedial alternative. They are estimated on an annual basis.
- Indirect costs are the project and construction management costs necessary for the management of the remedial action as well as costs associated with institutional controls.
- Present value represents the amount of money which, if invested in the current year, would be sufficient to cover all the costs over time associated with a project, calculated using a discount rate of 7% and a 30-year time interval.
- Construction timeframe is the time required to construct and implement the alternative. It does not include the time required to design the remedy, negotiate performance of the remedy with the PRPs, or procure contracts for design and construction.

9.1 Common Elements and Distinguishing Features of Each Alternative

Institutional controls are common elements of the active remedial alternatives. Institutional controls are administrative measures that, when enforced, protect human health by preventing exposure to contamination. Institutional controls for each alternative include:

- A combination of deed restrictions, zoning restrictions and/or restrictive covenants, to:
- Limit future land use in OU3 to industrial or commercial and certain recreational uses that would protect human health and protect the engineering components of the remedy. Institutional controls would restrict uses such as schools, daycares, and playgrounds where risk is estimated using residential exposure assumptions, unless MDEQ and the EPA approve a proposal that makes a specific use protective.
- Prevent groundwater use for human consumption in OU3 while the groundwater investigation continues. The future remedy for OU6 will address contaminated groundwater and will address the expectation to restore groundwater to beneficial use.

- Require a vapor intrusion assessment and/or vapor mitigation for new building construction, or existing building renovation, expansion or change in use in OU3. The future remedy for OU6 (groundwater) will address the vapor intrusion pathway outside of OU3.
- A Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels. The soil management plan will provide protocols to prevent unacceptable exposure of workers during future soil disturbing activities. These protocols may include: using worker personal protective equipment; planning for soil disturbing activities; screening soil in the field; criteria for handling, reusing, disposing or moving soil; and procedures for how to manage unexpected environmental conditions.

The Feasibility Study and Proposed Plan evaluate a range of alternatives that primarily differ by how they would address unacceptable risks and source areas in OU3. Alternative 5 relies on treatment to address remaining principal threats. Alternatives 3 and 4 combine engineering controls with some treatment until phytoremediation controls water levels (continued groundwater extraction and DNAPL removal using the existing system operated by the Multistate Trust as part of the CERCLA cleanup, which conveys wastewater to the local POTW under water pollution control permit number MSP090021). Alternative 9 and 10 relies mostly on engineering controls. Further distinguishing features between the alternative are discussed below.

9.2 Expected Outcomes of Each Alternative

Alternative 1: No Further Action

Evaluation of the No Action alternative is required under the NCP as a baseline against which all other alternatives are compared. Under this alternative, no remedial actions would take place.

Alternative 3: Downgradient Barrier Wall, Phytoremediation and Engineered Soil Cover (Figure 12)

Downgradient Vertical Barrier Wall: Alternative 3 includes a 3,500-foot-long vertical barrier wall downgradient of the primary and secondary source areas to contain the DNAPL source. For the purposes of the FS, a bentonite slurry wall was assumed. The final type of barrier wall will be determined during the remedial design if the selected remedial alternative includes a barrier wall. The barrier wall would be keyed into the underlying, lower-permeability Eutaw Formation to minimize/prevent DNAPL and groundwater migration under the wall. Soils are not expected to be disposed off-site as a result of the wall installation, but if they were, they would be characterized to determine whether constitutes RCRA hazardous waste (contains RCRA Listed hazardous waste or is considered RCRA toxicity characteristic waste) and managed in accordance with identified ARARs.

Phytoremediation: To address potential groundwater flow issues caused by the barrier wall, Alternative 3 includes planting of appropriate tree species along the inside of the vertical barrier wall. The trees would prevent mounding of groundwater behind the barrier wall and create an inward hydraulic gradient to prevent impacted groundwater from flowing around or

beneath the barrier wall. In addition, phytoremediation would provide limited treatment for dissolved COCs in shallow groundwater through rhizodegradation (the breakdown of contaminants in the soil through microbial activity in the soil around plant roots [the rhizosphere]) and would enhance the effectiveness of this alternative in controlling COC migration.

Engineered Soil Cover: Alternative 3 includes placement of a clean soil cover to address RAOs 2 and 3 by 1) eliminating exposure to OU3 soils with COC concentrations above the OU3 cleanup levels and 2) preventing the migration of COCs from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust. The soil cover would consist of a minimum 1 foot of imported clean fill material, with additional thickness if/as necessary in portions of OU3 to provide the final surface grades needed to reduce infiltration of rainwater, including use of fine-grained soils, surface contouring to facilitate surface runoff, and planting of vegetation to support evapotranspiration. The soil cover would have the added benefit of reducing local recharge of the shallow alluvial aquifer.

Institutional controls are detailed above but would include: 1) a combination of deed restrictions, zoning restrictions and/or restrictive covenants to limit future land use and (while the groundwater investigation continues) prevent groundwater use and require a vapor intrusion assessment and/or vapor mitigation for new or renovated buildings; and 2) a Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels.

Monitoring: Routine monitoring of groundwater quality would be conducted to evaluate the remedy performance with respect to hydraulic control of the groundwater plume, and to monitor the soil cover integrity and the health of the trees. Maintenance of the soil cover would occur as required, and the trees may require replacement on a periodic basis. Typical lifespan for hybrid poplar trees is around 50 years, and monitoring costs would include replacement of all trees over the course of 40 years.

The estimated timeframe for construction completion is six-to-seven months. It is estimated that the trees will take about five years to reach maturity. To prevent mounding of groundwater within the areas enclosed by the barrier wall as the trees grow to maturity and outside of the growing system, the groundwater extraction and treatment system will be operated as needed. Long-term the remedy will require maintaining the appropriate level of groundwater inside the barrier wall. Table 6 presents Alternative 3's estimated costs.

Alternative 4: Barrier Wall Isolation of Source Areas, Phytoremediation and Engineered Soil Cover (Figure 13)

Barrier Wall Isolation of Source Areas: Alternative 4 would include installation of a 4,550-foot-long vertical barrier wall surrounding the primary and secondary source areas. The barrier wall, in combination with the soil cover, would isolate the source areas and prevent DNAPL migration from these areas as well as address direct contact with contaminated surface soils. The barrier wall would be keyed into the underlying, lower-permeability Eutaw Formation to minimize the potential for DNAPL and groundwater to migrate under the wall. Soils are not expected to be

disposed off-site as a result of the wall installation, but if they were, they would be characterized to determine whether constitutes RCRA hazardous waste (contains RCRA Listed hazardous waste or is considered RCRA toxicity characteristic waste) and managed in accordance with identified ARARs.

Phytoremediation: To address potential groundwater flow issues caused by the barrier wall, Alternative 4 includes using plants to maintain a lower groundwater level inside the barrier wall. The phytoremediation pilot study discussed in the FS included poplar, willow, pecan, and peach trees, but other types of trees and plants may be used during remedial action. The trees would prevent mounding of groundwater behind the barrier wall and create an inward hydraulic gradient to prevent impacted groundwater from flowing through or beneath the barrier wall. In addition, phytoremediation would provide limited treatment for dissolved COCs in shallow groundwater through rhizodegradation and contaminant uptake and would enhance the effectiveness of this alternative in controlling groundwater COC migration.

Engineered Soil Cover: Alternative 4 includes placement of a clean soil cover to address RAOs 2 and 3 by: 1) eliminating exposure to OU3 soils with COC concentrations above the OU3 cleanup levels and; 2) preventing the migration of COCs from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust. The soil cover would be designed to manage infiltration of rainwater, including use of fine-grained soils, surface contouring to facilitate surface runoff, and planting of vegetation to support evapotranspiration. The soil cover would have the added benefit of reducing local recharge of the shallow alluvial aquifer. The footprint of the soil cover would include, at a minimum, the entirety of the primary and secondary source areas to manage infiltration to the area enclosed by the vertical barrier wall.

Institutional controls are detailed above but would include: 1) a combination of deed restrictions, zoning restrictions and/or restrictive covenants to limit future land use and (while the groundwater investigation continues) prevent groundwater use and require a vapor intrusion assessment and/or vapor mitigation for new or renovated buildings; and 2) a Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels.

Monitoring: Routine monitoring of groundwater quality would be conducted to evaluate the remedy performance with respect to hydraulic control of the groundwater plume, and to monitor the soil cover integrity and the health of the trees. Maintenance of the soil cover would occur as required, and the trees may require replacement on a periodic basis. Typical lifespan for hybrid poplar trees is around 50 years, and monitoring costs would include replacement of all trees over the course of 40 years.

The estimated timeframe for construction completion is six-to-seven months. It is estimated that the trees will take about five years to reach maturity. To prevent mounding of groundwater within the areas enclosed by the barrier wall as the trees grow to maturity and outside of the growing system, the groundwater extraction and treatment system will be operated as needed. Long-term the remedy will require maintaining the appropriate level of groundwater inside the barrier wall. Table 6 presents Alternative 4’s estimated costs.

Alternative 5: In-situ Stabilization of Source Areas and Engineered Soil Cover (Figure 14)

In-situ Stabilization (ISS) of Source Areas: Alternative 5 includes ISS treatment to bind the contamination in place within the primary and secondary source areas. ISS would create a solid monolith and/or induce a chemical reaction that limits the potential for contamination to be released to groundwater. ISS treatment would involve mixing reagents (e.g., cement and water) and injecting the reagents into the soil through drilled holes and using cranes with large mixers or augers to mix the binding agent throughout the soils in the primary and secondary source areas to the base of the shallow aquifer (i.e., to approximately 25 ft bgs).

Engineered Soil Cover: Alternative 5 includes placement of a clean soil cover across all of OU3 to address RAOs 2 and 3 by 1) eliminating exposure to OU3 soils with COC concentrations above the OU3 cleanup levels and 2) preventing the migration of COCs from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust. The soil cover would have the added benefit of reducing local recharge of the shallow alluvial aquifer because it would be lower in permeability than native soils and graded to encourage runoff to less contaminated areas.

Institutional controls are detailed above but would include: 1. A combination of deed restrictions, zoning restrictions and/or restrictive covenants to limit future land use and (while the groundwater investigation continues) prevent groundwater use and require a vapor intrusion assessment and/or vapor mitigation for new or renovated buildings; and 2. A Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels.

Monitoring: Routine monitoring of the cover integrity and maintenance would be completed as required. In addition, groundwater monitoring would be required to evaluate whether the remedy has been effective at treating sufficient source mass to facilitate restoration of groundwater.

The estimated timeframe for construction completion is 13 to 15 months. The estimated costs for this alternative far exceed the funds originally provided in the environmental cost account (ECA) for the Site. Alternative 5 cannot be implemented with remaining funds in the ECA and would require funding from an alternative funding source. As a result, the overall timeframe for implementation of Alternative 5 is uncertain and would depend on the availability of sufficient funds. Table 6 presents Alternative 5's estimated costs.

Alternative 9: Removal of Surface Soils and Source Area Soils (Figure 15)

Excavation: Alternative 9 includes excavation and disposal of OU3 surface soils exceeding cleanup levels and surface and subsurface soils in the primary and secondary source areas. All concrete and asphalt pads would be removed prior to excavation. Contaminated soils (including DNAPL) to the base of the shallow alluvial aquifer (~25 ft bgs) within the primary and secondary source areas would be excavated. A groundwater extraction and treatment system would be constructed to dewater the excavation below the groundwater table. In addition, surface soils (0–2 ft bgs) outside of the primary and secondary source areas that exceed cleanup levels would be excavated. This area is assumed to exclude the surface impoundments, which were

previously remediated and covered and are not considered to require additional remediation; it would also exclude the area of the Community Resource Building, where soils are covered by the building and parking lot.

Disposal: It is estimated that 35,500 CY of the soils excavated from the area of the former drip track and 20-ft buffer, will be designated as an F032/F034 listed hazardous waste and will require treatment to meet RCRA land disposal restriction treatment standards and then disposal at an EPA-approved, RCRA Subtitle C landfill. It is estimated that 520,000 CY of the soils will be non-hazardous and would require disposal at an EPA-approved, RCRA Subtitle D landfill.

Backfill: Backfill would include placement and final grading of 555,400 CY of imported backfill material suitable for industrial/commercial land use. The alternative includes possible stockpiling and beneficial reuse of OU2 soils as backfill provided the soil meets criteria that the EPA will establish, and the soil is not considered to contain RCRA hazardous waste.

Institutional controls are detailed above but would include: 1. A combination of deed restrictions, zoning restrictions and/or restrictive covenants to limit future land use and (while the groundwater investigation continues) prevent groundwater use and require a vapor intrusion assessment and/or vapor mitigation for new or renovated buildings; and 2. A Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels.

Monitoring: Groundwater monitoring would be required to evaluate whether excavation has been effective at removing sufficient source mass to facilitate restoration of groundwater. No other long-term O&M or post-remedy monitoring would be required.

The estimated timeframe for construction completion is 20 to 25 months. The estimated cost for this alternative far exceeds the funds originally provided in the ECA, and it cannot be implemented with the remaining funds. Therefore, implementation of Alternative 9 would require funding from an alternative funding source (e.g., EPA's Superfund program remedial action budget). The overall timeframe for implementation of Alternative 9 is uncertain and will depend on the availability of funds. Table 6 presents Alternative 9's estimated costs.

Alternative 10: RCRA Cap Over Source Areas and Engineered Soil Cover (Figure 16)

RCRA Cap: Alternative 10 would involve placement, monitoring, and maintenance of a RCRA Subtitle C, multilayer cap (or equivalent) over the primary and secondary source areas. The RCRA cap would isolate any soils in this area that exceed the OU3 cleanup levels and would effectively eliminate infiltration of rainwater to DNAPL and soils in the primary and secondary source areas to prevent leaching of COCs into the groundwater.

Engineered Soil Cover: Alternative 10 includes placement of a clean soil cover outside of the RCRA cap to address RAOs 2 and 3 by 1) eliminating exposure to OU3 soils with COC concentrations above the OU3 cleanup levels and 2) preventing the migration of COCs from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust. The soil cover would be designed to manage infiltration of rainwater, including use of fine-grained

soils and surface contouring to facilitate surface runoff. The soil cover would have the added benefit of reducing local recharge of the shallow alluvial aquifer.

Institutional controls are detailed above but would include: 1. A combination of deed restrictions, zoning restrictions and/or restrictive covenants to limit future land use and (while the groundwater investigation continues) prevent groundwater use and require a vapor intrusion assessment and/or vapor mitigation for new or renovated buildings; and 2. A Soil Management Plan to protect engineering components of the remedy and to prevent exposure of construction and/or remediation workers to COCs above cleanup levels.

Monitoring: Routine monitoring of groundwater quality would be conducted to evaluate the remedy performance.

The estimated timeframe for construction completion is six to nine months. Table 6 presents Alternative 10's estimated costs.

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in Section 121 of CERCLA, 42 U.S.C.§ 9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9), and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of each of the individual response measures per remedy component against each of nine evaluation criteria and a comparative analysis focusing on the relative performance of each response measure against the criteria. This section of the ROD describes the relative performance of each alternative against the nine criteria, noting how each compare to the other options under consideration.

The remedial alternatives summarized in this ROD have been evaluated against the nine decision criteria set forth in the NCP, 40 CFR 300.430(e)(9)(iii). These nine criteria are organized into three categories: threshold criteria, primary balancing criteria and modifying criteria. Threshold criteria must be satisfied in order for an alternative to be eligible for selection. Primary balancing criteria are used to weigh major trade-offs among alternatives. Modifying criteria are taken into account after public comments have been received.

The NCP criteria are:

Threshold Criteria

1) Overall Protection of Human Health and the Environment addresses whether or not an 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 ARARs considers whether or not an alternative will meet all identified federal or more stringent state environmental laws/regulations or whether there is justification for waiving a requirement under CERCLA section 121(d)(4).

Primary Balancing Criteria

3) Reduction of Toxicity, Mobility and Volume through Treatment indicates the EPA's preference for alternatives that include treatment processes to lower or eliminate the hazardous nature of material, its ability to move in the environment, and the amount left after treatment.

4) Long-Term Effectiveness and Permanence considers the long-term effectiveness and permanence of maintaining the protection of human health and the environment after implementing each alternative.

5) Short-Term Effectiveness considers the effect of each remedial alternative on the protection of human health and the environment during the construction and implementation phase.

6) Implementability considers the technical and administrative feasibility of implementing each alternative and the availability of the services and materials required during implementation.

7) Cost considers construction costs as well as long-term O&M costs of each alternative by considering whether costlier alternatives provide additional public health benefits for the increased cost.

Modifying Criteria

8) State Acceptance considers whether the state agrees with, disagrees with, or has no comment on the EPA's preferred alternative.

9) Community Acceptance considers the concerns or support the public may offer regarding each alternative.

The EPA uses the nine criteria to evaluate the remedial alternatives individually and against each other to select a remedy. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration.

10.1 Overall Protection of Human Health and the Environment

Alternative 1 (No Further Action) would not be protective of human health and the environment. It would not achieve RAOs and all estimated risks to human health and the

environment would continue. Because Alternative 1 does not meet this threshold criterion, it will not be assessed further in the comparative analysis.

For OU3, alternatives 3, 4, 5, 9, and 10 would satisfy the RAOs. Alternatives 3, 4, 5, 9 and 10 would protect human health and the environment and achieve RAOs 1 and 2 using removal, treatment, containment and/or institutional controls. These alternatives would prevent migration of DNAPL and COCs in groundwater through mass reduction, treatment and/or containment, satisfying RAO 4. RAO 3 will be achieved by standard construction best practices and per action-specific ARARs.

10.2 Compliance with ARARs

Per CERCLA Section 121(d)(2), remedial actions undertaken at any Superfund site must meet all identified applicable or relevant and appropriate requirements under federal and state environmental laws/regulations or provide a justification for invoking a waiver of those requirements pursuant to CERCLA Section 121(d)(4).

Because Alternative 1 does not meet this threshold criterion, it will not be assessed further in the comparative analysis. Alternatives 3, 4, 5, 9 and 10 would comply with ARARs.

BALANCING CRITERIA

The next five criteria, criteria 3 through 7, are known as “primary balancing criteria.” These criteria are factors by which tradeoffs between response measures are assessed so that the best options will be chosen, given site-specific data and conditions.

10.3 Long-Term Effectiveness and Permanence

Alternatives 4, 5 and 9 rate excellent with respect to the criterion of long-term effectiveness and permanence; Alternative 3 rates good; and Alternative 10 has a poor rating due to the continued flow of groundwater through DNAPL sources. All alternatives would provide an effective long-term remedy to prevent unacceptable risk to future site workers due to exposure to OU3 soils. Thus, the maintenance of engineered controls and implementation of institutional controls would be required to maintain long-term effectiveness and permanence of these remedies.

10.4 Reduction of Toxicity, Mobility and Volume

All alternatives follow the removal of 46,000 gallons of DNAPL, which is a principal threat, from the Site by the extraction system. These alternatives address the residual source material and the remaining principal threats through varying levels of treatment.

Alternative 5 would reduce the toxicity and mobility of DNAPL contamination through ISS treatment in the primary and secondary source areas. However, ISS treatment would result in an increase in the volume of contaminated media. Alternative 5 was assigned an excellent rating.

Alternatives 3 and 4 would result in some treatment of COCs in soils and groundwater through phytoremediation, rhizodegradation and contaminant uptake. However, the amount of treatment is not clear, and the reduction in COC mass would likely be low relative to the

remaining OU3 DNAPL and residual source material. As a result, Alternatives 3 and 4 were assigned a poor rating.

Alternatives 9 and 10 do not involve treatment of impacted soils or DNAPL. Thus, they were assigned a very poor rating with respect to this criterion.

10.5 Short-Term Effectiveness

The short-term effectiveness balancing criterion considers short-term risks to the community and site workers and the potential for negative environmental impacts during the implementation of the remedial alternative. Short-term effectiveness also considers the time required for the remedy to achieve protection of human health and the environment.

Alternatives 3, 4, and 10 can be readily implemented using conventional construction techniques and involve the use of well-established, minimally invasive technologies that require a low level of heavy machinery and truck traffic relative to Alternative 5 and Alternative 9. Alternatives 3, 4 and 10 have little potential for negative impacts on the environment, can be constructed in about 1 year, and rate excellent in terms of short-term effectiveness.

Alternatives 5 rates fair and 9 rates very poor with respect to the short-term effectiveness criteria. These alternatives would require a longer timeframe to construct than Alternatives 3, 4 and 10, and would involve considerably more use of heavy machinery. Further, completion of the remedy will require more time because the costs of Alternative 5 and Alternative 9 significantly exceed the amount of the remaining funding provided in the ECA for the Site. As a result, Alternative 5 and Alternative 9 would take longer to achieve RAOs.

10.6 Implementability

Alternatives 3, 4 and 10 can be readily implemented and were assigned an excellent rating. These alternatives involve the use of readily available and highly reliable technologies and equipment and would not require a high degree of specialized expertise. Further, existing site infrastructure does not pose a significant hindrance to implementation of either of these alternatives.

Alternative 9 would be highly challenging to implement due to the large volume and depth of excavation. Excavation in DNAPL source areas would require shoring and groundwater dewatering, and extracted groundwater would require extensive treatment prior to discharge. Based on these considerations, Alternative 9 was assigned a poor rating with respect to the implementability criterion.

Alternative 5 involves extensive ISS treatment. Although ISS treatment is well established in the environmental industry, it is not commonplace in the general construction industry and would require specialized equipment and expertise that are unlikely to be readily available in the area. Furthermore, there are challenges implementing ISS treatment at the Site given the large volume and area of soils in the primary and secondary source areas. Based on these considerations, Alternative 5 was assigned a fair rating with respect to the implementability criterion.

10.7 Cost

Table 6 provides a cost-estimate summary for remedial alternatives.

Table 6. Summary of Estimated Costs for Remedial Alternatives 1, 3, 4, 5, 9 and 10

Estimated Costs	Alternative 1 No Action	Alternative 3 Downgradient Barrier Wall, Phytoremediation, and Engineered Soil Cover	Alternative 4 Barrier Wall Isolation of Source Areas, Phytoremediation, and Engineered Soil Cover
Direct Capital	$0	$11,429,000	$10,907,000
Indirect Capital	$0	$2,500,000	$2,388,000
Periodic Costs	$90,000	$1,520,040	$739,200
Total NPV Costs	$32,000	$14,550,000	$13,593,000

Estimated Costs	Alternative 5 *In Situ* Stabilization of Source Areas and Engineered Soil Cover	Alternative 9 Removal of Surface Soils and Source Area Soils	Alternative 10 RCRA Cap over Source Areas and Engineered Soil Cover
Direct Capital	$72,902,000	$226,262,000	$15,869,000
Indirect Capital	$15,711,000	$48,653,000	$3,455,000
Periodic Costs	$375,000	$135,000	$450,000
Total NPV Costs	$88,760,000	$274,964,000	$19,502,000

Below is an Alternatives Comparison Summary. The EPA considers the substantially higher costs associated with Alternatives 5, and 9 to be disproportionate to the benefits provided over Alternatives 3 and 4. Further, although Alternative 10 has a similar estimated cost to Alternatives 3 and 4, it would be considerably less effective at controlling the DNAPL source and preventing migration of COCs with groundwater. Therefore, Alternatives 3 and 4 were assigned higher overall ranking in comparison to the other alternatives. Because Alternative 4 rates higher with respect to long-term effectiveness and has a lower estimated cost than Alternative 3, Alternative 4 was assigned an excellent overall rating and Alternative 3 was assigned a good overall rating.

LEGEND
- Excellent
- Good
- Fair
- Poor
- Very Poor

		EVALUATION CRITERIA: Threshold		EVALUATION CRITERIA: Balancing						OVERALL RATING
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness	Short-Term Effectiveness	Reduction of Toxicity, Mobility, or Volume through Treatment	Implementability	Estimated Cost (millions)		
Alternative 1	No Action	○	○	○	○	○	●	$0.03	●	○
Alternative 3	Downgradient Barrier Wall, Phytoremediation, and Engineered Soil Cover	●	●	◕	●	◔	●	$14.6	◕	◕
Alternative 4	Barrier Wall Isolation of Source Areas, Phytoremediation, and Engineered Soil Cover	●	●	●	●	◔	●	$13.6	◕	●
Alternative 5	*In Situ* Stabilization of Source Areas and Engineered Soil Cover	●	●	●	◑	●	◑	$88.8	○	◑
Alternative 9	Removal of Surface Soils and Source Area Soils	●	●	●	○	○	◔	$275	○	○
Alternative 10	RCRA Cap Over Source Areas and Engineered Soil Cover	●	●	◔	●	○	●	$19.5	◑	○

Prepared for: Greenfield Environmental Multistate Trust LLC
Trustee of the Multistate Environmental Response Trust

Prepared by: integral

Figure 7-1. Summary of the Detailed Comparative Analysis of Remedial Alternatives
Kerr-McGee Chemical Corp. – Columbus Superfund Site
Columbus, Mississippi
Feasibility Study, OU-3 and OU-5
May 2023

MODIFYING CRITERIA – The final two evaluation criteria, criteria 8 and 9, are "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.

10.8 State Acceptance

This criterion indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure. The State of Mississippi confirmed their acceptance of the preferred alternative in a June 28, 2024 concurrence letter included in Appendix A.

10.9 Community Acceptance

This criterion summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about. The public comments received during the comment period, were generally supportive of the preferred alternative. The selected remedy was adjusted in response to community input. Refer to the Responsiveness Summary for detailed responses to community comments.

11.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)), to use engineering controls for waste that poses a relatively low long-term threat (NCP Section

300.430(a)(1)(iii)(B)), and in appropriate site situations, treatment of the principal threats will be combined with engineering controls (such as containment) and institutional controls, as appropriate, for treatment residuals and untreated waste (NCP Section 300.430(a)(1)(iii)(C)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. Principal threats for which treatment is most likely to be appropriate include liquids, areas contaminated with high concentrations of toxic compounds and highly mobile materials. Containment remedies may be considered for principal threat waste that is relatively immobile and where containment has been demonstrated to be successful in isolating the principal threat waste and preventing releases of COCs into media. Source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Under the EPA's 1991 guidance, "A Guide to Principal Threat and Low-Level Threat Wastes," DNAPL floating on or under groundwater is generally considered to constitute a principal threat.

The EPA considers the remaining mobile DNAPL and residual DNAPL in the OU3 primary source area and the OU3 secondary source area to pose a principal threat. The DNAPL in the OU3 primary source area and the OU3 secondary source is a continuing source of groundwater contamination and is highly toxic should human exposure occur. The EPA considers the OU3 contaminated soils outside of the source areas to pose a relatively low-level threat.

At this Site, more than 46,000 gallons of DNAPL and more than 92.6 million gallons of groundwater were removed from the aquifer by the groundwater extraction system since 1991. The operation of the extraction system constituted treatment to permanently and significantly reduce the volume and mobility of DNAPL at the Site. The extraction system will continue to be operated (as part of the overall CERCLA cleanup with wastewater discharges to the local POTW under the water pollution control permit) until the barrier wall and engineered soil cover are functioning as intended, after which supplemental water pumping and treatment to maintain water levels would be conducted as part of the OU3 remedial action. The selected remedy compliments the previous removal of DNAPL because the reduction in volume and mobility makes source control easier to implement. While the selected remedy does not include treatment of remaining principal threats as a major component, the Feasibility Study did evaluate a range of alternatives, including alternatives that rely on treatment to address remaining principal threats, alternatives that combine treatment and engineering controls, and alternatives that rely mostly on engineering controls. This selected containment approach was selected as the best balance of trade offs with implementability, long-term effectiveness and short-term effectiveness as the most decisive factors.

12.0 SELECTED REMEDY

12.1 Summary of the Rationale for the Selected Remedy

Alternative 4, "Barrier Wall Isolation of Source Areas, Phytoremediation and Engineered Soil Cover" is EPA's selected remedy (Figure 14).

The RAOs for Alternative 4 are:

- RAO 1: Prevent exposure of outdoor and construction workers via inhalation, incidental ingestion and/or dermal adsorption to COCs in OU3 surface and subsurface soils above cleanup levels.
- RAO 2: Prevent the migration of COCs from OU3 surface soils through stormwater runoff or wind dispersion of fugitive dust.
- RAO 3: Prevent COCs in OU3 source areas (containing DNAPL and residual contamination) from migrating to the groundwater outside of OU3 source areas.

  This RAO will be achieved by maintaining (on average) a lower elevation water table inside the OU3 source area than outside.
- RAO 4: Prevent exposure of future building occupants to indoor air vapors via vapor intrusion (from groundwater or soil gas) containing Site COCs at concentrations that exceed EPA's acceptable risk range of 1×10^{-4} and 1×10^{-6} or have a non-carcinogenic risk greater than an HI of 1.

Alternative 4 will contain source materials and isolate them from the environment. The EPA expects some level of treatment in shallow groundwater to occur through rhizodegradation and contaminant uptake by the trees or other plants, but the amount of treatment is not clear and was not a deciding factor in selecting this Alternative. The most decisive considerations were implementability, long-term effectiveness and short-term effectiveness.

The EPA believes the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the selected remedy to satisfy the following statutory requirements of CERCLA 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify a waiver); (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the statutory preference for treatment as a principal element to the extent practicable.

The EPA expects that the selected remedy will protect the health of future users, transition the ongoing groundwater extraction source control to the proposed barrier wall and phytoremediation source control, and will enable community-support reuse.

12.2 Detailed Description of the Selected Remedy

The selected remedy for OU3 (Alternative 4) consists of the following remedial components:

- Barrier Wall Isolation of Source Areas: Installation of an approximately 4,550-foot-long vertical barrier wall surrounding the primary and secondary source areas. The barrier wall, in combination with the soil cover, would isolate the source areas and prevent DNAPL and COC migration from these areas as well as address direct contact with contaminated surface soils. The barrier wall would be keyed into the underlying, lower-

permeability Eutaw Formation to minimize the potential for DNAPL and groundwater to migrate under the wall. The construction of the barrier wall may include grading and backfilling on-site soils, provided the post-construction surface soil exposed at the site meets all cleanup levels. Soils are not expected to be disposed off-site as a result of the wall installation, but if they were, they would be characterized to determine whether constitutes RCRA hazardous waste (contains RCRA Listed hazardous waste or is considered RCRA toxicity characteristic waste) and managed in accordance with identified ARARs.

- Phytoremediation: To achieve the remedial action objectives, Alternative 4 uses plants to maintain a lower groundwater level inside the barrier wall than outside. The phytoremediation pilot study discussed in the FS included poplar, willow, pecan, and peach trees, but other types of trees and plants may be used during remedial action. The trees would create an inward hydraulic gradient that prevents impacted groundwater from flowing through or beneath the barrier wall. In addition, phytoremediation would provide limited treatment for dissolved COCs in shallow groundwater through rhizodegradation and contaminant uptake and would enhance the effectiveness of this alternative in controlling groundwater COC migration outside of the OU3 source areas.
- Intermittent Groundwater Extraction and Treatment: The purpose of the existing groundwater extraction system under the HSWA permit was to prevent off-site migration of creosote product and to contain dissolved groundwater contamination on site. The existing system is operated by the Trust with EPA oversight per the Settlement Agreement as part of the overall CERCLA cleanup with wastewater discharges to the local POTW under the water pollution control permit issued to the Trust. Once the barrier wall and engineered soil cover are functioning as intended, the existing system will not be needed to hydraulicly contain the groundwater and groundwater levels will be managed to maintain (on average) a lower elevation water table inside the barrier wall than outside. The EPA anticipates that supplemental groundwater extraction, treatment, and discharge to the POTW may be needed until the phytoremediation components are able to maintain water levels or during cooler months. Supplemental groundwater extraction and treatment may utilize parts of the current extraction system but would be conducted as part of the OU3 remedial action and expected to achieve ARARs.
- Engineered Soil Cover: Placement of a clean soil cover to address RAOs 1 and 2 by 1) eliminating exposure to OU3 soils with COC concentrations above the OU3 cleanup levels and 2) preventing the migration of COCs from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust. The soil cover will be designed to manage infiltration of rainwater, including use of fine-grained soils, surface contouring to facilitate surface runoff, and planting of vegetation to support evapotranspiration. The soil cover would have the added benefit of reducing local recharge of the shallow alluvial aquifer. The footprint of the soil cover would include, at a minimum, the entirety of the primary and secondary OU3 source areas to manage infiltration to the area enclosed by the vertical barrier wall.

- Soil Cover may be installed outside of the OU3 source areas to eliminate exposure to soil exceeding the surface soil cleanup levels. Remedial design soil sampling will be conducted to identify areas outside of the OU3 source areas requiring soil cover.
- Institutional controls: Institutional controls are in place that serve to limit Site use and exposure while the Site is owned by the Multistate Trust. The Trust's ownership pursuant to the Settlement Agreement serves as an "enforcement tool with institutional control components" which limits the use of the property and requires EPA and State approval prior to a property transfer. Prior to the sale or transfer of Multistate Trust property, additional institutional controls will be implemented, the details of which will be selected in a future decision document issued by the EPA. This remedy specifies the following institutional controls to ensure continued protection of the remedial components and of human health:
    - Institutional controls (such as deed restrictions, zoning restrictions or restrictive covenants), would be implemented to protect the engineering components of the OU3 remedy, including but not limited to the trees, barrier wall, and soil cover.
    - Institutional controls would be implemented to limit future land use in OU3 to industrial or commercial land use and walking trails to protect human health and to restrict land uses such as schools, daycares, and playgrounds where risk is estimated using residential exposure assumptions (unless MDEQ and the EPA determine in writing that a specific proposed use is protective of human health and the environment).
    - An institutional control consisting of a Soil Management Plan for OU3 would be established to require worker personal protective equipment and other protocols to prevent unacceptable exposure of future construction or O&M workers to COCs at concentrations that exceed the OU3 cleanup levels in soils during future construction or O&M activities.
    - Institutional controls to establish requirements for vapor intrusion assessment/management in areas where groundwater and/or soil COC concentrations exceed vapor intrusion screening levels.
- Monitoring: Routine monitoring of groundwater quality would be conducted to evaluate the remedy performance with respect to hydraulic control of the groundwater plume, and to monitor the soil cover integrity and the health of the trees. Maintenance of the soil cover would occur as required, and the trees may require replacement on a periodic basis. Typical lifespan for hybrid poplar trees is around 50 years.

RAO 1 will be achieved by placing a soil cover over OU3 surface soils that exceed the surface and subsurface soil cleanup levels and by placing land use restrictions to prevent uses that are not protective of human health.

RAO 2 will be achieved by following construction related ARARs.

RAO 3 will be achieved by installing a low-permeability barrier wall around the OU3 source areas, placing a soil cover over the barrier wall, and operating a phytoremediation area to maintain a lower elevation water table inside the barrier wall. It is estimated that the trees will

take about five years to reach maturity. To prevent mounding of groundwater within the areas enclosed by the barrier wall, the existing groundwater extraction and treatment system will continue to be operated until the trees grow enough that the barrier wall and phytoremediation source control remedial components attain RAO 3. Long-term, achieving RAO 3 requires maintaining an average inward hydraulic gradient as determined by measuring groundwater levels inside and outside the barrier wall.

RAO 4 is achieved by the existing institutional control while the Trust owns the property. Before the Trust sells or transfers OU3 to a future landowner or owners, additional institutional controls that will run with the land, such as a restrictive covenant, will be to require mitigation of unacceptable risks due to the vapor intrusion pathway.

12.3 Cost Estimate for the Selected Remedy

Table 7 includes the cost breakdown for the selected remedy. The full cost estimate can be found in the FS. The information in the cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design. Major changes will be documented in a memorandum in the AR file, an ESD or ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 7. Estimated Costs for the Selected Remedy

Estimated Costs for Selected Alternative 4	
Direct capital	$10,907,000
Indirect Capital	$2,388,000
Periodic costs	$739,200
Total Costs (+50 to -30%)	$13,593,000

12.4 Estimated Outcomes of Selected Remedy

12.4.1 Available Land Use

After completion of the selected remedy, surface soil in OU3 will attain cleanup levels that allow commercial and industrial use. Under EPA default exposure parameters, industrial or commercial workers spend more time on a site than someone using a walking trail, so the EPA expects that the industrial/commercial land use assumption will also be protective for people using walking trails. Residential land use will be prohibited. Commercial uses where risk is estimated using residential exposure assumptions, such as schools, daycares, and playgrounds, will not be allowed, unless MDEQ and the EPA determine in writing that a specific proposed use is protective of human health and the environment. The trees that are part of the phytoremediation effort will provide habitat.

12.4.2 Final Cleanup Levels

Table 4 lists the final cleanup levels for OU3.

12.5 Socio-Economic and Community Revitalization Impacts

Based on the Site's current redevelopment plan, input from the community, and input from local government, the EPA has determined that industrial/commercial land use and recreational uses such as walking trails are the reasonably anticipated future uses for OU3.

Upon completion of remedial actions, the Multistate Trust intends to make the Pine Yard and Former Main Plant Area available for community-supported redevelopment. Community outreach activities, market studies, and evaluations of Site conditions are being considered in the development of conceptual redevelopment.

13.0 STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy, Alternative 4, will protect human health and the environment by preventing exposures to contaminated soils and source areas by placing a soil cover where needed and through implementation of a soil management plan. The remedy will prevent the migration of contamination from soil and source areas by installing a barrier wall, soil cover and phytoremediation area. The remedy will ensure future potential outdoor construction workers will not be exposed to contamination above selected cleanup levels. The selected remedy will reduce the cancer risks to less than 1×10^{-5} and will reduce non-cancer risks to less than a Hazard Index of 1.0. The residual risk will be at the lower end of the EPA's target cancer risk range of 10^{-4} to 10^{-6}. Institutional controls will protect remedial components and prevent unacceptable uses of the property. Short-term exposures during remedy implementation can be readily controlled by standard remediation health and safety best practices. The selected remedy will not result in any long-term cross media impacts since contaminated soil and subsurface DNAPL are contained with a barrier wall and engineered soil cover.

13.1.1 Compliance with ARARs

Section 121(d)(2) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are ARARs to the hazardous substances or particular circumstances at a site unless such ARARs are waived under CERCLA section

121(d)(4). See also 40 CFR § 300.430(f)(1)(ii)(B). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. The 40 CFR § 300.150 requires compliance with Occupational Safety and Health Administration (OSHA) standards; therefore, the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the part of any removal or remedial action conducted entirely on-site as defined in 40 CFR § 300.5. See also 40 CFR §§ 300.400(e)(1) & (2). Also, CERCLA actions must only comply with the "substantive requirements," not the administrative requirements of a regulation. Administrative requirements include permit applications, reporting, record keeping, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements such as those typically identified as location-specific ARARs.

Applicable requirements, as defined in 40 CFR § 300.5, "means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable." Relevant and appropriate requirements, as defined in 40 CFR § 300.5, "means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not 'applicable' to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate."

In addition to ARARs, the lead and support agencies may identify other measures to be considered for a particular release. "The TBC category consists of advisories, criteria, or guidance that were developed by the EPA, other federal agencies, or states that may be useful in developing CERCLA remedies." See 40 CFR § 300.400(g)(3).

Chemical-specific ARARs

Chemical-specific ARARs usually are either health- or risk-based numerical values or methodologies that establish the acceptable amount or concentration of a chemical that may remain in or be discharged to the environment. There are no chemical-specific ARARs for OU3 contaminated surface soil.

Action-specific ARARs

Action-specific ARARs usually are restrictions on the conduct of certain activities due to waste type or the operation of certain technologies at a particular site for addressing contaminated media. Action-specific ARARs include requirements for characterization, temporary staging, and

disposal of contaminated sediment/soil as well as requirements for control of fugitive dust and stormwater runoff during land disturbing activities including excavation. In particular the RCRA regulations that include requirements for characterization, management and disposal of any contaminated soil that is removed from the ground and is considered a RCRA hazardous waste are identified as action-specific ARARs for this remedy.

Location-specific ARARs

Location-specific ARARs generally restrict certain activities or limit concentrations of hazardous substances solely because of geographical or land use concerns. Requirements addressing wetlands, historic places, floodplains, or sensitive ecosystems and habitats are potential location-specific ARARs.

The selected remedy will comply with all federal and any more stringent state ARARs identified for the Site. A detailed list of ARARs/To Be Considered requirements for the selected remedy is in Appendix C of this ROD.

13.1.2 Cost Effectiveness

The EPA has determined that the selected remedy is cost effective and represents a reasonable value for the funds to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP, CFR 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence, reduction in toxicity, mobility and volume through treatment, and short-term effectiveness). The selected remedy is effective at protecting human health in both the long-term and short-term and will contain source areas. Overall effectiveness was then compared to costs to determine cost effectiveness. The selected remedy is less costly than other alternatives that provide less overall effectiveness in the long-term and short term. For example, Alternatives 5 and 9 are less effective in the short-term but cost more. Alternatives 3 and 10 are less protective in the long term but cost more. The relationship of the overall effectiveness of the selected remedy was determined to be proportional to its costs. Therefore, it represents a reasonable value for the money to be spent.

13.1.3 Use of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The EPA has determined that the selected remedy (Alternative 4) represents the best balance of trade offs with regard to implementability, long-term effectiveness, and short-term effectiveness and it represents the maximum extent to which permanence and treatment can be practicably used at this site. The selected remedy compliments the removal of 46,000 gallons of DNAPL since 1991 because the reduction in volume and mobility of DNAPL makes source control easier to implement. The selected remedy combines containment and an inward hydraulic gradient to achieve long-term protectiveness and permanence. Initially, the inward hydraulic gradient will be provided by the existing groundwater extraction and treatment

system which will operate until the trees grow enough to maintain the desired water levels and will provide treatment during that time. The amount of treatment provided by phytoremediation through rhizodegradation and contaminant uptake is not clear and was not a deciding factor in selecting the remedy. While treatment of COCs through phytoremediation would satisfy the NCP's expectation to use alternative treatment technologies, the EPA has not quantified the potential for treatment because it was not a deciding factor in the selecting the remedy.

The Feasibility Study evaluated a range of alternatives, including alternatives that rely on treatment to address remaining principal threats, alternatives that combine treatment and engineering controls, and alternatives that rely mostly on engineering controls. Section 10 provides the comparative analysis of the alternatives. The selected remedy provides the highest level of long-term effectiveness and permanence, short-term effectiveness, implementability, and cost effectiveness. In terms of the reduction of toxicity, mobility and volume, all alternatives follow the removal of 46,000 gallons of DNAPL, which is a principal threat, from the Site by the existing extraction system. The selected remedy will result in some treatment of COCs in soils and groundwater through phytoremediation, rhizodegradation and contaminant uptake. However, the amount of treatment is not clear, and the reduction in COC mass would likely be low relative to the remaining OU3 DNAPL and residual source material. As a result, the selected remedy is less favorable than Alternative 5, which would use in-situ stabilization and solidification. The selected remedy is better than Alternatives 9 and 10, which do not involve treatment at all. The selected remedy will require the maintenance of the containment engineered controls and institutional controls to protect the remedy and limit land use to ensure long-term effectiveness and permanence.

13.1.4 Preference for Treatment as a Principal Element

CERCLA Section 121(b) and NCP at 40 CFR 300.430(f)(5)(ii)(F) specify that remedial actions, which permanently and significantly reduce the toxicity, mobility or volume of the hazardous substances, pollutants, and contaminants as a principal element, are to be preferred over remedial actions not involving such treatment. The EPA considers the remaining mobile DNAPL and residual DNAPL in the OU3 primary source area and the OU3 secondary source area to pose a principal threat. The DNAPL in the OU3 primary source area and the OU3 secondary source is a continuing source of groundwater contamination and is highly toxic should human exposure occur. The EPA considers the OU3 contaminated soils outside of the source areas to pose a relatively low-level threat. Some level of treatment of contaminated groundwater within the barrier wall from the phytoremediation component is expected through rhizodegradation and contaminant uptake, but the amount of treatment is not clear and was not a deciding factor in selecting this remedy. The DNAPL is being contained within the barrier wall and is not being treated to reduce toxicity, mobility, or volume. The operation of the extraction system to remove, treat, and dispose more than 46,000 gallons of DNAPL constituted treatment that permanently and significantly reduced the volume and mobility of DNAPL. This selected remedy follows and compliments the removal of DNAPL. While the selected remedy does not include treatment of remaining principal threats as a major component, the Feasibility Study did evaluate a range of alternatives, including alternatives that rely on treatment to address remaining principal threats, alternatives that combine treatment and engineering controls, and

alternatives that rely mostly on engineering controls. This selected containment approach was selected as the best balance of trade offs with implementability, long-term effectiveness and short-term effectiveness as the most decisive factors. contamination.

13.2 Five-Year Review Requirements

Because hazardous substances will remain at the Site above levels that allow for unlimited use and unrestricted exposure, the EPA will review the remedial action no less than every five years, per CERCLA Section 121(c) and the NCP at 40 CFR 300.430(f)(4)(ii) until the levels of COCs allow for unrestricted use of soil and groundwater with unlimited exposure to these media. If results of the five-year reviews reveal that remedy integrity is compromised and protection of human health and the environment is insufficient, then additional remedial actions will be evaluated by the EPA and MDEQ

14.0 Documentation of Significant Changes from Preferred Alternative of Proposed Plan

Pursuant to CERCLA Section 117(b) and NCP §300.430(f)(3)(ii), the ROD must document any significant changes made to the Preferred Alternative discussed in the Proposed Plan. EPA reviewed all written and verbal comments submitted during the public comment period. During the public comment period for the OU3 and OU5 Proposed Plan, the EPA received a request to select and implement an alternative for OU5 that was not considered in the proposed plan (to excavate and remove contaminated soil that exceed the construction worker scenario). After careful consideration, the EPA determined that the requested change to the OU5 remedy was one that public could not have been reasonably anticipated based on information in the original Proposed Plan. As a result, the EPA did not select a remedy for OU5 in this ROD and will address OU5 separately in a later ROD.

This ROD selects four RAOs for OU3 that differ from the four proposed RAOs in the Proposed Plan. One RAO that which was specific to OU5, was removed. One RAO was revised to exclude OU5. No cleanup levels or remedial actions are selected for OU5. An RAO was added to protect future building occupants from indoor air vapors via vapor intrusion that could present an unacceptable risk of exposure.

There are no other significant changes to the remedy, as originally identified in the Proposed Plan.

15.0 References

The Administrative Record is available at https://semspub.epa.gov/src/collection/04/AR67483. The table below in electronic versions of this document contains hyperlinks to the files in the Administrative Record.

Date	Document Title
10/05/2023	ADMINISTRATIVE RECORD INTRODUCTION, MSD990866329, KERR-MCGEE CHEMICAL CORP - COLUMBUS (OPERABLE UNITS #3 AND #5) NPL SITE, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI. (1 pp, 80.7 KB)
10/01/2023	"PROPOSED PLAN, KERR-MCGEE CHEMICAL CORP. - COLUMBUS SUPERFUND SITE, LOWNDES COUNTY, COLUMBUS, MISSISSIPPI," USEPA. (43 pp, 7.37 MB)
09/26/2023	"KERR-MCGEE CHEMICAL CORP - COLUMBUS SUPERFUND SITE, OPERABLE UNIT 3 & 5 - PROPOSED PLAN CLEANUP SUMMARY," USEPA. (5 pp, 577.26 KB)
06/20/2023	EMAIL FROM BEN BENTKOWSKI, USEPA TO ADDRESSEES. SUBJECT: NOTES ON THE COMMENT RESPONSE TABLE. (1:49 PM) (3 pp, 2.93 MB)
05/01/2023	"FEASIBILITY STUDY REPORT - OPERABLE UNIT 3 AND OPERABLE UNIT 5, KERR-MCGEE CHEMICAL CORP. - COLUMBUS SUPERFUND SITE, 2300 14TH AVENUE NORTH, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI" INTEGRAL. (3997 pp, 184.57 MB)
04/13/2023	EMAIL FROM JAMES LANDMEYER, USGS TO ADDRESSEES. SUBJECT: RE: [EXTERNAL] COLUMBUS - PHYTOREMEDIATION PILOT STUDY DATA REVIEW & DISCUSSION. (1:24 PM) (19 pp, 2.7 MB)
04/10/2023	EMAIL FROM BEN BENTKOWSKI, USEPA TO ADDRESSEES. SUBJECT: NOTES ON THE COMMENT RESPONSE TABLE. (1:49 PM) (3 pp, 5.54 MB)
03/15/2023	EMAIL FROM AUSTIN HOFMEISTER, G-ETG TO ADDRESSEES. SUBJECT: MULTISTATE TRUST: COLUMBUS, MS - FINAL 14TH AVENUE DITCH SAMPLING MEMORANDUM ATTACHED. (7:42 AM) (32 pp, 2.02 MB)
02/22/2023	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: FW: MULTISTATE TRUST - COLUMBUS & MERIDIAN, NOVEMBER/DECEMBER INVOICES. (2:17 PM) (4 pp, 200.74 KB)
02/22/2023	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: FW: MULTISTATE TRUST - COLUMBUS & MERIDIAN, NOVEMBER/DECEMBER INVOICES. (2:19 PM) (13 pp, 1.36 MB)
02/02/2023	EMAIL FROM BEN BENTKOWSKI, USEPA TO CHARLES KING, USEPA. SUBJECT: RE: DELIVERABLE: MULTISTATE TRUST - COLUMBUS, OU3/OU5 DRAFT FS COMMENT RESPONSE & PLAN FOR FINALIZATION. (5:22 PM) (5 pp, 377.05 KB)
12/27/2022	EMAIL FROM ARMED RASBERRY, MDEQ TO ADDRESSEES. SUBJECT: RE: MULTISTATE TRUST FOR APPROVAL AND CONSULTATION NOTICE - COLUMBUS, MS. (4:21 PM) (3 pp, 227.04 KB)
12/21/2022	EMAIL FROM CYNTHIA BROOKS, G-ETG TO ADDRESSEES. SUBJECT: MULTISTATE TRUST REQUEST FOR APPROVAL AND CONSULTATION NOTICE - COLUMBUS, MS. (9:00 AM) (2 pp, 152.28 KB)
12/08/2022	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: FW: [EXTERNAL] RE: AUTUMN ASSESSMENT OF GROWING SEASON -1 YEAR REPORT

Date	Document Title
	- LEADING TO DECISION ON THE FULL SCALE DEPLOYMENT? (3:22 PM) (12 pp, 614.44 KB)
11/10/2022	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: RE: REPORT DELIVERABLE: MULTISTATE TRUST - COLUMBUS, DRAFT FINAL OU3/OU5 FEASIBILITY STUDY REPORT. (3:42 PM) (4 pp, 156.06 KB)
11/10/2022	EMAIL FROM CHARLES KING, USEPA TO BEN BENTKOWSKI, USEPA. SUBJECT: FW: [EXTERNAL]: MULTISTATE TRUST: COLUMBUS - PYTOREMEDIATION PROJECT CHECK IN. (3:57 PM) (10 pp, 252.04 KB)
08/24/2022	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: FW: KM COLUMBUS OUS 3 AND 5 ALTERNATIVES MODIFICATIONS 8 24 2022.DOCX. (3:56 PM) (2 pp, 124.87 KB)
08/24/2022	EMAIL FROM THEO VON WALLMENICH, G-ETG TO ADDRESSEES. SUBJECT: MULTISTATE TRUST COLUMBUS: BI-WEEKLY EPA/MDEQ COORDINATION CALL. (2:29 PM) (3 pp, 294.28 KB)
08/16/2022	EMAIL FROM BEN BENTKOWSKI, USEPA TO CHARLES KING, USEPA. SUBJECT: A BIT LATE IN THE DAY BUT HERE IT IS. (4:32 PM) (3 pp, 422.17 KB)
08/15/2022	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: FW: EPA REQUEST THAT AN ALTERNATIVE THAT CONTAINS A RCRA CAP OVER THE PRIMARY AND SECONDARY SOURCE AREAS BE INCLUDED IN THE FS FOR OU3 AND 5 AT THE KERR-MCGEE COLUMBUS, MISSISSIPPI. (6:10 PM) (6 pp, 357.36 KB)
08/08/2022	EMAIL FROM CHARLES KING, USEPA TO SCOTT MILLER, USEPA. SUBJECT: FWD: INFO: MULTISTATE TRUST - COLUMBUS, SAMPLING RESULTS FOR THE FORMER SANDERSON PLUMBING PROPERTY, COLUMBUS, MS. (6:05 PM) (11 pp, 2 MB)
08/03/2022	EMAIL FROM JAMES LANDMEYER, USGS TO CHARLES KING, USEPA. SUBJECT: REVISED DRAFT USGS MONITORING KM, COLUMBUS, MS. (5:02 PM) (104 pp, 19.77 MB)
08/03/2022	"DRAFT REPORT - INSTALLATION AND MONITORING DATA REPORT FOR 2021, PILOT SCALE PHYTOREMEDIATION SYSTEMS, OU-3 AND OU-4, KERR-MCGEE CHEMICAL CORPORATION SITE, COLUMBUS, MS," USGS. (103 pp, 19.71 MB)
07/22/2022	EMAIL FROM DAVID BUXBAUM, USEPA TO ADDRESSEES. SUBJECT: RE: AVAILABILITY WITHIN THE NEXT FEW DAYS TO RESOLVE OUTSTANDING ITEMS RELATED YOU THE FS FOR OUS 3 & 5 (FORMER MAIN PLANT) AT THE KERR-MCGEE COLUMBUS, MS. (11:57 AM) (4 pp, 208.38 KB)
07/18/2022	EMAIL FROM CHARLES KING, USEPA TO THEO VON WALLMENICH, G-ETG. SUBJECT: RE: INFO: MULTISTATE TRUST - COLUMBUS, 706 MOSS ST. SAMPLING APPROACH EPA APPROVAL OF REVISED SAMPLING PLAN. (3:47 PM) (2 pp, 124.15 KB)

Date	Document Title
06/28/2022	PRESENTATION - HAZARDOUS WASTE DETERMINATION BRIEFING. (13 pp, 2.42 MB)
06/23/2022	MEMORANDUM FROM CHARLES KING, USEPA TO SITE FILE. SUBJECT: DETERMINATION THAT CONTAMINATION WITHIN THE DRIP TRACK AREA WAS CAUSED BY LISTED HAZARDOUS WASTE. (3 pp, 163.99 KB)
06/22/2022	EMAIL FROM BEN BENTKOWSKI, USEPA TO CHARLES KING, USEPA. SUBJECT: RE: DRAFT REPORT FOR YOUR REVIEW - USGS 2021 DRAFT REPORT. (2:28 PM) (108 pp, 16.8 MB)
06/08/2022	EMAIL FROM BEN BENTKOWSKI, USEPA TO CHARLES KING, USEPA. SUBJECT: ONE MORE TECHNICAL DETAIL. (1:54 PM) (2 pp, 172.26 KB)
05/07/2022	PRESENTATION - CONSIDERATION OF CONTAINMENT STRUCTURE COVERS. (6 pp, 583.1 KB)
04/20/2022	EMAIL FROM CHARLES KING, USEPA TO ADDRESSES. SUBJECT: EPA'S APPROVAL OF DECEMBER 2021 STORMDRAIN DITCH RACR AND CITY OF COLUMBUS' MARCH 30, 2022 SIGNED AFFIDAVIT ACCEPTING WORK. (3:49 PM) (2 pp, 172.12 KB)
05/06/2021	EMAIL FROM CHARLES KING, USEPA TO HEATHER NEWTON, USEPA. SUBJECT: 1 MANAGEMENT OF REMEDIATION WASTE UNDER RCRA 1988 HIGHLIGHTED CK2.PDF.DOCX. (12:37 PM) (14 pp, 520.84 KB)
02/08/2021	EMAIL FROM CHARLES KING, USEPA TO ADDRESSEES. SUBJECT: KERR-MCGEE COLUMBUS - WRITTEN APPROVAL OF REVISED ERRATA TO THE APPROVED RAWP FOR OU2. (11:30 AM) (2 pp, 122.44 KB)
02/08/2021	EMAIL FROM CHARLES KING, USEPA TO CHARLOTTE WHITLEY, USEPA. SUBJECT: FW: KERR-MCGEE COLUMBUS - WRITTEN APPROVAL OF REVISED ERRATA TO THE APPROVED RAWP FOR OU2. (2:44 PM) (2 pp, 126.78 KB)
09/29/2020	"RECORD OF DECISION, KERR-MCGEE COLUMBUS SUPERFUND SITE, OPERABLE UNIT 2, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," USEPA. (71 pp, 4.03 MB)
05/06/2019	"RECORD OF DECISION, KERR-MCGEE COLUMBUS OPERABLE UNIT 1 SUPERFUND SITE, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," USEPA. (142 pp, 11.87 MB)
09/09/2018	EMAIL FROM LAURI GORTON, GREENFIELD ENVIRONMENTAL TRUST GROUP, INC. (G-ETG) TO CHARLES KING, USEPA. SUBJECT: RE: EPA'S COMMENTS ON THE FFS AND DECISION ON BACKFILL SOIL IN RESIDENTIAL AREAS OF OU1 AT THE KERR MCGEE COLUMBUS MISSISSIPPI SITE. (7:38 PM) (5 pp, 583.72 KB)
08/09/2018	"FOCUSED FEASIBILITY STUDY REPORT, OPERABLE UNIT 1, KERR-MCGEE CHEMICAL CORP. - COLUMBUS SUPERFUND SITE, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," INTEGRAL CONSULTING, INC. (130 pp, 5.21 MB)

Date	Document Title
08/07/2018	EMAIL FROM CHARLES KING, USEPA TO TODD MARTIN, INTEGRAL CORP. SUBJECT: RE: COLUMBUS: OU1 IMPORT FILL APPROVAL. (8:52 AM) (2 pp, 189.51 KB)
07/16/2018	EMAIL FROM THOMAS WALLACE, MDEQ TO ADDRESSEES. SUBJECT: RE: MULTISTATE TRUST COLUMBUS: TRANSMITTAL OF OU1 RAWP + APPENDICES. (1:03 PM) (2 pp, 179.67 KB)
07/16/2018	LISTED WASTED DETERMINATION OPTIONS FOR HEADQUARTERS. (1 pp, 104.77 KB)
06/26/2018	EMAIL FROM CHARLES KING, USEPA TO LAURI GORTON, GREENFIELD ENVIRONMENTAL MULTISTATE TRUST, LLC. SUBJECT: EPA'S COMMENTS ON THE KERR-MCGEE REVISED RI. (4:52 PM) (3 pp, 184.66 KB)
05/14/2018	EMAIL FROM THOMAS WALLACE, MDEQ TO ADDRESSEES. SUBJECT: KERR MCGEE COLUMBUS - HHRA COMMENTS. (5:12 PM) (2 pp, 190.4 KB)
05/11/2018	EMAIL FROM LAURI GORTON, GREENFIELD ENVIRONMENTAL MULTISTATE TRUST, LLC. TO CHARLES KING, USEPA. SUBJECT: MULTISTATE TRUST COLUMBUS: WORKING DRAFT FOR EPA REVIEW - PROPOSED APPROACH TO HAZARDOUS WASTE DESIGNATION. (5:42 PM) (3 pp, 204.04 KB)
05/11/2018	PROPOSED REMEDIATION WASTE DESIGNATION APPROACH FOR KERR-MCGEE CHEMICAL CORP. SUPERFUND SITE - COLUMBUS, MS, GREENFIELD ENVIRONMENTAL MULTISTATE TRUST, LLC, TRUSTEE OF THE MULTISTATE ENVIRONMENTAL RESPONSE TRUST. (2 pp, 460.68 KB)
03/21/2018	"PHASE II REMEDIAL INVESTIGATION REPORT (REVISED DRAFT), APPENDIX I, KERR-MCGEE CHEMICAL CORP - COLUMBUS, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," EARTHCON CONSULTANTS, INC. [PART 1 OF 4]. (2999 pp, 100.97 MB)
03/21/2018	"PHASE II REMEDIAL INVESTIGATION REPORT (REVISED DRAFT), APPENDIX I, KERR-MCGEE CHEMICAL CORP - COLUMBUS, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," EARTHCON CONSULTANTS, INC. [PART 2 OF 4]. (3000 pp, 84.3 MB)
03/21/2018	"PHASE II REMEDIAL INVESTIGATION REPORT (REVISED DRAFT), APPENDIX I, KERR-MCGEE CHEMICAL CORP - COLUMBUS, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," EARTHCON CONSULTANTS, INC. [PART 3 OF 4]. (2501 pp, 24.63 MB)
03/21/2018	"PHASE II REMEDIAL INVESTIGATION REPORT (REVISED DRAFT), APPENDIX I, KERR-MCGEE CHEMICAL CORP - COLUMBUS, COLUMBUS, LOWNDES COUNTY, MISSISSIPPI," EARTHCON CONSULTANTS, INC. [PART 4 OF 4]. (3675 pp, 168.6 MB)

Date	Document Title
03/21/2018	"PHASE II REMEDIAL INVESTIGATION REPORT (REVISED DRAFT), KERR-MCGEE CHEMICAL CORP - COLUMBUS, COLUMBUS, LOWNES COUNTY, MISSISSIPPI," EARTHCON CONSULTANTS, INC. (1823 pp, 466.61 MB)
03/12/2018	LETTER FROM RANDALL CHAFFINS, USEPA TO CYNTHIA BROOKS, GREENFIELD ENVIRONMENTAL MULTISTATE TRUST. SUBJECT: REQUEST FOR FUNDS FROM MULTISTATE ENVIRONMENTAL RESPONSE TRUST COLUMBUS COSTS ACCOUNT. (2 pp, 154.03 KB)
11/20/2017	EMAIL FROM NARDINA TURNER, USEPA TO ADDRESSEES. SUBJECT: FW: KERR-MCGEE OFF LITIGATION HOLD. (9:11 AM) (3 pp, 112.83 KB)
07/25/2017	"SUPERFUND TASK FORCE RECOMMENDATIONS," USEPA. (33 pp, 1.84 MB)
06/01/2011	SITE MAP - SAMPLING LOCATIONS SEMI-VOLATILE ORGANIC COMPOUND RESULTS, AND RCRA SAMPLING RESULTS. (1 pp, 22.92 MB)
03/28/1991	COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS INDEX. APPENDIX B OF THE COMPENDIUM OF CERCLA RESPONSE SELECTION GUIDANCE DOCUMENTS USERS MANUAL, REVISED MARCH 1991. (28 pp, 1 MB)
08/29/1988	REFERENCE NO.: 13 - LETTER FROM GAYLE KLINE, A.T. KEARNEY, INC. TO ROWENA SHEFFIELD, USEPA. SUBJECT: INTERIM RFA REPORT. (211 pp, 4.24 MB)
Undated	WASTE STREAM REVIEW CHECKLIST - KERR-MCGEE CHEMICAL CORP - COLUMBUS. (2 pp, 3.02 MB)
Undated	HIGHLIGHTS FROM 1988 RFA REPORT - KERR-MCGEE COLUMBUS, MISSISSIPPI. (2 pp, 90.42 KB)
Undated	KERR-MCGEE COLUMBUS OU3/OU5 HIGHLIGHTS. (2 pp, 84.52 KB)
Undated	THE SUPERFUND PROCESS. (1 pp, 9.92 MB)

PART 3: RESPONSIVENESS SUMMARY

EPA published the notice of availability of the Proposed Plan and Administrative Record in the Columbus Dispatch on October 19, 2023, and released the Proposed Plan to the public by posting the publicly accessible link on the EPA's web page or other means.

From October 16, 2023 through December 18, 2023, the EPA held a 60-day public comment period, which included a 30 day extension, to accept public comments on the alternatives presented in the Feasibility Study and Proposed Plan, and on any other documents previously released to the public. On Thursday, October 26, 2023, the EPA held a public meeting to describe the EPA's Proposed Plan and to accept any oral or written comments. The meeting was held at the Genesis Dream Center 1820 North 23rd Street, Columbus, Mississippi.

The EPA summarized the comments received and prepared the following responses.

1.0 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

Comment #1

A commenter indicated that the EPA acknowledges that "specific site reuse plans in Operable Unit 5 may not pose an unacceptable risk [to construction workers], depending on the location and nature of construction activities [,]" but proposes an "interim remedy" that is likely to ultimately delay community-supported, protective reuse. Nor have stakeholders suggested that institutional controls to protect future construction workers would be considered unfavorably.

EPA Response # 1

During the public comment period, the EPA received comments from the local government and the Community Action Group (CAG) requesting that the selected remedy be modified to remove contaminated soil in areas of OU5 that that would currently be unsafe for construction and outdoor ground workers, in addition to the other standards associated with expected continual indoor and outdoor uses.

Comment #2
A commenter indicated that the EPA can substantially reduce this uncertainty in Operable Unit 5 by issuing a final remedy that requires institutional controls to prevent unacceptable exposure of future construction workers.

EPA Response #2

According to EPA guidance, an FS with only one alternative other than no action requires the EPA to issue an interim remedy. After careful consideration of all comments received during the comment period, the EPA has decided to remove OU5 from this decision document. Within the next year, the EPA plans to issue a proposed plan for Operable Unit 5 that contains several alternatives, including the one requested by a group of commenters during this public comment period, that consists of the removal and disposal of soils that exceed the proposed industrial worker and construction worker cleanup goals.

Comment #3

The Multistate Trust requested that the EPA to issue a Record of Decision (ROD) that includes a final remedy finding that commercial land is the reasonably anticipated future land use for OU5 at this time, rather than when a potential future buyer is identified.

EPA Response #3

Since the FS Report eliminated all OU5 remedial alternatives except for the no action alternative and institutional controls in the form of a soil management plan, the EPA was required to propose the remaining alternative as an interim remedy until the uncertainty in the OU5 risk assessment is resolved. However, during the OU3 and OU5 Proposed Plan public comment period the EPA received several comments from groups and local officials requesting that contaminated soils that exceed the construction and commercial worker risks scenarios in OU5 be removed from the site. After careful consideration of all comments received during the comment period, the EPA has decided to remove OU5 from this decision document. Within the next year, the EPA plans to issue a proposed plan for OU 5 that contains an alternative, requested by a group of commenters during this public comment period, that includes the removal and disposal of soils that exceed the proposed industrial worker and construction worker cleanup goals.

Comment #4

At the Public Meeting a concerned resident asked how many acres in OU1 are available for reuse and redevelopment? At the meeting, representatives from the EPA and the Multistate Trust indicated that approximately 10 to 15 aces would be available for redevelopment but committed to reviewing the data and providing a better estimate in the responsiveness summary.

EPA Response #4

Approximately 11 acres are currently available for sale, donation, and/or redevelopment in the Pine Yard. This area was excavated as part of the Operable Unit 1 (OU1) remediation at the Site and is available for commercial or light industrial purposes, including for recreation uses.

Comment #5

An attorney, on behalf of the several hundred claimants expressed a deep disappointment in the lack of actual redevelopment work being done at and around this site. The commenter indicated that it seems like the Proposed Plan focused is strictly on remediation (which is necessary but lacks much credibility and seems to take advantage of the credulity of the masses) and there is no mention any longer of a plan to reimagine this space for the good of this community.

EPA Response #5

Although representatives from the EPA and the Trust may have responded to questions at public regarding the estimated acres of land available for reuse, the purpose of the Proposed Plan was to present the EPA's preferred remedy for remediating OU3 and OU5 at the Site. Redevelopment and reuse options will be developed on a local level with some input from state

and federal regulators to ensure that all activities comply with appropriate laws, requirements, and policies.

Comment #6

The city and community have a plan to redevelop the area with a mixed-use theme to include commercial use and usable green space that will require maintenance by ground keepers. The master plan for the site includes potential development options for the site that could not be supported by the current proposed remedies. The proposed remedy for OU3, which contains and does not remove the contamination, is not sufficient to support future use plans for the site or the safety of the citizens.

EPA Response #6

It has been determined that the cost to remove and dispose of the contamination from the primary and secondary principal threat areas, similar to Alternative #9 in the OU3 OU5 Proposed Plan, would greatly exceed the remaining funds available to the Multistate Trust for investigation and cleanup at the site. Additionally, Alternative #9 is approximately 20 times more expensive than the preferred alternative. Containment rather than treatment is the preferred alternative for this principal threat waste because of the large volume of soil (approximately 490,000 cubic yards) and the discontinuous nature of the remaining DNAPL contamination to be addressed. In addition, it has been determined that containment remedies have been successful in isolating the principal threat waste and preventing releases of COCs into media. The preferred alternative meets the EPA's expectation for addressing principal threat waste. As a result, it would be necessary to design and construct the containment barrier around the primary and secondary source areas within OU3. The appropriate institutional controls would be issued to ensure that the remedy remains protective of human health and the environment. While the surface that covers the containment wall is expected to contain institutional controls that prohibit the construction of certain types of buildings, excavation of soil, or any actions that create unacceptable risk scenarios, it is anticipated that portions of that same area could be designed to safely accommodate mixed-used options as well as greenspace areas, park benches, picnic tables, walking trails and/or pedestrian pathways.

Comment #7

The fact that the OU3 remedy does not remove contamination in the areas where redevelopment is probable would GREATLY impact the ability of the city to redevelop the area in any useful manner adding insult to the injury left by past actors.

EPA Response #7

Although the entire OU3 former facility property may not be available for unrestricted redevelopment/reuse, it is anticipated that up to approximately half of the former main facility land surface of the combined OU3 and OU5 would be available for redevelopment, for a wide range of mixed used theme options. Although the surface area within the containment system on OU3 will require institutional controls that may prohibit certain construction activities, it is

anticipated that considerations for greenspace with pedestrian traffic would be incorporated during the remedial design.

Comment #8

A commenter expressed concerns regarding the sustainability of the "engineered soil cover" due to erosion or deuteriation.

EPA Response #8

As a part of the remedial design, a significant emphasis would be placed on evaluating a variety of surfaces to identify options that will meet the performance criteria in categories including erosion resistance, sustainable and longevity. Additionally, a maintenance program to assure that the cover would continue to be protective of people and the integrity of the remedy would also be incorporated.

Comment #9

Phytoremediation, which is a natural remedy, would be insufficient without a well-maintained engineered back- up. Should something happen to the trees, which is of concern given the current climate conditions, it would be equivalent to shutting down a remediation system.

EPA Response #9

Phytoremediation, as presented in this remedy is intended to be part of the hydraulic control system for the groundwater within the containment structure. Although it is possible that concentrations of contaminants of concern in the groundwater may be reduced during the hydraulic containment process, the trees are not intended to be considered a groundwater treatment. Groundwater will be sampled and analyzed to see if some treatment occurs and to document the effectiveness of the hydraulic containment process.

If the trees over the containment area do not survive, then a physical water removal system will be implemented. It is anticipated that a physical water removal system would be a part of the startup to control the internal groundwater level and then that system would be discontinued and/or mothballed once the trees mature. It is not a part of the remedial process that does not have an irreversible option, as if the soils were solidified and that was not performed properly.

Comment #10

The CAG would like the site to be "Ready for commercial use" following the remediation. Some additional items requested include: i) A combination of a barrier wall around the source areas coupled with some level of excavation to further reduce the risk of exposure for contract workers and outdoor workers following remediation; ii) A more stable top barrier than the soil barrier proposed; and iii) A well-maintained pumping system must be in place until the trees are both mature and proven effective.

EPA Response #10

i): The selected remedy, Alternative 4, will protect human health and the environment by preventing exposures to contaminated soils and source areas through implementation of a soil management plan and placing a soil cover where needed. The remedy will also prevent the migration of contamination from soil and source areas by installing a barrier wall, soil cover and phytoremediation area. The remedy will ensure potential construction workers and recreational users will not be exposed to contamination above selected cleanup levels. Institutional controls will prevent unacceptable uses of the property.

ii) The soil cover over the containment system would be designed to meet the criteria for erosion resistance, sustainable longevity and a maintenance program *to assure the* cover would continue to be protective of people and the integrity of the remedy .In addition, because waste would be left in place, the EPA is required to conduct a review of the remedy at a minimum of once every five years, to ensure that the remedy continues to function as intended and to determine if the remedy remains protective of human health and the environment.

iii) It is anticipated that a key component of the phytoremediation portion remedial design will include the requirement of a well-maintained pumping system to remain in place until the trees are both mature and are proven effective. It is estimated that the trees will take about five years to reach maturity. To prevent mounding of groundwater within the areas enclosed by the barrier wall as the trees grow to maturity and outside of the growing season, the groundwater extraction and treatment system will be operated as needed. Long-term, the remedy will require maintaining the appropriate level of groundwater inside the barrier wall. In addition, it is anticipated that a groundwater monitoring network and appropriate extraction and/or irrigation techniques and procedures will be designed and installed to ensure that the water levels inside of the containment system don’t get too high or too low.

Comment #11

The in-situ Stabilization be used in the primary source area to further reduce the movement of the DNAPL. Currently, while the percentages of DNAPL being extracted from the wells over the year is low, the absolute amount of DNAPL is still close to seven gallons per day.

EPA Response #11

In-situ stabilization was considered and evaluated during the feasibility study. In-situ stabilization is approximately 6.5 times more expensive than the preferred alternative, which is protective and meets all federal and state requirements. In addition, it has been determined that containment remedies have been successful in isolating the principal threat waste and preventing releases of COCs into media.

FIGURES

Figure 1. Site Operable Units

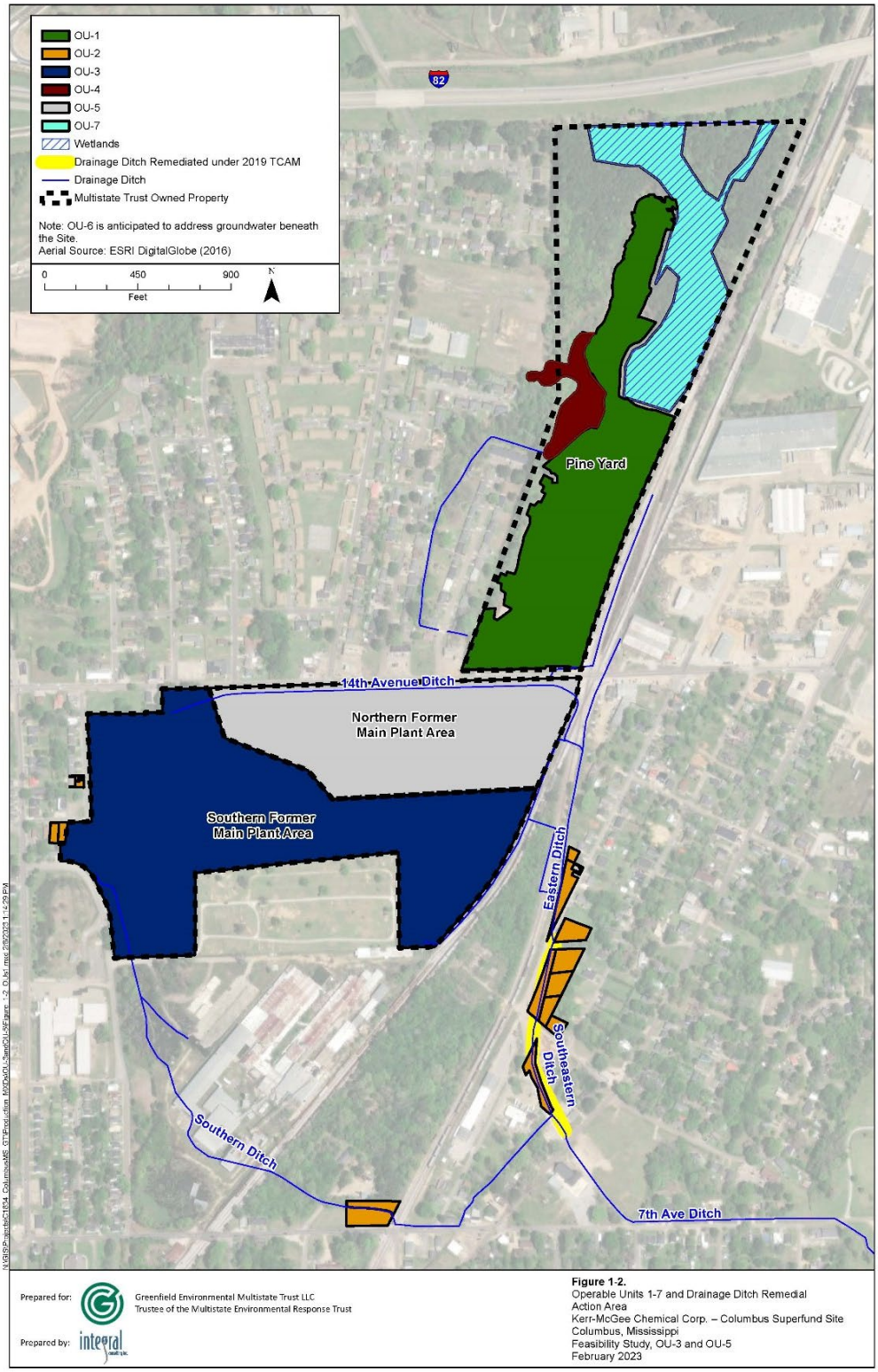


Figure 1. Updated OU4 Boundary

Figure 2. Site Geology

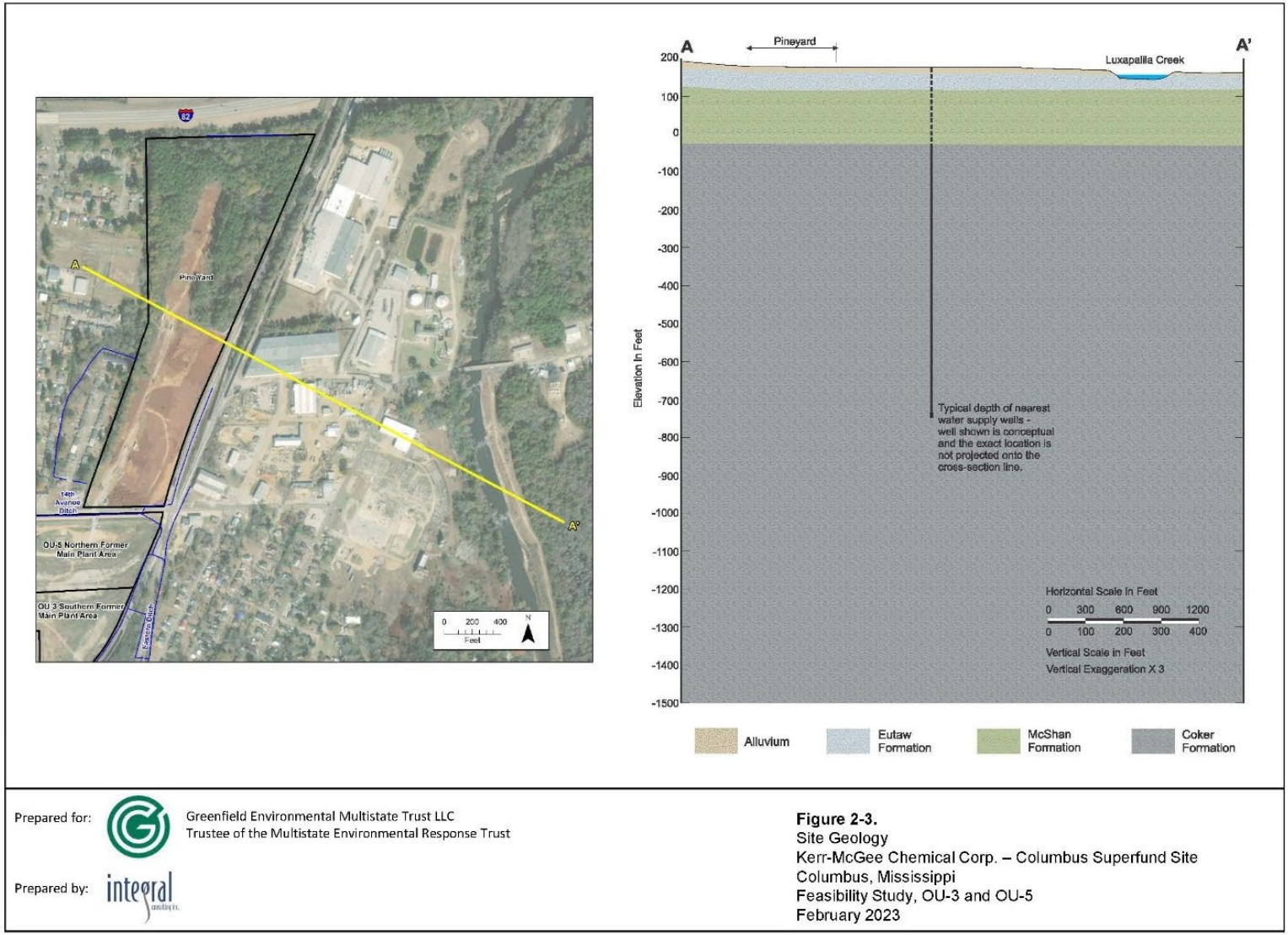


Figure 3. OU3 Features

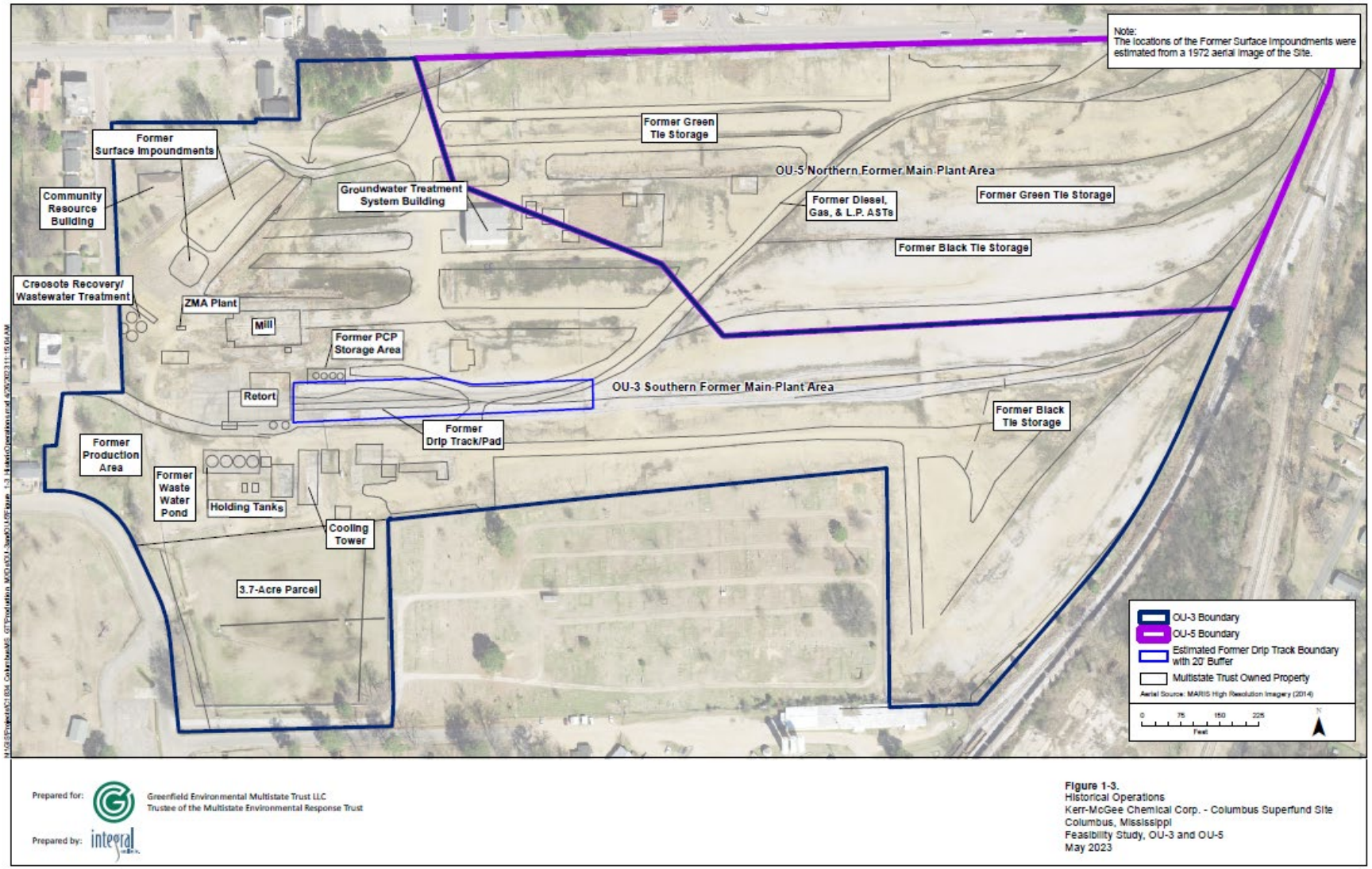


Figure 5. Estimated Extent of Primary Source Area

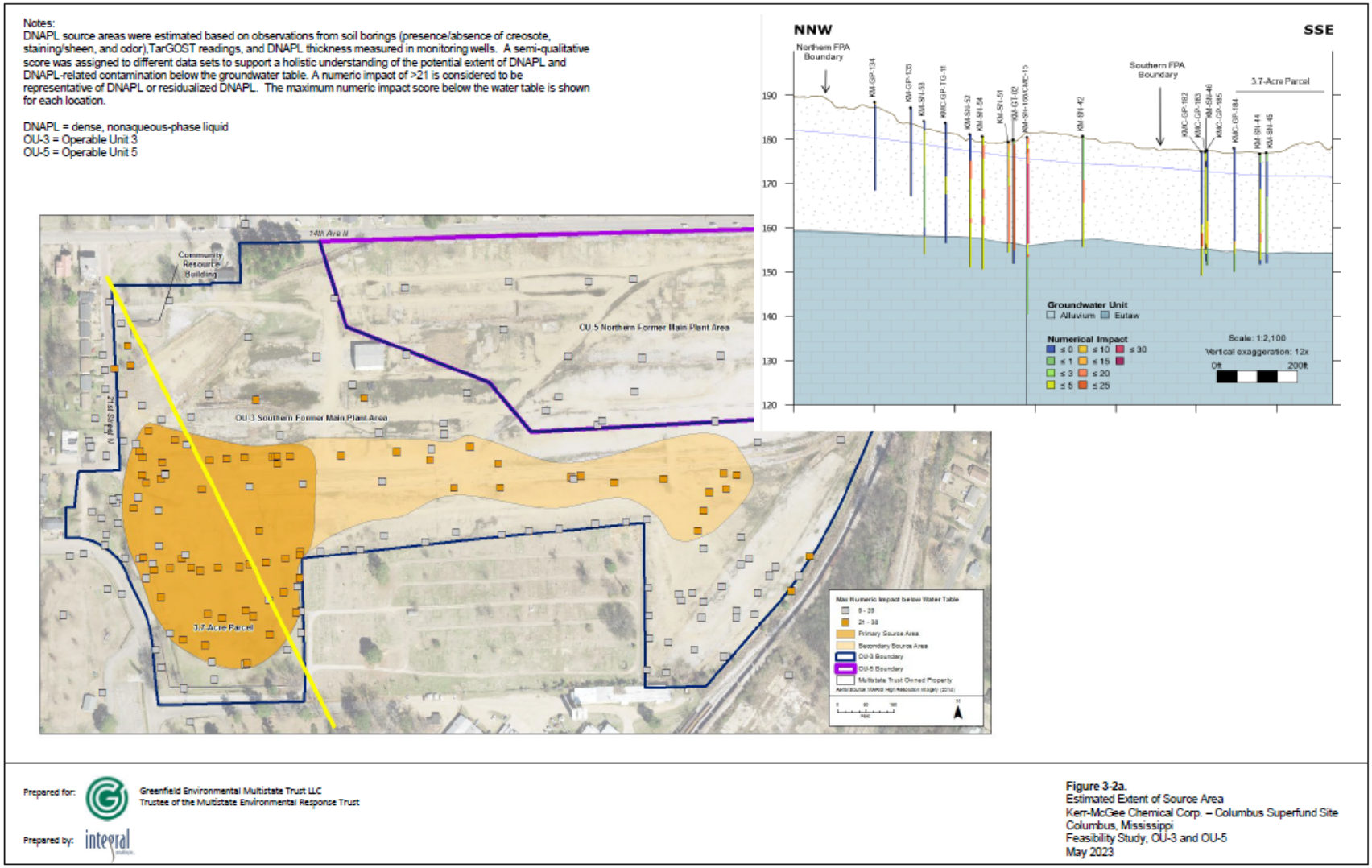


Figure 6. Estimated Extent of Secondary Source Area

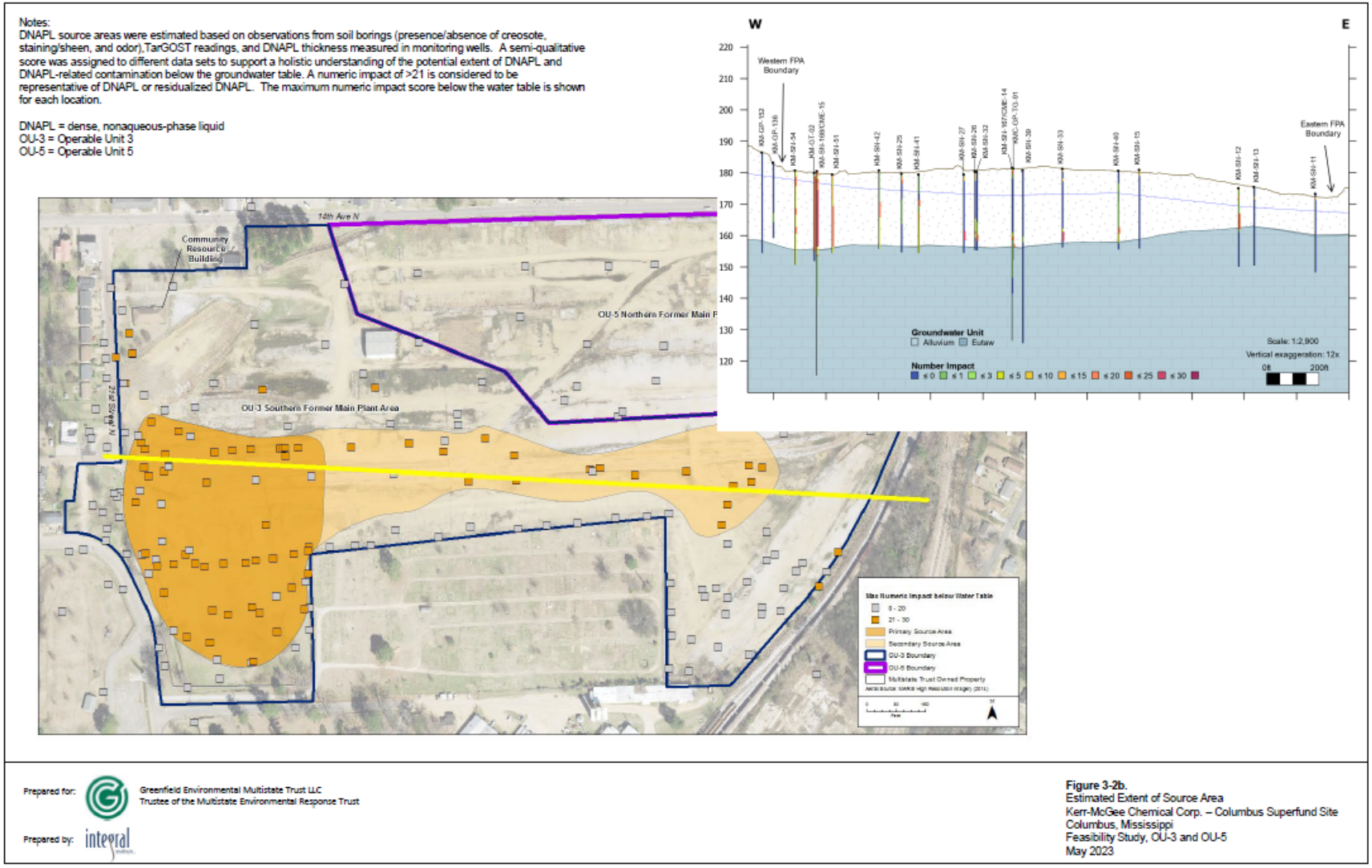


Figure 7. Groundwater Conditions

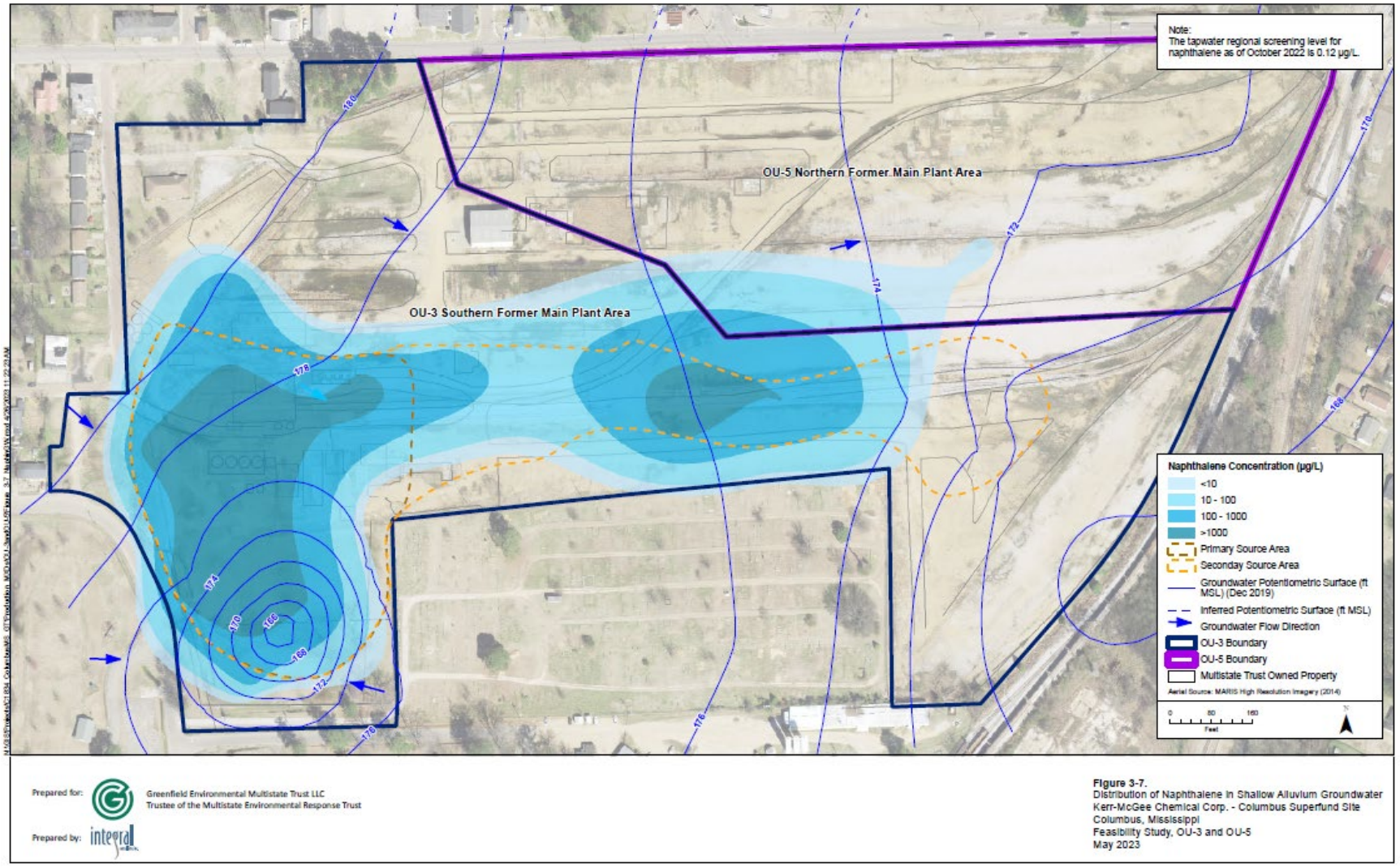


Figure 8. Existing Groundwater and DNAPL Recovery System

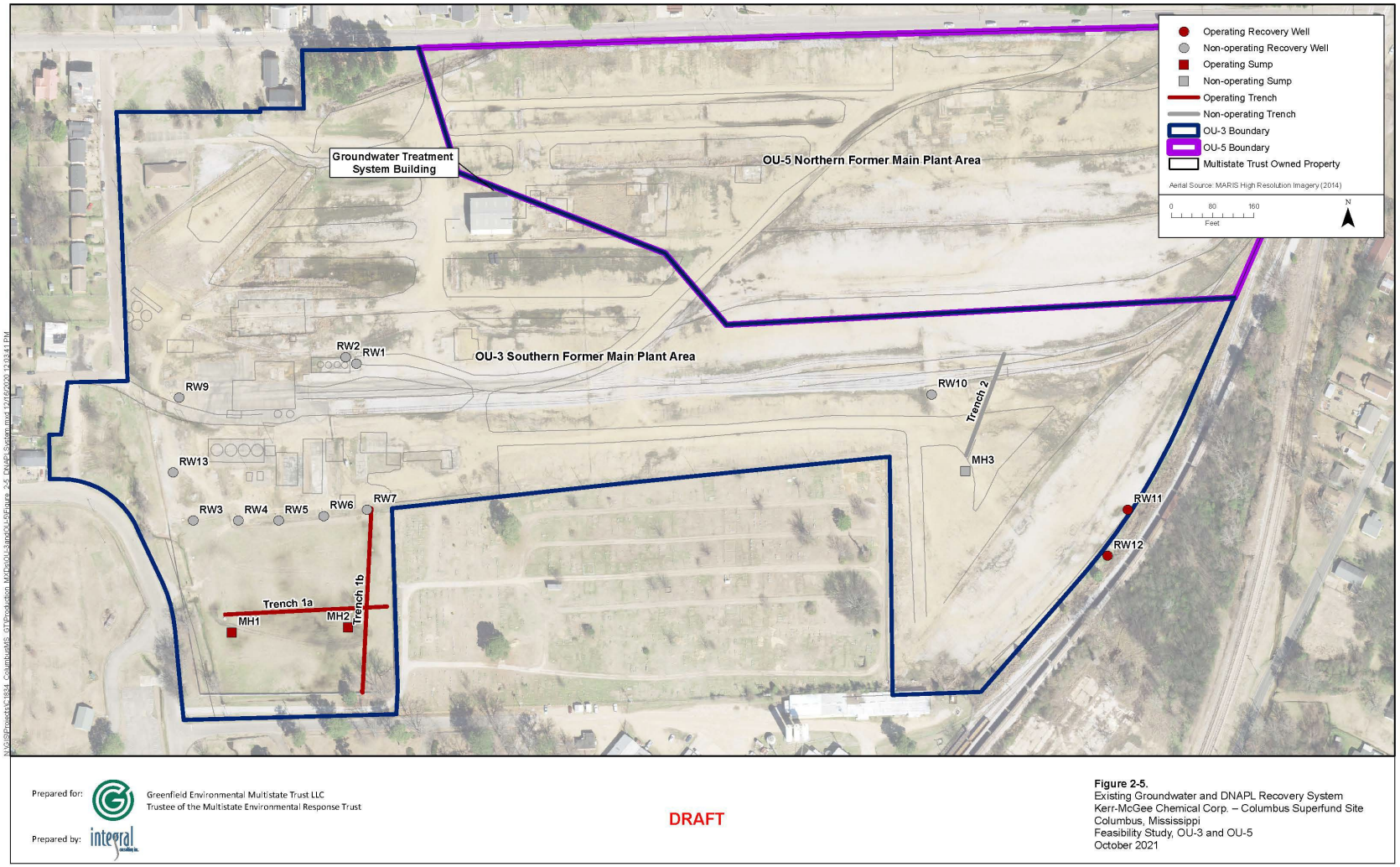


Figure 9. OU3 Sample Locations

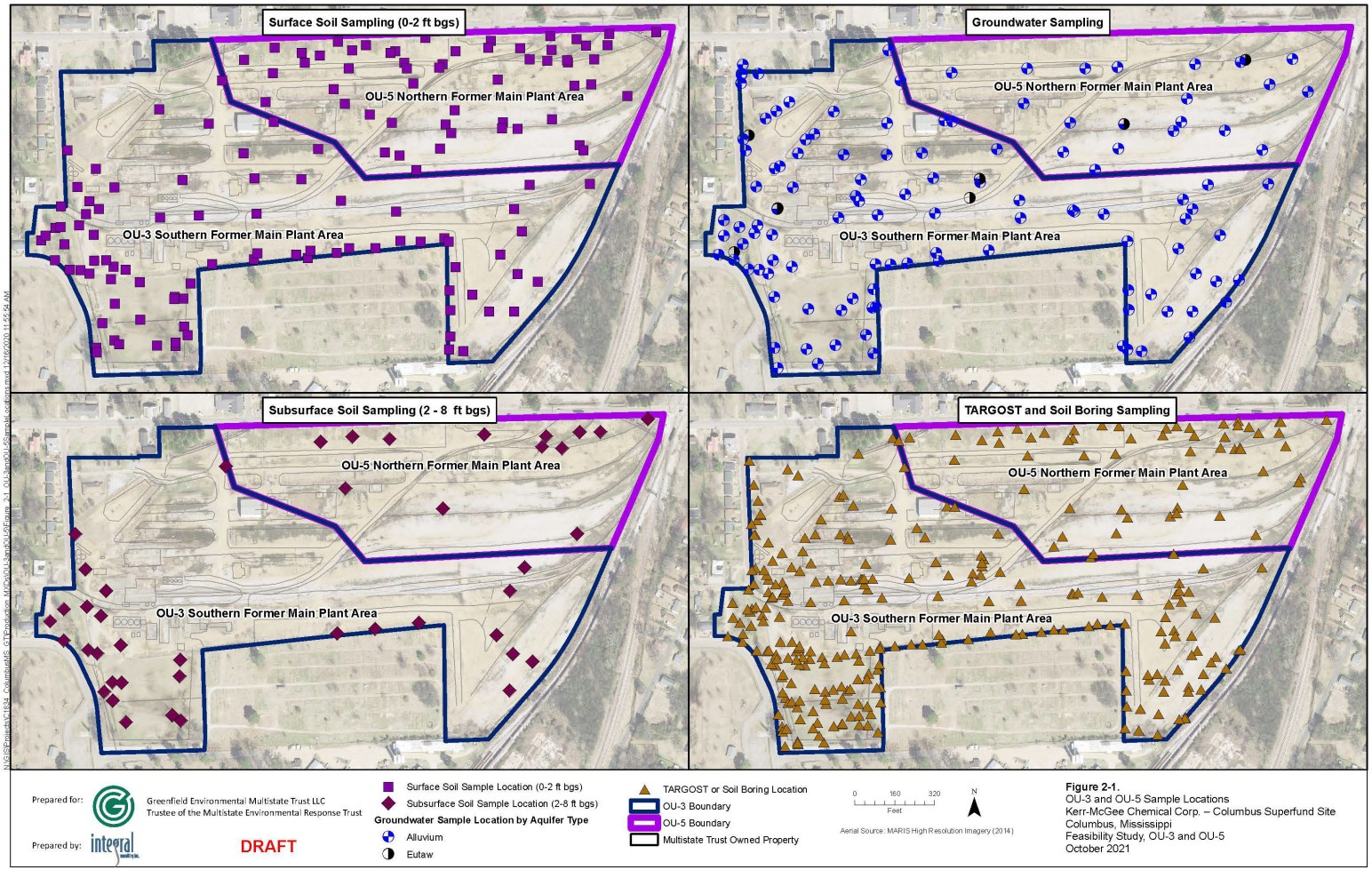


Figure 10. Visibly Impacted Soils

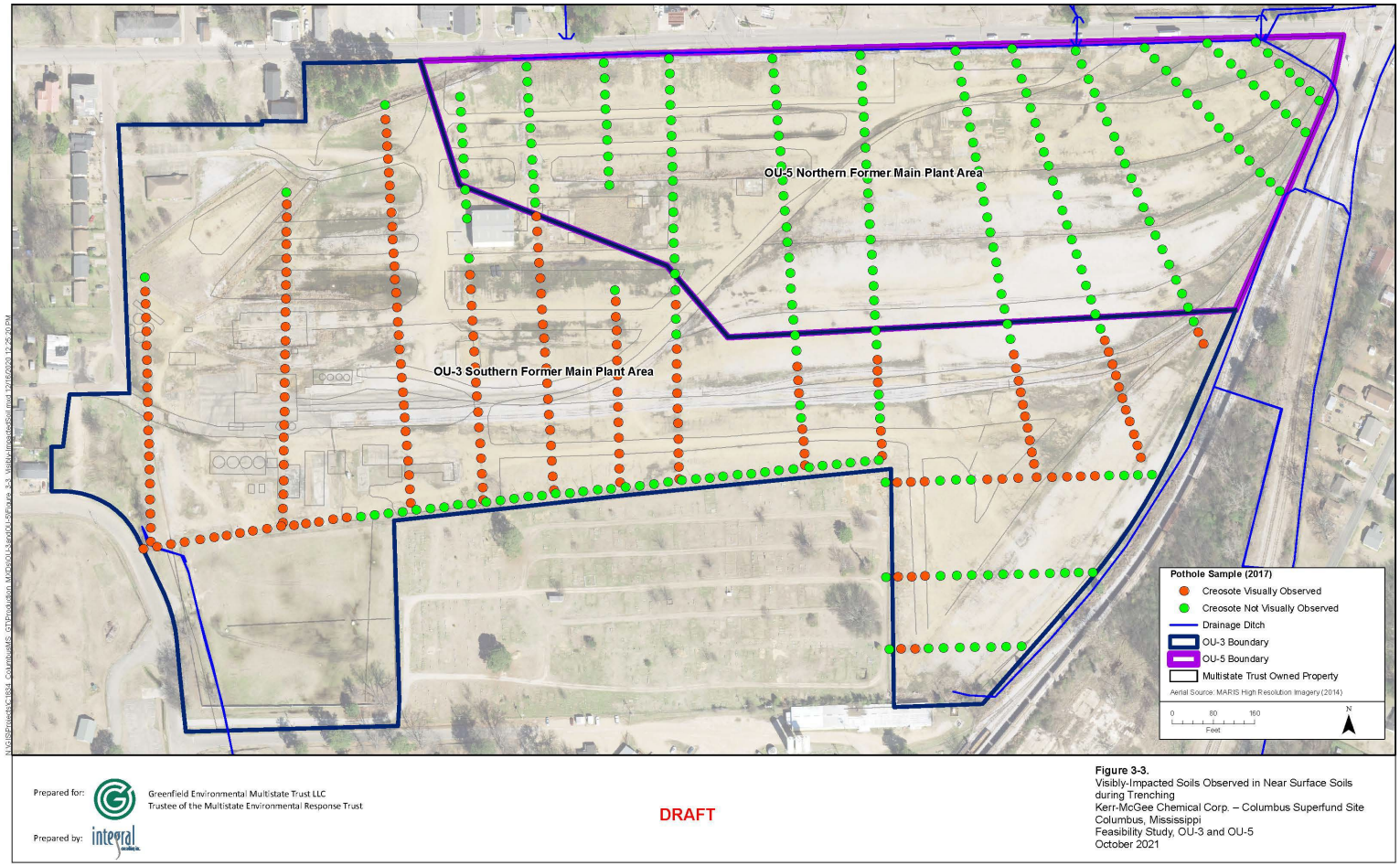


Figure 11. Conceptual Site Model

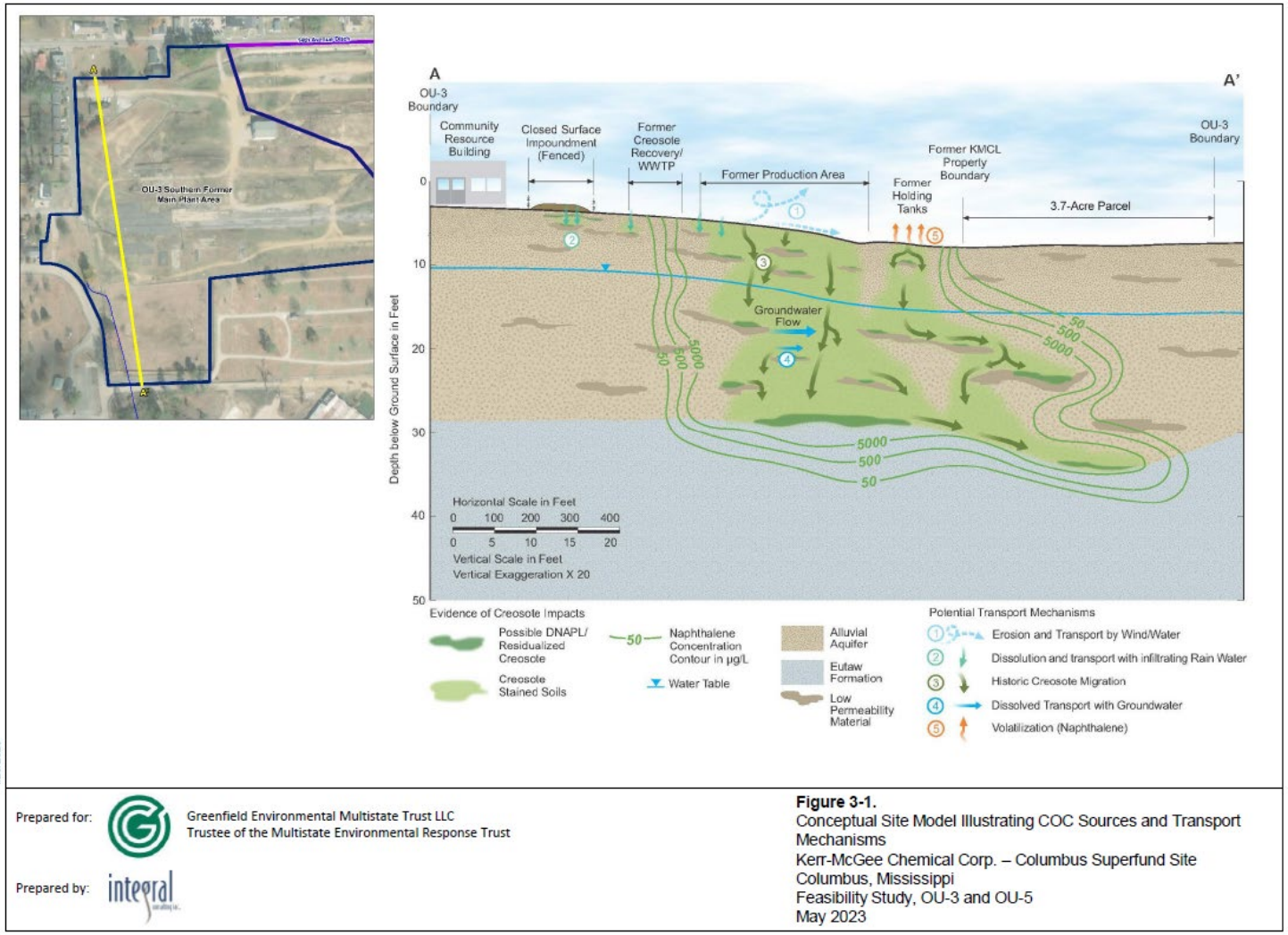


Figure 12. Alternative 3: Downgradient Barrier Wall, Phytoremediation, and Engineered Soil Cover

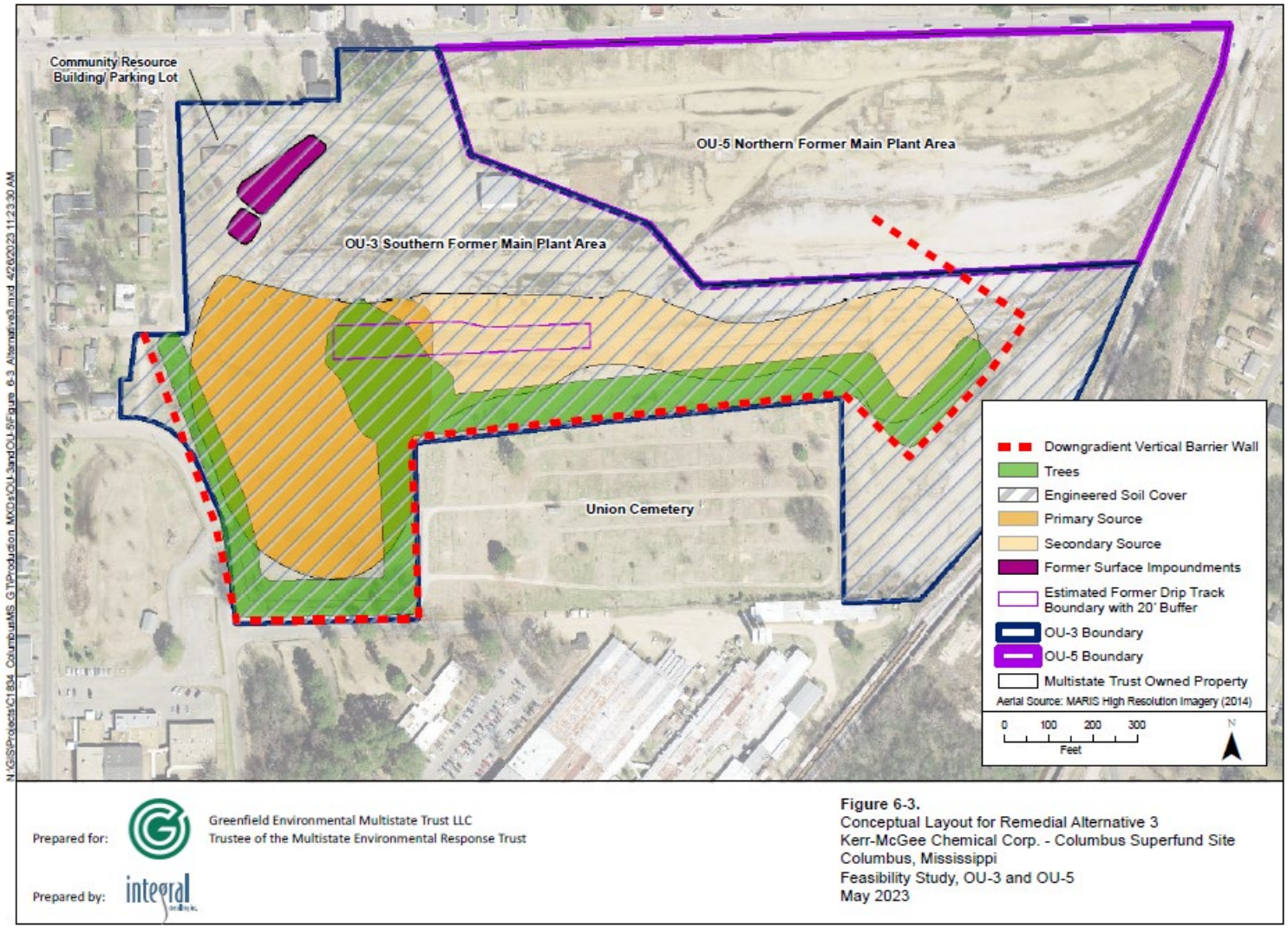


Figure 13. Alternative 4: Barrier Wall Isolation of Source Areas, Phytoremediation, and Engineered Soil Cover

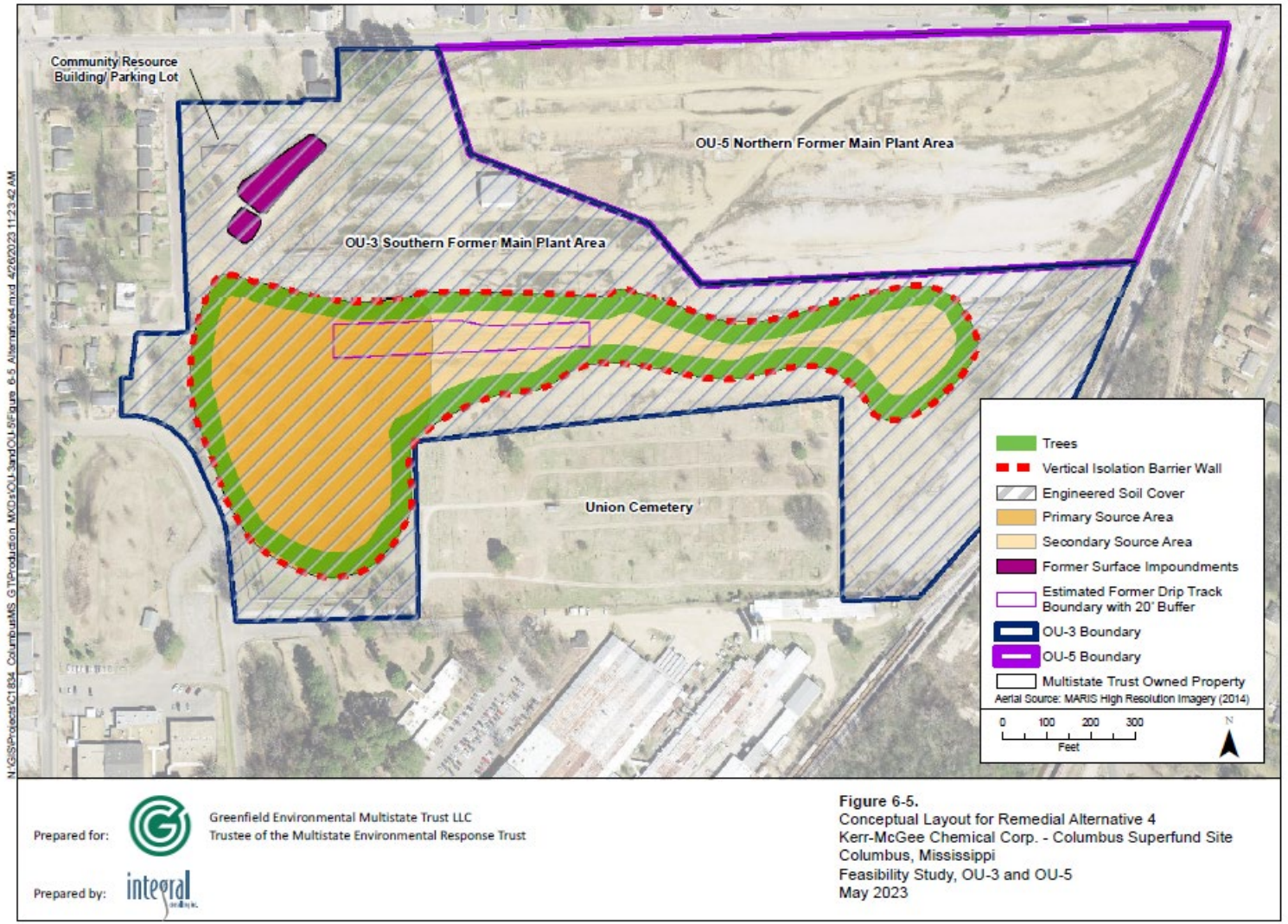


Figure 14. Alternative 5: In Situ Stabilization of Source Areas and Engineered Soil Cover

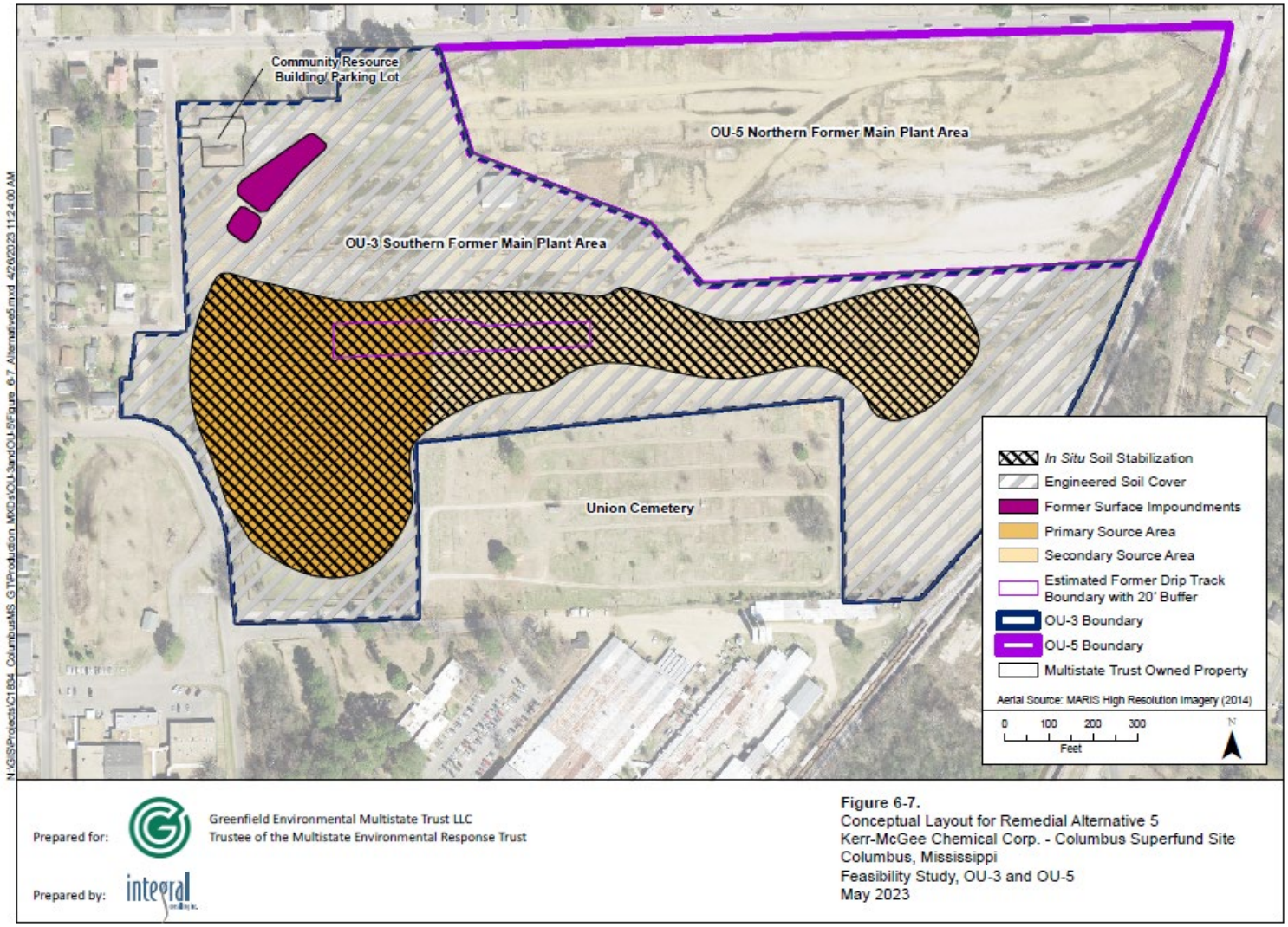


Figure 15. Alternative 9: Removal of Surface Soils and Source Area Soils

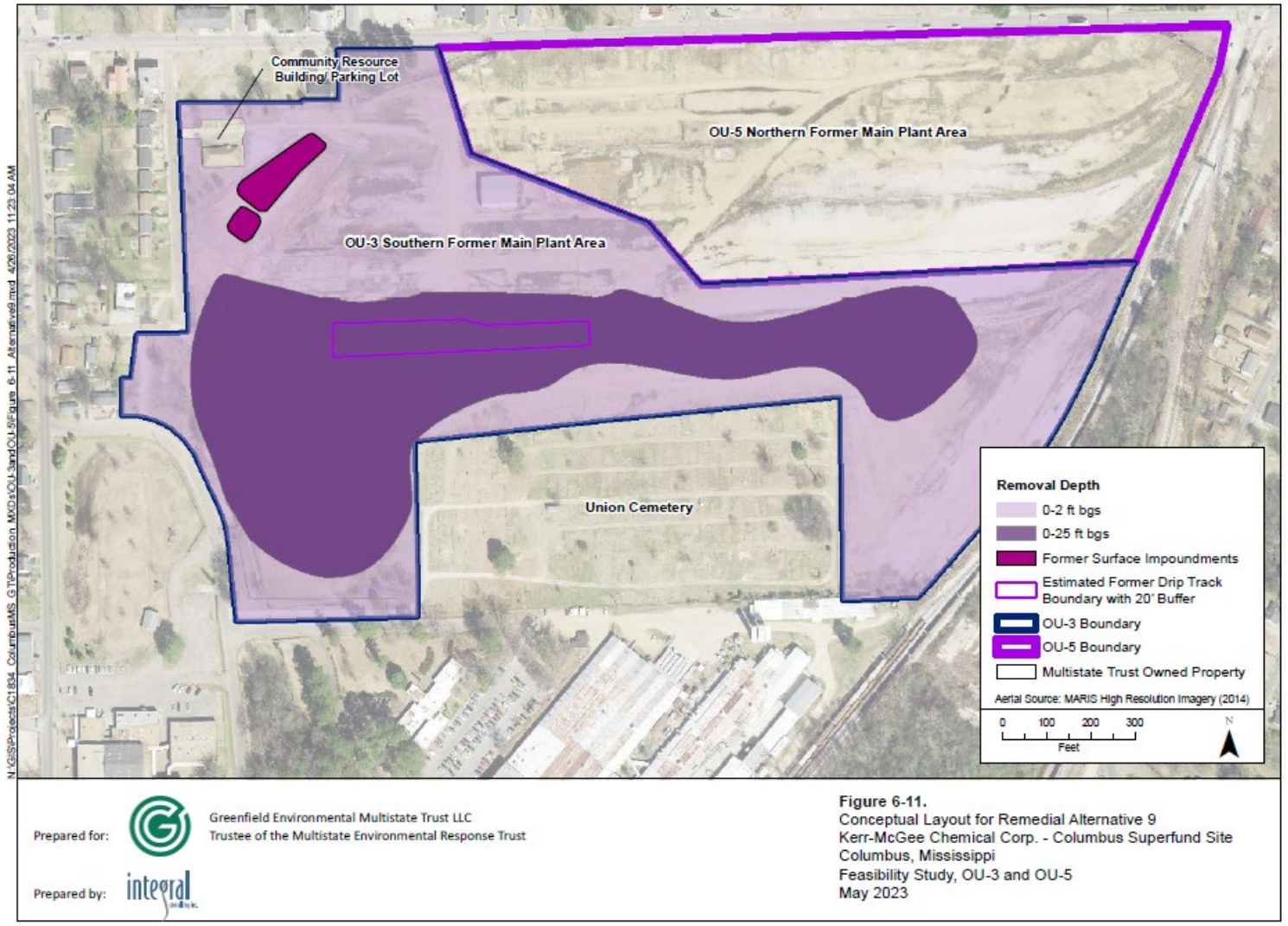
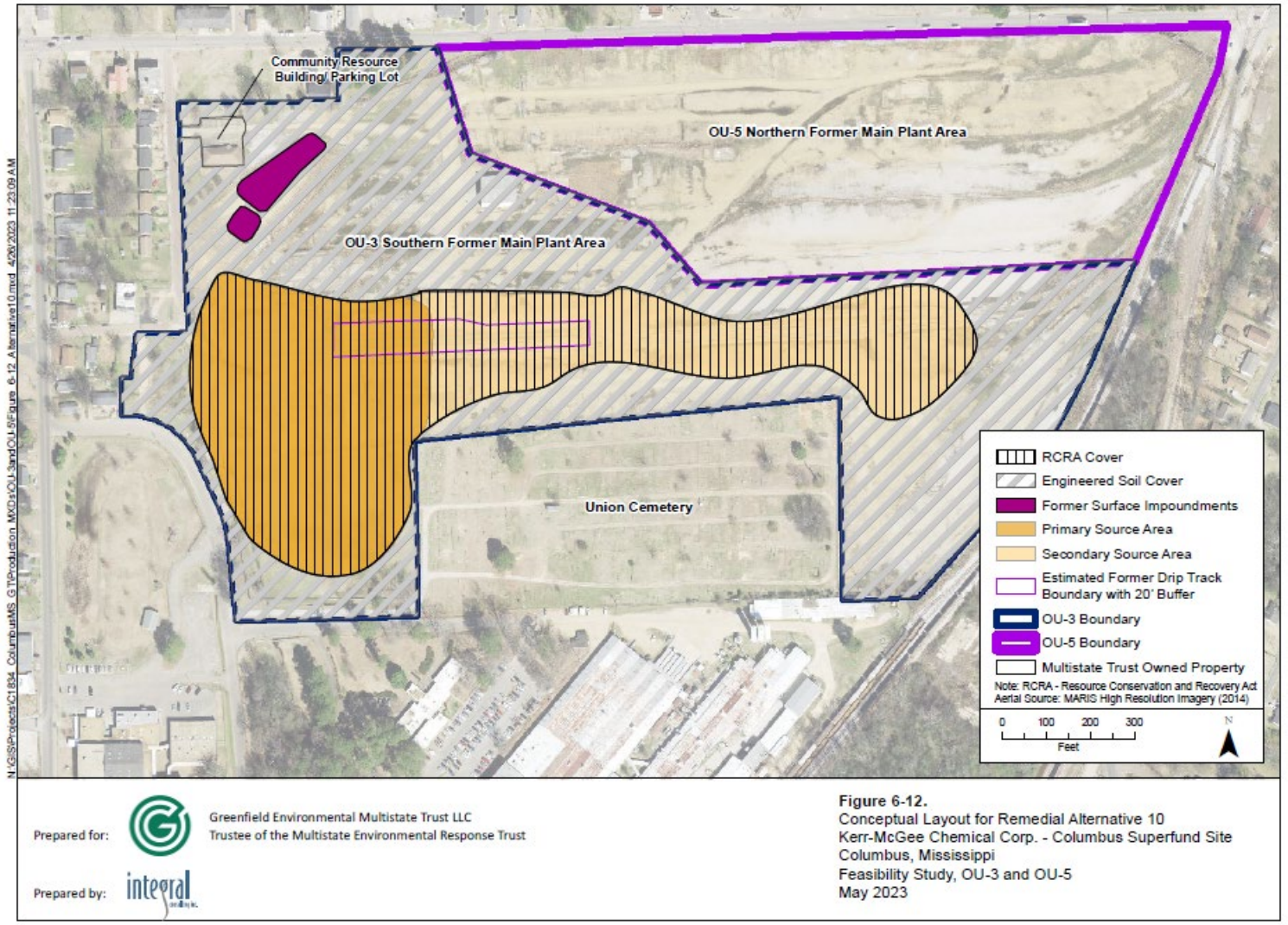


Figure 16. Alternative 10: RCRA Cap over Source Areas and Engineered Soil Cover



APPENDIX A

STATE OF MISSISSIPPI CONCURRENCE

State of Mississippi

TATE REEVES
Governor

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

CHRIS WELLS, EXECUTIVE DIRECTOR

June 28, 2024

Charles King
Remedial Project Manager
Region 4 Superfund Division
Atlanta, GA

Re: KERR-MCGEE CHEMICAL CORP – COLUMBUS, MS
SUPERFUND SITE OPERABLE UNITS 3 RECORD OF DECISION [DRAFT]
Dated: June 2024
Columbus, MS (Lowndes County)

Dear Mr. King:

The Mississippi Department of Environmental Quality (MDEQ) has reviewed the above referenced document prepared by the US Environmental Protection Agency (EPA). The review of this document has generated no comments. MDEQ supports and accepts the preferred alternative plan.

If you have any questions or comments, please contact me at 601-961-5388 or arasberry@mdeq.ms.gov.

Sincerely,

Armed Rasberry
GARD - CERCLA Branch Chief

OFFICE OF POLLUTION CONTROL
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AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX B

PUBLIC MEETING TRANSCRIPT AND COMMENTS

RE: PROPOSED PLAN FOR THE KERR-MCGEE CHEMICAL CORP.
Public Meeting on 10/26/2023

6:18 BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

RE: PROPOSED PLAN FOR THE KERR-MCGEE CHEMICAL CORP. - COLUMBUS SUPERFUND SITE, OPERABLE UNIT 3 (OU3) AND OPERABLE UNIT 5 (OU5) IN COLUMBUS, MISSISSIPPI

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PUBLIC MEETING

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Meeting had at Genesis Dream Center,
1820 North 23rd Street,
Columbus, Mississippi,
on Thursday, October 26, 2023,
beginning at approximately 6:18 p.m.

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MS. SPENCER-HARDY: We're going to go ahead and get started tonight. My name is L'Tonya Spencer-Hardy and I am the acting Superfund chief for community engagement. I am also the community involvement coordinator. And Rosemarie Nelson over here is also an EPA community involvement coordinator. And I want to welcome you guys tonight to our Kerr-McGee Chemical Corporation Superfund site meeting for Operable Units 3 and 5. Thank you for taking the time to come out to be here with us tonight.

So the purpose of tonight's meeting is to talk about the remedial process and the alternative that EPA is proposing for cleanup for OU3 and OU5. The public comment period started October 16th. It will last through November 16th.

On tonight, your comments will be recorded. We do have a transcriptionist on the Zoom line who will be recording this whole meeting, and whatever comments and questions are asked tonight will go into the record of decision after the questions are answered. So just know that this is just another opportunity to provide comments.

So this is our agenda for tonight. I'm going to go ahead and move into the introductions. On tonight, I've introduced myself. I'm with EPA.

Rosemarie is with EPA. We have Eric Spalvins, who is another remedial project manager for a Kerr-McGee site in Navassa, North Carolina. We have Ben Bentkowski who's with the EPA, and, of course, Charles King, who's the remedial project manager. And we also have members of the Multistate Trust. We have Claire Woods. We have Theo.

Theo, do you want to say your last name? Because I'll mess it up.

MR. VON WALLMENICH: It's Von Wallmenich.

MS. SPENCER-HARDY: Von Wallmenich.

MR. VON WALLMENICH: I can't understand why you'd mess that up.

MS. SPENCER-HARDY: I know. After all these years, I should have it by now. I apologize.

But that is Theo. And we also have members of the Mississippi DEQ, Armed Rasberry and --

What's your first name?

MS. LINDSEY: Taneial.

MS. SPENCER-HARDY: Taneial? Okay.

And do we have any other -- oh, we have Mayor Gaskin present.

And do we have any other Federal officials?

UNIDENTIFIED SPEAKER: We've got Councilman Beard.

MS. SPENCER-HARDY: Councilman Beard. Okay. Any other councilmen here, city council? Okay. And we also want --

Pastor Leach, are there any other members of the CAG present on tonight?

Would you like to introduce yourself? No? Okay.

Well, we have members of the community action group who works with us in keeping us informed about environmental issues in the community. So we're happy to have you all here tonight, as well.

And also, please note that we have media here. We have WCBI TV and --

UNIDENTIFIED SPEAKER: The "Dispatch."

MS. SPENCER-HARDY: The "Dispatch."

Did I miss anybody? Okay.

So we have a few house rules. First of all, because this meeting is being recorded and we have do a transcriptionist, we're going to ask that you hold your questions until we get to the question-and-answer portion. And if you're anything like me and you forget things pretty quickly, we have some index cards on the table where you can write your questions down as Charles goes through the presentation. And also, sometimes if you have a question, your question may be

answered during the rest of the presentation. So if you would just hold your questions to the end of the presentation, we'd appreciate it, for the transcriptionist and the recording.

Also, if you have a question or a statement that you would like to go on record, Rosemarie is going to have the mic, and if you would, please state your name and then state your question so that the transcriptionist can take note of it in the transcription.

Also, for the people that are on the Zoom call, if you want to come off Zoom and ask your question, please press star 6 during the question-and-answer period, and also would you please state your name and your question.

And I think that is it. Anything I've missed for house rules?

(Indiscernible background speaking.)

MS. SPENCER-HARDY: And please note, if anybody has a question about the presentation, we will make this recording available on the website once the meeting is concluded. So it will be put on the website for those people who are not available to get on tonight.

So Pastor Leach, if you will come and lead us

in prayer, please,

PASTOR LEACH: Let us pray. Father, we thank you for allowing us to come out tonight. We thank you, God, for the many years that many people have put into getting to this point to where we're deciding what we're going to do to remediate this issue that we've seen in this community for a long time.

I pray, God, that as we go through this evening and many to come, that you will give us the strength, the unity, and the constancy of purpose that's necessary to take this thing to an acceptable conclusion.

God, we pray that, as we go through all of this stuff, that we keep our children and our children's children in mind as we decide what we're going to do with these neighborhoods, and these EPA issues, and all of those things that tend to plague our disadvantaged community.

God, I pray that you will turn all of our hearts toward those that can't necessarily fight or speak for themselves, that we will work for them, or that we would make acceptable solutions for them, or that we would move things forward for them so that their children, as well as ours, can be safe.

We ask this in your son Jesus' name. Amen.

MS. SPENCER-HARDY: So the first thing we're going to do is (audio distortion) talk about the process. This is a short version of the Superfund remedial process and, just so you know, every operable unit that we have will have to go through the same process. And so this is probably the third proposed plan meeting we've had. And so this third proposed plan meeting is for Operable Unit 3 and 5, as I mentioned before, and it has to go through the same process.

And at this point, we are here at the proposed plan process. And so we started out through all of this in the beginning and then, again, each operable unit has to go through a remedial investigation and feasibility study process to get to this proposed plan.

So tonight, we will be talking about the alternative that is being proposed and, after that is done, after the 30-day comment period of is over, we will move it to the record of decision, which is called a ROD, and then at that point, the responsiveness summary will take into account all of the comments and questions that we get during the 30-day comment period. And so this is where we are for Operable Units 3 and 5.

And Charles is going to talk to you about the details on how we got to this remedy proposed plan.

MR. KING: Thank you, Tonya.

How's everybody doing this evening? I'm going to see if I can work this technology. And if I turn my back to you, I'm not trying to turn from you, I'm trying to look at the -- I might hold this in my hand, see if we can navigate this.

Okay. We're here to talk about the Kerr-McGee site, of course. It's a 90-acre site in Columbus, and it's basically split by 14th Avenue. It was a wood treatment chemical manufacturing plant placed on the national priorities list by EPA in 2011 for contamination in the soil, groundwater, and sediment, and the contaminants of concern were related to creosote production, and the site is currently owned by the Multistate Trust.

This is a photo while the facility was in operation, just to give you -- I mean, the people that may be old enough to remember during that time, you can remember these photos, but for some, this is -- this may be new. But this shows a lot of activity on the former main plant, and this is the the part (indiscernible due to unmuted Zoom participant).

As Tonya mentioned, she talked about

operable units, and operable units are just the way that EPA breaks the site up into pieces so that we can manage them. At this site, we have seven operable units. Operable Unit Number 1 is the pine yard area.

Operable Unit 2 was some residential properties that was off the main facility property.

Operable Unit 3 is this darker area here.

Operable Unit 4 is this area, and that includes that (indiscernible.) There was an access road that was initially part of Operable Unit 1, but we're going to deal with that as we -- well, it was an access road that led to Operable Unit 4, and we decided that it was just best to deal with it all. There was nothing that (indiscernible due to unmuted Zoom participant.) So that area was (indiscernible) as well.

Operable Unit 5 is the other part of the main facility, the part that's closest to 14th Avenue and the pine yard.

Operable Unit 6 is the groundwater underneath the whole property.

Operable Unit Number 7 is going to address the wetlands area.

But what we've come to discuss tonight is Operable Units 3 and 5.

(Indiscernible due to unmuted Zoom participant) contamination in Operable Unit 5, kind of where it came from. It came from basically the process areas, the tank farm and creosote recovery and that was a -- there is a surface impoundment that was actually addressed under the State law that we commonly call RCARA, but it stands for Resource Conservation and Recovery Act, but that was regulated under the (indiscernible due to unmuted Zoom participant) within the facility finding.

What we get from this slide is, there was a large number of samples that we collected in order to come up with the alternative that we're going to bring to you tonight. TarGOST soil borings in Operable Unit 3, there were almost 250 TarGOST borings. And TarGOST is, it's where you drill and your core down and there's a special piece of equipment that actually looks for creosote-type problems, because we knew that this was a creosote site. We looked for it and, guess what, we found it in a lot of areas.

Surface soil samples in Operable unit Number 3, we took almost 100 -- well, we took over 90, because we may have even done more than the 93, but we collected some samples since this document was printed or since those numbers were generated. So over 93

samples of surface soil. And what we call surface soil was zero to two-foot depth from ground surface.

Subsurface soil, we call it, from two to eight feet below ground surface, we took over 40 of those.

Groundwater samples, we collected over 450 groundwater samples at Operable Unit 3.

Over in OU5, we took the same type of samples. We took 59, 57, 43, and 73 of those respective samples in OU5, and all -- OU3 and OU5 together are the main facility. So this is -- these are additional samples not included in what I just showed you. These were samples to just determine visibly whether they could find contamination.

The Multistate Trust, under the direction and oversight of EPA and the State, actually did some trenching, and basically it was straight lines all the way across the facility. And I don't know how well you can see the difference in the color, but -- hold on.

These lines here are -- that used to be green. I think that -- what's that showing; green or yellow? Okay. That color is basically saying that there was no visible contamination there.

On this side, where you see the oranges,

there was actually visible contamination shown. And that's consistent with what we thought we would see because the part where we're seeing the oranges are the part where more of the production stuff was.

This is just another example. I wanted you to see diagrams that are in the big report that we call a feasibility study report. Either that's feasibility or remedial investigation. But it's one of the reports that we looked and showed the number of samples that we've taken are at the locations.

So these four areas still show the same kind of -- they kind of represent the chart that I showed. Some of them are surface, zero to two; some are subsurface, two to eight; some are groundwater, and then some are the TarGOST. The TarGOST down in the bottom right there are the ones that you drill down and they look specifically for creosote. And we spent a lot of energy and effort looking for creosote-type products.

The NCP, or the National Contingency Plan, which is the law that we have to follow, the law that we operate under, expects that EPA will use treatment to address principal threats posed by sites whenever practicable, that means, whenever possible, whenever it makes sense, and to use engineering controls for

wastes that pose a relatively low long-term threat.
EPA considers there's a DNAPL, a dense nonaqueous phase liquid, which is a primary source, and then a residual one that we call a secondary source. We consider those principal threats, and I'll show you on a figure coming shortly. And EPA considers the sort of outside those source areas as relatively low-level threat areas, and I'll show you why in just a second.
This is a figure that came out of one of our investigation documents that basically shows -- you see, this is a darker colored orange and this is maybe a lighter, but this is what we determined was a principal source and a secondary source, and that figure was drawn based on sample results. So it's a lot that went into that figure.
This up here is a reading from a TarGOST scan and basically it's -- I think it goes along this line. All of these indicators help to determine where creosote is identified. And the -- I won't say experts -- the geologists, they're -- they have contractors that specialize in remediation help to determine where the contamination is.
This figure here is showing a naphthalene, which is a groundwater plume, but it almost has a

similar shape to the other plume that we said was a principal source. If you remember, it -- well, it has a really similar shape, pretty similar. As a matter of fact, I'll roll it back so you can look at that one. It has some similarities. It's not exactly, but there are some similarities. Okay.

So when we evaluate the risk and offer an agreed risk for the future residents, there were unacceptable risks to future residents, outdoor workers, indoor workers, construction workers, and trespassers via ingestion, dermal contact, and inhalation.

So any time EPA -- any time the EPA is evaluating risk, unacceptable risk, to any kind of contamination, you have to have what our risk assessors call a completed pathway. In order to complete a pathway, you've got to make sure that the contamination gets to you and it gets to a person by three ways: Inhalation, when you smell it; ingestion, you eat it accidently or on purpose; and dermal contact, meaning through your skin.

So we're going to talk -- and I took the time to say that because we're going to talk about risk exposure and the thing that's going to be important to note, any time that -- the only way risk gets to you

is by three ways from contamination: Inhalation, ingestion, dermal contact, which is through the skin. Got it? Smell it, taste it, get it on your skin.

Okay. What you want to get from this slide, we talked about the unacceptable risk. We talked about -- I mentioned that a little bit. The ones in gray are areas where they're unacceptable risks. These are soil, skin -- OU3 soils, and it's from the FS report, from the feasibility study report. We looked at two risks in there. We looked at lifetime cancer risk, excess lifetime cancer risk, and noncancer risk.

For this scenario, for the OU3 soils, for the soils back in the process area, resident exceeds -- it's an unacceptable number. Outdoor workers is an unacceptable number. For surface soils and subsurface soils, the construction worker has unacceptables. Anything in the cancer line that's above one is going to be unacceptable number. Anything above one times 10 to the minus 4 here will be an unacceptable number.

Okay. The same thing that we just talked about, the hazardous indexes, this is for the OU5 soils. OU5, remember, that's the one that was not in the process area. So in general, you would think it would probably be less contaminated because there was

not as much activity going on.

In OU5, the excess lifetime cancer risk was exceeded for resident. That means you can't live on it. You can't live on OU5. The noncancer was exceeded for a resident. The only other thing that was exceeded for OU5 soil was a construction worker, and I said anything above three, so -- I mean, excuse me, above of one. So in this case, in the OU5 soils, right now, with nothing to do, you can't live on it and, if you're going to do some kind of construction, you've got to make some special provisions.

Now that we've talked about the risks to the soils in OU3 and OU5, it's EPA's current judgment that the preferred alternative that we submitted in the plan or one of the other active measures considered in the proposed plan is necessary to protect human health and the environment from actual or threatened release of hazardous waste.

Remedial action objectives: Remedial action objectives are what EPA has to develop. When you find there's an unacceptable risk, you have to figure out what you've got to do to mitigate or to overcome that risk, or to make sure that that risk is not a -- there's not any harm.

So in this case, the remedial action

objective or RAO number 1 is to reduce or eliminate exposure of potential future construction workers to the OU5 surface soils. Now, remember when we said that OU5, the only threat -- I mean, you couldn't live on it and it was construction worker. So, therefore, the RAO for OU5 is going to make sure that a construction worker -- so that we -- to eliminate that risk for the construction worker. And you remember the three ways that you get that risk: Inhalation, dermal contact, ingestion. Okay.

So RAO number 2, we're going to reduce or eliminate the exposure to potential future industrial, commercial, or construction workers to OU3 soils, and it's going to be the same way, by preventing the inhalation, ingestion, dermal contact.

RAO number 3 is to prevent or minimize the migration of COCs, or the contaminants of concern, the ones that were unacceptable at that, quote, unacceptable risk, from contaminated surface soils through stormwater runoff or windblown dust. We want to make sure that that doesn't happen.

And RAO number 4 is to minimize the migration of COCs, or contaminates of concern, that have unacceptable risks from the source material through either removal, treatment and/or containment to

improve the groundwater quality outside of OU3 and OU5 over time.

We thought it was important to note that groundwater restoration is not in the objective of this remedy. However, the proposed remedy will -- it is expected to improve, and it will. And I believe it will. We believe it will. All the technical people, based on the information we have now, we believe it will improve the groundwater quality and will eventually help to improve the groundwater restoration, or it may shorten the water restoration time. But we will have a groundwater ROD. There will be another proposed plan that will deal with groundwater. Basically, we're not trying to -- groundwater restoration is not the objective of this remedy, but what we're doing will help it, even though that's not the primary objective.

Okay. This big table, what it is is it's proposed cleanup levels for each of the contaminants of concern in OU3. These were risk-based numbers. The risk assessor generated those, and these are numbers that the soil will have to be cleaned up to.

These are proposed cleanup soil -- these are proposed soil cover levels. So any soil that we bring in or that's brought in by the trucks that EPA and the

State have provided oversight of, you can't just get it outside of somebody's back yard. There is testing that goes on to ensure that the soil meets or exceeds those conditions.

In the cleanup levels for -- proposed cleanup levels for OU5, and there was only one contaminant of concern in OU5, and that's benzo(a)pyrene.

So now that we've talked about what the proposed cleanup levels are, so let me give a quick review. The first thing we did with all those samples and stuff that I showed you, we were trying to do what EPA calls determine nature and extent of possible contamination. What that means in the short run is to find what's there, where is it, how much of it is it, and is it poisonous or is it toxic, does it cause a harm. After you find out what's there, you determine whether it causes harm. If it does cause harm, then that's what we call an unacceptable risk.

Once we determine that there's an unacceptable risk, then we do remedial action. Our objective is to try to eliminate or minimize those risks. And then we have to come up with alternatives, what's the best way to now eliminate the risk that we sampled and found out was not safe.

Now, as we generate the alternatives, the EPA

Superfund program has a set of guidelines that we have to use, and that's called the nine criteria. That's what this is up here. The nine criteria is -- and you guys probably can't read it there, but the nine criteria is broken up into three major sections.

The first section is called the threshold criteria. The threshold criteria consists of overall protection of human health and the environment, and compliance with ARARs. What that really means is that we can't carry a remedy through full evaluation if we know that it's not protective. The other thing that that remedy has to also do is it has to meet -- I said ARARs. ARARs are applicable or relevant and appropriate requirements. And what that means in simple terms is it must meet all Federal, State -- all appropriate Federal, State, and local laws and ordinances. So whatever we carry through, it has to meet those two.

Then we have what's called the balancing criteria. The balancing criteria includes long-term effectiveness, reduction of toxicity, mobility, and volume, short-term effectiveness, Implementability, and cost.

Long-term effectiveness is how good is it going to work, is it going last. Reduction of

toxicity, mobility, or volume means can you make it less toxic, can you make it less poisonous. Mobility, can you contain it, can you -- if it was spreading, could you contain it. Reduction of volume means that could you take it and make the problem smaller. Everybody with me? Okay.

Short-term effectiveness: Short-term effectiveness is, while you try to construct the -- while the project is being built, constructed, is it going to be difficult to do, is it going to be dangerous, are there going to be some dangers to the community while you're building it up.

Wait a minute. Is that what I'm doing? Yes. Yes.

Yeah, how much time and is it going to cause any problems with the folks around, workers and/or residents.

Implementability: Can you do it? I mean, sometimes there's something that you think is good and it's just something that maybe it's not proven, don't want to take a risk of trying to do something that's not been implemented or there's not a good chance that it can work.

Cost: Cost is just that we evaluate all the alternatives based on how much they cost.

Now, modifying criteria: Modifying criteria is State support agency acceptance. We've worked with MDEQ throughout the process and we expect to continue to work with them, but that -- and then the other one is community acceptance.

Community acceptance is why we're here tonight. Community acceptance is EPA, the lead agency, with support from the State agency, has evaluated the situation, proposes a remedy, but we want to get your input. We want to make sure that there's nothing that we've forgotten or something that we've not considered maybe as fully as we should have. This is where you get a chance to give us input. We will, at the end of the presentation, we'll take questions at the meeting, but as Tonya indicated and should be on your mail-out, if you still have it or if you looked at it, the comment period lasts from August 16th to November 16th.

What did I say? October 16th to November 16th. I apologize. Thank you. That's why I -- I've got the best folks on my team in the world. Don't let nobody tell you different.

But so that's why we're here tonight. We want to get your input on what we're proposing.

So I told you that we have to evaluate

alternatives, but what I wanted you to see here was in the original feasibility study. The feasibility study report is, after we found out there is a problem, we need to do something, then the feasibility study is where the alternatives are developed, things that can be done to address the problem.

In this case, there were nine alternatives that were identified: DNAPL recovery, vertical barrier wall, removal and disposal, engineered soil cover, phytoremediation, institutional controls, RCRA cap, in situ treatment, and monitoring. And the one that -- so I have nine up there, but under our circle of law, we have to also consider no action. We have to always consider no action.

So of those 10 alternatives -- you know, there were nine, nine plus the one for no action. There were 10 alternatives that we were looking at, but only six of those were carried through through a full evaluation. And I know the numbers -- my mama was a teacher in math in Mississippi, and if I counted the way those numbers look like now, one, three, four, five, nine, and ten, I might have to -- I might get punished for that. But I do want you to know we do know how to count to 10.

The four alternatives that were -- that

didn't get evaluated all the way through, we just kept or original numbers of the alternatives in the FS, so that's why the numbers are not sequential from 1 to 10.

The ones that did get carried through were no action. Alternative number 3 is downgrading it, barrier wall, phyto remediation, and engineered soil cover.

Alternative 4 is the barrier wall, isolation of source areas, phytoremediation, and engineered soil cover.

Alternative 5 is in situ stabilization of source areas and engineered soil cover.

Alternative 9 is removal of surface soils and source area soils.

Ten is RCRA cap cover, source areas and engineered soil cover.

Those were the six that were carried through for a full evaluation. And that was the evaluation for UO3.

In the FS report for OU5, all of the alternatives were eliminated except for the no action and institutional controls in the form of a soil management plan. And, because of that, the EPA proposes as an interim -- we propose this as an

interim remedy until the uncertainty of OU5 risk assessment is resolved. Once it's resolved, EPA will evaluate the data, collect additional data, if necessary, and update the risk assessment, and then we'll issue another proposed plan to address the interim.

And when I said we don't have enough information, I want to make sure that you guys understand what the soil management plan is. I think I told you that, in OU5, there was only one contaminant. That was benzo(a)pyrene. It was at low levels. It's in an area we call a relatively low-risk area.

Depending on what the reuse scenario is, let's say it's going to be a parking lot, maybe nothing will need to be done. You know, I mean, you would pave over it and there wouldn't be any threat. But if there was going to be something that may require digging, or footings, or something like that, there may be some additional things that need to be done.

Once EPA -- we work very closely with the CAG, the mayor, and the local stakeholders here. Once a decision is made on what would be done, whether that's with local state funds, or if somebody bought

it, or whatever the situation was, once a decision is made what will be done, then that could impact whether any remediation is needed.

But right now, the only unacceptable risk is if you were living on the OU5 part or if you were a construction worker digging through that dirt. So right now, there's no unacceptable risk unless you were living there or you are a construction worker. I can hear myself answering a question. And the risk that is there to a construction worker, oftentimes it can be eliminated by just protective clothing, meaning boots, hard hats, making sure that there's no contact on the skin, those type of adjustments.

Summary of alternatives: I know this figure is really, really busy. I want you to -- I'm going to try to guide you through two things you've got to get. If you guys can see the circles through here, the more the circle -- so the clean circle is very poor, that's poor. Fair is half. Good looks like it's three-quarters of a pie. And the completely filled one is excellent. So that's the circles.

These categories up here are the nine criteria that we just talked about. Well, not nine. There are seven of them that we just talked about. And along this line are the alternatives. What I want

you to get from this figure is, when you look at the circles, the two that's -- have the most completely filled circles are these two here, unless I'm seeing wrong, these two. This one is three-quarters full. This one is completely full.

This is alternative 4, which is -- but it's based on the evaluation of all the criteria, which leads us to the EPA's preferred alternative is alternative 4, which is the barrier wall, isolation of source areas, phytoremediation, engineered soil cover, ICs, or institutional controls, meaning it could be deed and land use restrictions to make sure that, you know, there was no digging where -- there doesn't need to be any digging, there would be monitoring and, because in this case, this alternative would leave material inside this -- inside this slurry wall, this wall and cap area.

It's a requirement by EPA that any time waste is left on-site, EPA has to come back at least once every five years. It's called a five-year review, and it's a mandatory -- it's a statutory requirement. And what happens during that five-year review inspection, EPA and the representative from -- well, a representative of EPA and the State would come out, they look at the site with contractors, they do an

evaluation, and the things you're looking for is, is the remedy still performing as it was intending, are there any changes in what we know about the signs of the chemicals that we're dealing with.

If there's a change in the, let's say, something that maybe we thought was less toxic and we found out later that it's more toxic, then we would do an evaluation to see are those cleanup levels that we set at this time on this lot, are they still protecting, you know. And if they were not protecting, then EPA would be mandated to come out and do something and make sure that it's protected. And as long as there's waste left on-site and that -- whatever waste that's on-site, it's a mandatory requirement to come back and ensure that it remains protected at least once every five years.

The rest of the selected remedies that achieve the threshold criteria, is protective of human health and the environment, complies with any laws, the State and local laws and ordinances that are applicable, it's the best trade-off of the balancing criteria, it's cost effective, and it provides a permanent solution to the maximum extent practicable, and it has concurrence or support from our EPA headquarters, MDEQ, as well as the Multistate Trust.

As I indicated earlier, this public comment period runs from October 16th to November 16th. You can e-mail comments to me, king.charlesl@epa.gov. And if you have the fact sheet of the mail-out, it is on that, so you don't have to write it down, if you've got the fact sheet or mail-out. If you want to write comments, U.S. EPA R4, SEMD-RSS, 61 Forsyth Street, NW, Atlanta, Georgia 30303. There's also a website and it's in the fact sheet, too. I'm not going to read all of the dashes and slashes. And there's an information repository at the Columbus-Lowndes Public Library at 314 North 7th Street.

One of the things that, over the years -- and I've been working with the project for more than 10 years. We have taken what we call a TEAM approach, you know, together everyone accomplishes more. I won't go through all of this, but on the together part, I think it's been -- I think it's reasonable to at least talk about the "Together" part. We worked collaboratively with State of Mississippi, City of Columbus, the Trust, the CAG, Columbus Light and Water, the local stakeholders, and we've got some things that I think are pretty special. I mean, a couple them that I could just mention right off the bat (indiscernible), but you probably can't even read

them, may not be able to read that.

But the 14th Avenue Ditch, if you've been living here for some time, the 14th Avenue Ditch was one of the first things that we did. It was a collaborative effort with City of Columbus, EPA, State, Columbus Light and Water, and we took what was an area that was contaminated, City needed a turning lane, and we put resources together and put staff together, and we found a way to find some common ground to try to deal with issues that helped everybody, you know. And on this site, I'm proud to say, not only did the 14th, then we turned around and did the 7th, the 7th Avenue, and then we did the connection between Moss Street, and Moss Street is between 14th and 7th. So we've got some collaborative projects and we've got some good stuff coming in the future, too.

But I just wanted to at least let you guys know that, you know, EPA is here. We're not going anywhere. The Trust is here. The Trust has been working very, very hard. I think we've got a good collaboration going on. And I just wanted to make sure you guys really understood that we really mean TEAM when we say it, together everyone accomplishes more.

Questions?

MS. SPENCER-HARDY: Just as a reminder as we go into the questions, for those people who are on Zoom, please press pound six to come off of the Zoom audio if you have questions. And also for everyone, if you have a question, please state your name and then your question for the transcriptionist, to make sure she gets it for the record.

And also as a reminder for the folks on Zoom as well as the people in the room, we will not be taking questions about the tort suit tonight. If you have questions about that, we do have a flier that has been developed. There's some out on the table. If someone wants that information, you can get that information, as well, from the community center about the tort claim. And also for those of you who know Reverend Samuels, you can also contact him, as well. So just a reminder, we are not answering questions about the tort suit. That is a separate issue and -- but we do have information available and a sign-up sheet for those people who want more information about that.

Questions?

MR. BARLETTO: I do have one question.

PASTOR LEACH: Darren Leach, Memphis Town

Community Action Group.

Charles, I want you to tell me the statement you made about under what conditions that no remediation would be required.

MR. KING: Well, in -- what are you talking about? In --

PASTOR LEACH: You made a statement that, under certain conditions, no remediation will be required on parking lot or --

MR. KING: I think you're talking about for Operable Unit 5. So let me -- I did say that. I want to make sure I did the full -- so OU5 currently has -- we're currently proposing a soil maintenance plan. I mean a soil management plan. I'm sorry. And the management of the soils is going to determined based on the activity that's going to be done on it. So I did say that there's -- there could be a scenario like if they're going to make a parking lot, you know, maybe the construction workers might need to make sure that they don't get the dust and things like that on them, but if it was a parking lot in OU5, then that would only just be an additional barrier. And so I'm saying that it wouldn't be any -- that could be the kind of scenario that no remediation would be required.

PASTOR LEACH: I realize that, you know, no single technology can remediate an entire facility site, but what are your pretreatment and your post-treatment methods for addressing --

MR. KING: That's going to be determined during the design.

PASTOR LEACH: I've accused you guys of doing the cleanup on the cheap, and it looks like my suspicions are founded because there are several ways, methods, to do cleanup. Okay? But you guys seem to come to the conclusion that this is the way to do it. So if you think that this does not work, what are the alternatives?

MR. KING: If the cleanup does not work, as I told you, any time waste is left on-site, EPA has to come back and evaluate. The EPA would have to make sure that whatever remedy is in place would be protective of human health and environment.

PASTOR LEACH: It bothers me that, a few years ago, we discussed the pumping situation --

MR. KING: The what situation?

PASTOR LEACH: The pumps that had been installed down there, and the money run out. So we have not gotten assurances that the groundwater will be pumped for eternity, because I believe the last

time you talked about it was seven years ago, and there was a specific amount of money that was designated by MDEQ to run the pumps.

And, furthermore, will the Corps of Engineers get involved in any of the activity now? Because in my research, I found that the Corps has participated in the past on other sites in Region 4 and in other regions.

MR. KING: You asked a lot of stuff. I'm trying to unpack it. I'm not trying to dodge your question. I want to make sure I -- so the first thing you asked me was the pumps. The pumps that are there for groundwater, we monitor the groundwater wells. We have to make sure that either the pumps are working up to standards. One of the reasons that the phytoremediation is being proposed is that the trees will help to control the groundwater migration probably better than the pumps because --

PASTOR LEACH: (indiscernible) my own.

MR. KING: Okay. So you remember when these things, a couple of months ago, Dr. Lindmire -- he was supposed to be on the call tonight, four or five questions. But phytoremediation, which means you use trees to help clean up the site, the trees help get the groundwater, and we have a pilot study that's been

going on -- we're looking at more than two years, almost three years now, and we've got a lot of data that suggests that, even during the heavy periods of rain here over the last couple of years, the trees were able to reduce the groundwater table by almost two feet. So what you've got, imagine a tree gets -- almost each tree being a pump. So the trees are going to actually, in the long run, pump more than what the pumps are going to do.

There are some times during the wintertimes when trees are more dormant that the pumps may be required, and we'll make sure that the trees are -- I mean, that the pumps are available. We'll make sure that there is some coordination to make sure that the water levels stay at a level that's going to make sure that human health and environment are protected.

And you asked about the Corps of Engineers. Corps of Engineers, I don't know about other projects. I have used the Corps of Engineers. As a matter of fact, Eric is using the Corps of Engineers on one of his projects over in Navassa. I have used the Corps of Engineers for different things on projects before. They get tasked by us just like any other contractor. So you asked if they were going to be on it. I don't know at this time.

PASTOR LEACH: Well, they were on the project in Pensacola.
MR. KING: Yeah.
PASTOR LEACH: Where you put in stronger pumps and they maintained the pumps.
MR. KING: Do you know who's the project manager for that project you're talking about? That guy right there
PASTOR LEACH: (Indiscernible.)
MR. KING: He's the man.
PASTOR LEACH: Okay. I've got a bunch of questions.
(Indiscernible background speaking.)
MS. SPENCER-HARDY: We've got to call on the Zoom call.
PASTOR LEACH: Okay. I'm sorry.
MR. KING: What you got?
MS. WOODS: Vincent Barletto, if you could unmute yourself and ask your question, and we'll repeat it in case it's not audible.
MR. BARLETTO: Yeah. Thank you so much. I'm not in --
MS. WOODS: One moment.
MR. BARLETTO: Can you hear me?
MS. WOODS: Yes. Go ahead.

MR. BARLETTO: Can you go back one slide, or maybe it's two, where you showed the half a dozen remediation options and the half circles and the cost? Yeah, that one there.

So, and then, I think on the following slide, you said, okay, hey, let's look at really -- I think it was alternative number 4, was what kind of had the best options. And my question is -- and can you go to that next slide that kind of outlines that alternative? There you go.

So the final remediation, you just touched on it. Unfortunately, it kind of triggered another question in my brain, but, you know, what if it -- instead of trees -- I'll kind of break this up, my question up, into two parts maybe. So instead of the trees, which we know suck up a lot of water, like you say, what would grasses do? Do you have any comparison? Would that also count as phytoremediation?

MR. KING: Yes, sir. Grass would also count as phytoremediation. And at this time, we're -- we're at the proposal stage for the remedy. If, in fact, this goes through like we think it should, grasses could be acceptable phytoremediation. There could be some kind of combination of grasses and trees.

MR. BARLETTO: And the reason -- and thank you for that. And this is part of a --

MR. KING: My colleague here has a good bit of background in that, too.

MR. SPALVINS: I've done a little bit of work with phytoremediation. I can just address that. One of the chief advantages of the trees is that the root systems are installed very deep in the ground. And so Ben was out here when they did that and so was Charles.

How deep did they drill those holes that they put those --

MR. BENTKOWSKI: Well, they put the whole --

MR. SPALVINS: Well, I'll let you -- and I'll just add that grasses have a shorter root system. They're also seasonal. So one of the things that they've evaluated was different types of trees so that you have trees doing the work over a longer growing season. And right now, EPA is not proposing a specific kind of tree or a specific number of trees. That's something that can be adjusted as needed as we go along.

MR. BARLETTO: Right. And that was kind of my question to you.

MR. BENTKOWSKI: They used a Ditch Witch and

they planted these little twigs that were a couple of feet long.

MR. KING: Hold on.

MR. BENTKOWSKI: Okay. I can actually hear myself. Okay.

So when they planted the trees, they used a Ditch Witch, and they made these linear trenches, and these little twigs that were about two feet long, stuck that into the ground. They put some soil, some better quality of soil down in there, and stuck these in there. And now, two years later, some of the trees are 20 feet tall. And like Eric said, the root systems go down much deeper than if you're using grasses.

I did some -- I looked into some of the grasses and they have their benefits for shallower soil, but in this case, we're going to try to use the trees that draw up the water, control the groundwater migration.

But within the containment area, we're going to use them as an alternative of running the pumps all the time within the containment area. It's a lower cost, more natural way of doing things. And we have to keep in mind the water budget and how effective the trees are. There's lots we've done in the remedial

design. But I do think that, in the end, that will be effective at keeping the water levels low within the containment area and working on controlling the off-site migration of the dissolved phase groundwater, which will be the subject of another operable unit decision.

MR. BARLETTO: And that makes a lot of --

MR. KING: Well, one of the things that I've learned from Dr. Landmeier in dealing with the trees and you may -- you all may know this, but it was interesting and almost shocking to me. What he told me is that, when you look at a tree, especially the ones that we've got out there, but many trees, he said that, oftentimes, as high as the tree is up, the root system goes that far down, and I just -- I had no idea. So that's just something to think about. When you've got a tree that's 20 feet up, you think that root system or approximate root system could be as far as 20 feet down. So that's going to help in pumping the water.

MS. WOODS: There's a follow-up from the same person.

Vincent, did you have a follow-up question?

MR. BARLETTO: Yeah. So my first part of that question was for the phytoremediation, and I

appreciate that and, of course, it makes sense that we're, you know, proposing the trees to go deeper and, of course, they pull more water. But we've got to -- you know, if we can -- if there's a design opportunity that we can come across and say, hey, you know, we've got a solution that can also suck up a lot of water without it being trees, then, you know, maybe that's something the EPA can consider.

But my further question is with this barrier wall and the engineered soil cover. I mean, the good thing here is that, yes, there's a good solution, but the problem is that is expensive, incredibly expensive. So is the EPA proposing that, if alternative number 4 is the preferred option, which I would agree with, then does that mean that all of the remediation exercises would need to be executed for that consideration, or could we design parts and pieces such that it would still satisfy -- in other words, as an example, could we forego the barrier wall, use a significant phytoremediation plan, and then use engineered soil cover where we would need it?

MR. KING: Vincent?

MR. BARLETTO: Yes.

MR. KING: Vincent, you sound like a contractor. Am I correct?

MR. BARLETTO: I'm an engineer, so you're close.

MS. WOODS: Sorry. He can't really -- you have to tell us when you want to talk to him.

MR. KING: He's not a contractor?

MS. WOODS: He said he's an engineer.

MR. KING: But what you're asking, though, Vincent, it's in the design stage. We talk about phytoremediation. We're not opposed to getting any ideas that are going to be the best idea. So if you've got something that you should need to propose, that's why we have the public comment period. Submit it. It will be evaluated, just like any other comment that's received.

Yes?

MR. BENTKOWSKI: Plus I'd like to add that the trees really only work on contamination that's dissolved in the groundwater, and that's the land in the blue on this one poster over here. The trees will not clean up the DNAPL that's down there stuck between the sand grains. It just won't. Dr. Landmeier has got a 400-page book about phytoremediation and you can get deep, deep into it if you need to, but the trees just won't work on the creosote itself.

MR. KING: Can you talk about the role of a

barrier wall, alternative 6?

MR. BENTKOWSKI: And so the barrier wall will actually go all the way around where the creosote is, the residual creosote is. Charles talked about all those tarGOST borings. Those were actually -- you know, it specifically identifies where the creosote is. We use it at all of our creosote sites all across the region, and you can really tell where it is and where it isn't. And that's how we determine the shape of the barrier wall, to go around where the residual creosote is.

And, you know, I was one of the people that read through the feasibility study and there are things that were three times more expensive. And so since this is the Trust money, some of our money, some of the money that's going to be borne by the State of Mississippi eventually, it's our objective to find the most cost-effective remedy that is also effective at controlling the risk. So that's the whole point of the feasibility study, is to work through that and understand it.

UNIDENTIFIED SPEAKER: Can you describe what the barrier wall is made out of and what it changes?

MR. BENTKOWSKI: Right. So the question was about the construction of the barrier wall. I'm

working on a project up in Paducah. There, they're using sheet piling.

UNIDENTIFIED SPEAKER: What state?

MR. BENTKOWSKI: Paducah, Kentucky. It's a big place. They've got a barrier wall that's going to be miles long, and the part is right up next to the Ohio River is going to use sheet piling because the ground needs -- you can't really dig a trench to put this other kind of wall in that close to the river. But here, we'll probably use -- dig a trench with a big track hoe and mix a bentonite, which is a type of clay, and cement slurry to go in this trench. And it has such a low permeability that the water doesn't go through it. In fact, that's why we're putting the pump and the trees inside of the barrier wall, so that the groundwater comes towards the center.

There's a great fact sheet that's out there on the table that shows a good a cartoon about how that -- how we want to keep the water level lower, and that material is just -- well, I actually have some clay. Let me reach into my bag of tricks here. I have a piece of clay, and it's this fine-grain material and, it has a very low permeability, and it keeps the contamination on the inside of the containment wall. And that's -- you know, they make

these -- the powders and mix it with the concrete and the bentonite. Engineers design these things to have a very low permeability, and then you put them in place and control the groundwater. They have an inward gradient, and that's how you keep the contamination in place.

Yes, ma'am. For me or for Charles?

MS. MILLER: My name is Velvet Miller, and I'm relatively new to the community, but I have a couple of questions to help me put things in context.

First, how deep is the trench? How far down does that go? Does it go down as far as you found the creosote?

MR. BENTKOWSKI: Yes, ma'am.

MS. MILLER: How deep is it?

MR. BENTKOWSKI: All right. So it's about 40 --

MS. SPENCER-HARDY: Have her say her name.

MR. BENTKOWSKI: She did.

MS. SPENCER-HARDY: Oh, I'm sorry.

MS. MILLER: I can. I'll say it again. Velvet Miller.

So how deep does it go?

MR. BENTKOWSKI: About 40 or 50 feet deep.

MS. MILLER: Okay.

MR. BENTKOWSKI: And we use those soil borings and the TarGOSTs to get through the surficial aquifer down to a zone called the Eutaw, and all the creosote is above the Eutaw.

MS. MILLER: Okay.

MR. BENTKOWSKI: So we have a very good understanding of the vertical extent of the contamination.

MS. MILLER: Okay. That's why you call it a vertical?

MR. BENTKOWSKI: Yes, ma'am.

MS. MILLER: Okay. Thank you.

Now, Charles, if you can just help to put things in context. And bear with me. I know you've done this before. Tell me, how many total acres need remediation?

MR. KING: That was one I don't know by memory, but the -- so I'm going to tell you this. The OU3, OU5, that total size is about 40, around 40, 44 acres. And if you just split that, I would say probably closer to 30 acres or more that would need remediation, and then you've got some that have the soil maintenance -- a soil management plan. So right now, we know it's going to probably be at least 25 to 30 that will be --

UNIDENTIFIED SPEAKER: Do you know what the number of acres is?

MR. KING: Someone said 18 to 20 that's in OU3 part. OU5 is 18? So the other part is 18 --

MS. WOODS: A little over 20.

MR. KING: So it's about 45. So it's like 26 and 18, something like that.

MS. MILLER: And am I'm correct? What I learned previously is that there are 20 acres that are being remediated; is that correct?

MR. KING: Over on the other side, over in the pine yard, which -- so we had a number, I think about -- I think I said at the meeting uptown, it was like 15-ish, and I think that's number is still accurate, but they made us -- they said that the 15 is not a straight square. If you're trying to get a straight block -- what did we say that number was? I don't want to misquote it.

MS. WOODS: So there was a remediation at the pine yard that was, I think, around 16 acres, but that's different than the acres that are available for reuse because there's the acreage that was remediated, and then there's areas on the pine yard that don't have contamination that don't need to be remediated. So it's actually -- and then there's areas of the pine

yard that we're still studying. So we're still working to come up with a final plot for the area that is available for reuse, and those specific acreage will be coming out soon. But it's in that range of 10 to 15 that's going to be ready now.

MS. MILLER: I guess what I'm trying to -- thank you. And I'm trying to get a sense of the context of how much work has been done, how much needs to be done of the operable units, how many more are there, the timeline. This has been going on for a long time, and I'm just trying to see what's the end of -- what's the timeline that you feel the project will be ready for whatever kind of use is decided?

MR. KING: Well, I think it will be some uses that will be ready relatively soon, within the next year. The OU1 will be ready, parts of OU1, that 10 to 15 acres that we talked about, that's going to be ready to be used relatively soon, within -- we're going to probably try to delist it within a year. But we'll go through the process. I think there's some interesting -- a portion of that from the local stakeholders.

OU3 and 5, OU5 is the one where we're talking about that's going to require the slurry wall. We're talking about at least two, two-and-a-half years

before you do design, construction. OU5, depending on what the soil management plan is and the intended use, that could be something that could be done within a couple of years.

The groundwater and the wetlands area, I don't even feel comfortable saying a date just because we've got (indiscernible) and all kind of things. But I think within the next two to three years, there should be at least 25 or so acres that should be ready. That's my best guess at this time.

PASTOR LEACH: So the only -- one of the major concerns that I have is, when you talk about --

(Indiscernible.)

PASTOR LEACH: Darren Leach. I forgot that there's somebody here that doesn't know me.

So, yeah. So when you talked about OU5 and you said that what we were going to do was just do some maintenance, and then when I looked in the actual proposal, it talked about another thing, controls was it, some --

MR. KING: Institutional controls?

PASTOR LEACH: Institutional controls.

MR. KING: Yes.

PASTOR LEACH: Which would do stuff like maybe limit the usage of the facility. How do we

get -- how do we plan for redevelopment if we do that combination? How could we -- what do we do to --

MR. KING: So one of the institutional controls would be --

Eric, if I'm saying something (indiscernible.)

One of the things for institutional controls, I'll give you an example of what one might be. It would be to prohibit drinking -- I mean, using -- putting a private well there. Well, you guys are on municipal water. It's highly unlikely that that would happen. But one institutional control would be that you don't want to do that. There'd also be one where you can't live on it, I mean, because we already saw that those numbers were not acceptable. I want to let Eric give a little -- because Eric has just come off detail with headquarters, and he and I (indiscernible) back on a lot of our projects, and this is right up his alley.

MR. SPALVINS: Thank you.

So when I started helping Charles with this proposed plan and looking at the risk assessment, we were focused on what exactly are we trying to propose for OU5. And one of the things that makes it -- creates a lot of uncertainty is the location of the

soil in OU5 that poses an unacceptable risk and the way that the risk assessment handled that.

So there was more than 50 samples taken in OU5. Of those samples, less than 20 of them had a concentration that posed this unacceptable risk, and those 20 samples are kind of spread all out on OU5. And so there's a back -- and we don't know what kind of development or what kind of, you know, construction might be needed there until there's a property owner and until there's a development plan for that.

But rather than put a restriction on all of OU5, and rather than try to say you've got to clean up all this dirt in OU5, where we don't know exactly where the construction is going to be, we decided that we'd do what we call interim matching, which just means we're going to come back later in the final action. And the interim action would be, if somebody is ready to use this piece of land, but, you know, we want to make sure that they do some sampling and make sure that their construction workers are not going to be put at risk.

Now, EPA, and the State, and the Trust, you know, will be a part of that conversation when that happens. And what I would expect would happen is that, as this conversation goes more to specific

redevelopment opportunities, that, you know, that's when you sit down with the planner and what are you going to put here, what are you going to put there. Okay. If you put that in this location, you're not going to need to do anything, because that's 18 acres. Well, the construction worker's not going to spend, you know, 270 days, or whatever the estimate is based on the risk assessment, they're not going to spend that in those 20 locations that are contaminated for a whole year.

So we need to figure out, like, if you want to build something over here and you're going to go down five feet, that's an area that's clean, there's not going to be any restrictions. But if you're going to go over on this part, where we know there's some soil contamination, then we might want to go ahead and excavate that soil and haul it out so that you don't have to have that (audio distortion.) I don't know if that's answering the question or not.

PASTOR LEACH: The only thing that still remains problematic for me is, that if I wanted to do the redevelopment, the first thing you'd have to do is find somebody that's attracted, that's attracted to the property. And if I know that there are problems and that I was going to have to jump through all these

hoops to potentially do the work, that may scare off some of our future developers.

So I would suggest that maybe we go ahead and assume that the use on OU5 is going to be industrial, light industrial, commercial industrial, and that we clean the site to that standard so that, when we get ready to court new developers, that property will already be ready.

MR. SPALVINS: Right.

PASTOR LEACH: If that makes sense.

MR. SPALVINS: Oh, yeah, it makes sense. Absolutely. I think that the position that the EPA was in with the risk assessment and the feasibility study that we had, when we started to have this conversation with headquarters, headquarters asked us to take another look at the way we were proposing OU5. And so that's --

PASTOR LEACH: The reason I'm not over concerned is because you did suggest this as an interim.

MR. SPALVINS: Interim, yeah.

PASTOR LEACH: So that means you know, like we know, that something may need some --

MR. SPALVINS: There's more work to be done.

PASTOR LEACH: Exactly. Now, the reason I

think that it would be good to put it in this proposed plan is because times are aplenty. So if we wanted to get something to deal with legacy pollution, there is probably -- this is probably one of the better times to go get additional funding to deal with legacy pollution. I don't know if times will be as aplenty to two to three to four years from now. So if we can get that into this proposed plan, then we can all go out and start looking for the funding to deal with legacy pollution.

And, of course, according to Justice40, that's one of the target investment areas. So that's why I'm thinking it would help us to go get the funding we need, to work with you to get the funding we need, or if we go can ahead and get it in this proposed plan.

MR. SPALVINS: Yeah. I think -- let me just say one more thing about -- let me grab one of these maps here. Let me use this one. So the areas where the soil's contaminated are kind of on the southern part of OU5, and there's not a lot of sample density over here. And when they wrote the risk assessment, they assumed that this entire area would be one exposure unit, is what we call it.

And now, that may -- there may not be

somebody who wants an 18-acre piece of property for a redevelopment. If they want something smaller, then we would look at that in, you know, a smaller piece at a time. And I think that it will be kind of a strategy decision for Charles and his team to figure out, okay, we need to make some more detailed decisions on this and what's the best way to do that, and what do we need technically so we can make those decisions. But that -- just to talk a little bit more about it, it's really just a handful of places here.

PASTOR LEACH: Actually, that part is encouraging, if it's only a handful of areas.

MR. SPALVINS: Yeah.

PASTOR LEACH: That's saying something.

MR. SPALVINS: It's very promising.

PASTOR LEACH: Yeah.

MR. SPALVINS: Yeah, very promising.

PASTOR LEACH: All right.

MR. KING: While we're waiting on the next person, the thing I was going to add to that is, that's the reason we put it in there as an interim, because we knew that there's some opportunity to do things and we did not want to just put a full deed restriction that would limit use that we can get some opportunity to address it.

MS. SPENCER-HARDY: Are there any more questions from folks on Zoom?

I'm sorry. All right.

MR. McLAUGHLIN: Grant McLaughlin. The question is, how much does this proposed plan, like, the cost of this project, and what is the scope of it? How much of OU3 would be contained in those barrier walls and that cap, and (indiscernible.)

MR. KING: So there's not going to be a barrier wall in OU5. The barrier wall is in OU3. (Indiscernible.) Let me -- I want to make sure I say it right. Alternative 4 is 13.6 million. So that's the estimated cost of it.

And think I -- I think I need to say, the cost for -- that we generally required in a feasibility study, according to our circle of law, it's not an engineer's -- like, it's not a contracting cost. What the rules require it to be plus or minus, I think it's 50 percent. That's the way the law is. But we believe 13.6 is a good number. It's the best number we have right now.

MR. McLAUGHLIN: Yeah. And just the scope of the containment area, you know, are we going to have -- like, is it going to completely encircle it?

MR. KING: It's going to completely circle --

that's the estimated layout, right.
MR. McLAUGHLIN: And how many acres is that and how long would the wall be?
MR. KING: I want to say in the plan, I think it said the wall -- was it about approximately 4500?
MR. SPALVINS: 4550 with the --
MR. KING: Okay. I left 50 feet off. But, yeah, it's about 4500, in fact, 4550 in the fact sheet. And the acres -- what did we say that acres was?
MS. WOODS: Twenty --
MR. KING: Eighteen-ish?
MS. WOODS: Eighteen, so we have five. So 45 minus 18, 20, 20 and some change.
MS. SPENCER-HARDY: A little over 20 acres.
MR. KING: It's a little over 20 acres, is the estimate.
MR. McLAUGHLIN: That's how much would be encircled?
MR. KING: Yes. Getting the information from my trusted sources.
PASTOR LEACH: I've got a follow-up question.
MR. KING: What's that?
PASTOR LEACH: I've got one follow-up question. So, also with the soil barrier that we put,

how deep is that? I think I know the answer. Is that 12 inches?

MR. KING: I think it's a minimum of 12 inches. (Indiscernible.) There are some areas -- because the ground is not necessarily even, there's going to be some areas that will be greater than 12 where we've got dips, but I think it's a minimum of 12 inches.

PASTOR LEACH: Now, when I looked -- when I looked at the remediation that we did OU2 --

MR. KING: Uh-huh.

PASTOR LEACH: -- and where we did some work at different pumps.

MR. KING: Yes, sir.

PASTOR LEACH: The depth that we dug out was two feet.

MR. KING: Yes, sir.

PASTOR LEACH: Is that correct?

MR. KING: Yes, sir.

PASTOR LEACH: Is there a reason why you chose two feet there?

MR. KING: Usually, we dug -- usually what we'll do is we usually take two samples. We -- sometimes I take at 06 and then one that's deeper than that, and we do what we call archiving. We'll analyze

the top sample and, if it's above the unacceptable levels, then we'll analyze a sample and there may be some cases where some were two feet. I have done yards where they were one foot. I don't know -- I can't remember the actual indications here, but there are some. In residences, there are times that, especially if the person says, I have a garden or I want a garden, they do things like that to make sure that that's clean, so --

PASTOR LEACH: That was --

MR. KING: Yes, sir.

PASTOR LEACH: -- my specific concern. My specific concern was --

MR. KING: Yes, sir.

PASTOR LEACH: -- if we did plant grass or we did plant anything, anything that would go down and then bring things up, which is possible, like when you put a garden --

MR. KING: Yes, sir.

PASTOR LEACH: -- in, goes down in the soil and then what you eat, you have access to, even though you didn't, never touched the soil two feet deep, once you plant it, it brings it up for you. So I want to make sure that what we do --

MR. KING: I gotcha.

PASTOR LEACH: -- we continue to limit that. I just thought 12 inches is a little shallow to that end, especially when you think about some other things that was even talked about in the proposed plan, like runoff, soil runoff over time. So I --

MR. KING: So let me -- I didn't mean to cut you off.

PASTOR LEACH: No, no. I'm done. You understand the gist of the question.

MR. KING: Yes, sir.

PASTOR LEACH: I just want to make sure it's safe for the --

MR. KING: Yes, sir. And we want to make sure it's safe, too. So we said a minimum of 12 inches. So there's going to be some areas where you got some lower areas that will be a total of more than 12, but remember, because we're covering various -- various inspection and maintenance, so we've got to ensure that that stays in place. If there are some obvious areas of runoff or things like that, we have to make sure that it be addressed.

One thing I was going to mention, I really wish Dr. Landmeier was here because the thing that he's talked about is the trees that we plant over there. We planted some pecan and some peach and

things like that. I'm not sure how -- I know they have not grown as fast as the poplar trees, but Dr. Landmeier has indicated several times that you can eat the pecans and things like that and it doesn't come up in the fruit. I specifically asked about that. They were analyzed. I will -- I will, that will be -- that's a fair question and, when we get our response, we'll make sure that we work with the experts.

And I'm not saying that everything is like that, but he was talking about the trees and the pecan and things like that. But that was one of the reasons that we were doing the pilot. As those fruit come up, I would anticipate us analyzing and things like that.

Did I answer your question, sir? If I didn't, I still --

PASTOR LEACH: You did talk about the trees.

MR. KING: Okay.

PASTOR LEACH: I still think 12 inches is a little shallow.

MR. KING: Okay. Thank you for that comment. You can put it in -- yes, sir. Yes, sir.

MR. SPALVINS: So the 12 inches for the cap is to limit and so we can manage the rainwater that infiltrates inside the containment wall. So that's a

little bit -- that's kind of the design. Like, we'll design that soil cap so that it -- we manage how much water goes inside the -- inside the wall so that it doesn't exceed what the trees can pump out.

And so in a yard, the two feet is to provide a surface soil and, you know, even down to two feet, that it's clean for the resident to be able to use however they want. So it's kind of got a different purpose. Like that GPN soil has a slightly different purpose than the one-foot cap, but the key, I think, for the long-term protectiveness is the inspections and things like that.

And often when we do a soil cap, we put a layer underneath it so that we know when we're through the soil cap or that the -- or the soil cap is surveyed so that we've maintained the elevation. Now, with lidar, it's fairly easy to get an idea of what the elevations are at (indiscernible).

MR. BENTKOWSKI: Eric was talking about the lidar. It's just -- it's amazingly high resolution data. They actually have them mounted on drones. He's used that down at his site in Navassa, and you can get just amazing detail. We actually found the places where the fiddler crabs were digging holes in the marshland with the lidar. It's that high of

degree of resolution.

And from a science perspective, that's what you want. You want perhaps not the most precise, absolutely, absolute best. You kind of have to balance it to the -- what you want to do for you project. But lidar has become so commercially available that people are doing that instead of going out and doing traditional, you know, staff and transits for surveying.

MR. KING: Any more questions?

PASTOR LEACH: One of the methods that you've used to remedy this pollution has been -- that you spoke of was containment, and another method was encapsulation, where this slurry is pumped into the contained area and totally -- and when it hardens, it contains the whole deal, and that's supposed to eliminate even having to pump; is that correct?

MR. KING: No. The pump is needed to make sure that -- so it will stop the materials from moving from within the contained area. The cap, the covering for it, is designed to try to minimize how much water is still -- imagine the containment system almost like a bathtub. And in a normal bathtub, you've got the drain that won't let the tub overflow.

In this system, you can't have a hole -- I

mean, you don't need to have a hole in the bottom because that would be a problem. (Audio distortion) maybe that answers your question, but what we do is we -- that cap is down to minimize the water that comes to the top, and it also -- we use the trees to minimize the tub overflowing, as we speak, or minimize the containment wall from overflowing.

MS. SPENCER-HARDY: Does Mr. Wilburn have another question outside of -- oh, the Mayor has a question.

MAYOR GASKIN: Keith Gaskin. You mentioned earlier -- and I tried to write it down and I can't find it. This was a question that came up at one of the prior meetings. When you said y'all would come back and do retesting in five years, did you --

MR. KING: So, yes, sir. What that is is any time -- any time that there's waste left on any EPA site, in any Superfund site, not just this site, any time that there's waste left in place, under the Superfund or the circle of law, we are required to come back at least once every five years to ensure that the remedy remains contained.

MAYOR GASKIN: And that's in perpetuity?

MR. KING: Yes, sir.

MAYOR GASKIN: Okay.

MR. KING: (Indiscernible), yeah. And we're looking for is it still functioning as it -- if it wasn't -- let's say -- so here would be an example for the containment wall and cap. If we were to come back and the cover had deep breaks in it and -- so we'd have a concern that it's not keeping the water out. So that would be a reason to do something about it. If there was something -- we have margin wells on the outside of the system. If for some reason we start to see different monitoring data, we get large concentrations of something that we knew was in the wall and that hadn't been showing up on the wells and now it starts showing up, then we do some investigation to figure out what happened, is there a break in the wall, is something going on.

So EPA, with support of the State, because it's Federal and State, would come out and we would do inspections at least once every five years. You can do it more than that, but you ensure it's protected.

MR. SPALVINS: Make sure you say we write a report every five years, but an O&M, but, you know, (indiscernible.)

MR. KING: Yeah. O&M could be more often than that.

MR. SPALVINS: So what I was saying was that,

for every Superfund site that has long-term maintenance, we write what we call an operations and maintenance plan. And that differs for every site, but it's typically -- well, I've got my wood treater in Pensacola, we have a containment cell that we built there. It's a half million cubic yards, about 18 acres, and it's got a bunch -- it's basically a landfill. It's got clean soil on top of it.

The State is doing the O&M on that site. They have to go out have to go and monitor it, I think, every quarter, because we've reduced the frequency because it's stable. They have to -- they gave some leaching collection sumps they have to empty, and they have to maintain the rest of ut, and they have a contractor that does that. And if there's a big storm, they go out and check on it. And then the State will send us an annual report that they're getting, reports that their contractor sends to the lab. And then every five years, we're required to do a five-year review and report.

So we're not only checking on it every five years. It will be something negotiated with the good folks of the State and they will be responsible for carrying out that operations and maintenance.

MAYOR GASKIN: So once those testing occurs,

then how do you get that information back to the community?

MR. KING: So, like (indiscernible) says, at a minimum of every five years. So if something were to come up based on other inspections, we would do something sooner, but there is a five-year report that is a public document that gets issued, I mean, that gets released every five years, and with technology now, it would probably go up on our website.

UNIDENTIFIED SPEAKER: Public notice.

MR. KING: Yeah, public notice. Public notice will state a five-year review is coming.

MS. SPENCER-HARDY: So every time we have a five-year review, we have to do a public notice that announces that we're going to do five-year review for a specific site and, if needed, we will come back and have a meeting. If we have an active community that has questions, we will come back out and have a meeting in conjunction with anybody that can answer questions about it, so ...

MAYOR GASKIN: Thank you.

MS. SPENCER-HARDY: Any other questions? Any questions on Zoom?

PASTOR LEACH: I have one more, and it's a follow-up to that one. Is there another trigger for

monitoring? For instance, is it just on a set frequency, or can there be -- can we say, hey, can somebody come up and take a look at this?

MR. KING: If there's an incident or if you've got a legitimate -- I mean, if you say, hey, something's wrong, you smell something or see something, yeah, we -- yeah.

MR. McLAUGHLIN: I do want to ask about, you guys said this doesn't address the groundwater remediation or the wetlands area. What's going on with that? What are the -- what are the next steps for that part of this project? I've heard a lot of concern around that.

MR. KING: It's in the part -- I mean, it's -- we're in the process of evaluating. We are trying to deal with the most -- the biggest risks as quick as we can, you know. With the groundwater, one thing that there's some -- that gives us some level of comfort is -- and I'll let Ben add if I -- if he wants to add some more to it. But the municipal water that people drink from their tap water is, like, 600 feet, 6-, 700 feet down. So it's not -- the tap water that you're drinking is not impacted by groundwater from this site. So that -- while I'm not trying to minimize the concern, it's not -- it's less of a

potential health risk. So that's why it's done -- it will be done later.

MR. BENTKOWSKI: Also, the containment will contain the source of the contamination that's flowing away from the source area. But it's really just in the shallow aquifer. The production wells for the City are 600 to 750 feet down. What we're doing is we're addressing the thing that causes the most risk for the long term and -- by containing the source.

And the stuff that's -- you know, the naphthalene is actually easier to clean up, and the rest of the benzo(a)pyrenes and those other things that are in the creosote.

So it's a matter of, you know, sort of prioritizing things with the risk to the environment and to the public, and that's why we're doing the source control first.

MR. KING: Ben, I've got one thing I want you to elaborate a little bit on. You said that the contamination is flowing away, and I just wanted you to -- I don't want them to think it's flowing like a river.

MR. BENTKOWSKI: No, no, it's not. And for here, we can actually look at this diagram. This is the naphthalene concentrations.

Thank you, Vanna.

This naphthalene is the most soluble component of creosote. It was the -- if the groundwater was moving, the naphthalene would go the farthest, and as you can see, it's really pretty much still on the site. But what we're going to do is we're going to lock up the source of this contamination first, and then we'll address the dissolved phase. Okay. You know, one thing (indiscernible.) I don't know --

MR. KING: (Audio distortion) came over here, I had to put him to work changing it. No free rides.

MS. SPENCER-HARDY: Any other questions from Zoom?

MR. BENTKOWSKI: Glad to do it.

MS. SPENCER-HARDY: No? Any other questions from the audience here tonight?

If not, I want to take the opportunity to say thank you to Pastor Leach for allowing us to use his facility. Thank you for Chanelle, for all of your expertise, and also for Claire, y'all working together. We had a good team tonight trying to use electronics. So we want to appreciate everybody that had a part in this in putting this together, especially for the folks on Zoom.

Don't forget that the comment period does not end until November 16th. So if you were unable to attend by Zoom or in this meeting, you can e-mail Charles at king.charlesl@epa.gov, and you can also e-mail to the address that's in the fact sheet. And I appreciate you guys participating tonight and, for those people on Zoom, we appreciate you. Thank you for joining us and, until next time. We appreciate everybody for your participation.

So at this point, this ends the proposed plan meeting portion. For our transcriptionist, Cathy, we're done.

(Whereupon the meeting was concluded at 8:00 p.m., the same day.)

CERTIFICATE OF COURT REPORTER

I, Catherine M. White, CSR, and Notary Public in and for the County of Rankin, State of Mississippi, hereby certify that the foregoing pages, and including this page, contain a true and correct transcript of the proceedings, as taken by me at the time and place heretofore stated, and later reduced to typewritten form by computer-aided transcription under my supervision and to the best of my skill and ability.

I further certify that I am not in the employ of or related to any counsel or party in this matter, and have no interest, monetary or otherwise, in the final outcome of the proceedings.

Witness my signature and seal this the 22nd day of November, 2023.

CATHERINE M. WHITE, CSR No. 1309

My Commission Expires:
February 1, 2026

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APPENDIX C

ARARs TABLES

Table 1. LOCATION-SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD- Columbus, Mississippi

LOCATION-SPECIFIC ARARs and TBC			
LOCATION	**REQUIREMENT**	**PREREQUISITE**	**CITATION**
Presence of Floodplains designated as such on a map[1]	Shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.	Federal actions that involve potential impacts to, or take place within, floodplains – **TBC** *NOTE*: Federal agencies required to comply with E.O. 11988 requirements.	Executive Order 11988 Section 1. *Floodplain Management*
	Shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain		Executive Order 11988 Section 2.(a)(2) *Floodplain Management*
	Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.		Executive Order 13690 Section 2 (c)
Presence of floodplain designated as such on a map	The Agency shall design or modify its actions so as to minimize[2] harm to or within the floodplain.	Federal actions affecting or affected by Floodplain as defined in 44 CFR § 9.4 – **relevant and appropriate**	44 CFR § 9.11(b)(1) *Mitigation*
	The Agency shall restore and preserve natural and beneficial floodplain values.		44 CFR § 9.11(b)(3) *Mitigation*
	The Agency shall minimize: • Potential harm to lives and the investment at risk from base flood, or in the case of critical actions[3] from the 500-year flood; • Potential adverse impacts that action may have on floodplain values.		44 CFR § 9.11(c)(1) and (3) *Minimization provisions*

[1] Under 44 CFR § 9.7 *Determination of proposed action's location*, Paragraph (c) Floodplain determination. One should consult the FEMA Flood Insurance Rate Map (FIRM), the Flood Boundary Floodway Map (FBFM) and the Flood Insurance Study (FIS) to determine if the Agency proposed action is within the base floodplain.
[2] Minimize means to reduce to smallest amount or degree possible. See 44 CFR § 9.4 *Definitions*.
[3] See 44 CFR § 9.4 *Definitions, Critical action*. Critical actions include, but are not limited to, those which create or extend the useful life of structures or facilities such as those that produce, use or store highly volatile, flammable, explosive, toxic or water-reactive materials.

Table 1. LOCATION-SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD- Columbus, Mississippi

LOCATION-SPECIFIC ARARs and TBC			
LOCATION	**REQUIREMENT**	**PREREQUISITE**	**CITATION**
Presence of any migratory bird, as defined by 50 CFR § 10.13	It shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take[4], capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or eggs of any such bird.	Actions that have, or are likely to have, a measurable negative effect on migratory bird populations **–Applicable**	16 U.S.C. § 703(a) *Taking, killing, or possessing migratory birds unlawful* Migratory Bird Treaty Act[5]
	No person may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such bird except as may be permitted under the terms of a valid permit issued pursuant to the provisions of this part and part 13 of this chapter, or as permitted by regulations in this part, or part 20 of this subchapter (the hunting regulations), or part 92 of subchapter G of this chapter (the Alaska subsistence harvest regulations). Birds taken or possessed under this part in "included areas" of Alaska as defined in § 92.5(a) are subject to this part and not to part 92 of subchapter G of this chapter.		50 CFR 21.10 *General Permit Requirements*

ARAR = Applicable *or* Relevant and Appropriate Requirement
CFR = *Code of Federal Regulations*
CWA = Clean Water Act
TBC = To Be Considered
U.S.C. = *United States Code*

[4] Under 50 CFR 10.12 Definitions, the term "take" means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.
[5] Migratory Bird Treaty Reform Act of 2004 - (Sec. 102) Amends the Migratory Bird Treaty Act (MBTA) to clarify that the MBTA's prohibition on taking, killing, or possessing migratory birds applies only to native migratory bird species whose occurrence in the United States results from natural biological or ecological conditions.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Construction Standards – All Land Disturbing Activities (e.g., excavation, backfilling and grading)			
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Implement good construction management techniques in accordance with the substantive requirements for permits issued pursuant to 40 CFR § 122.26(c) – storm water discharges associated with industrial activity or under a General Permit.	Dewatering or storm water discharges associated with construction activity disturbing one or more acres as defined in 40 CFR 122.26(b)(15) – **Applicable**	40 CFR Part § 122.26(c)(1)
	Shall provide a narrative description of: (A) The location (including a map) and the nature of the construction activity; (B) The total area of the site and the area of the site that is expected to undergo excavation; (C) Proposed measures, including BMPs to control stormwater discharges during construction, including a brief description of applicable State and local erosion and sediment control requirements; (D) Proposed measures to control pollutants in storm water discharges that will occur after construction operations have been completed, including a brief description of applicable State or local erosion and sediment control requirements; (E) Estimate of the runoff coefficient of the site and the increase in impervious area after the construction is completed, the nature of fill material and existing data describing the soil or the quality of the discharge; and (F) The name of the receiving water. *NOTE*: Above information should be provided in Remedial Design or Remedial Action Work Plan issued or approved by EPA.		40 CFR Part § 122.26(c)(1)(ii)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Activities causing storm water runoff (e.g., clearing, grading, excavation) *cont.*	You must design, install, and maintain stormwater controls required in Parts 2.2, 2.3 and 2.4 to minimize the discharge of pollutants in stormwater from construction activities. Must develop a Storm Water Pollution Prevention Plan (SWPPP) consistent with the requirements in Part 7 in the EPA 2022 Construction General Permit. *NOTE*: Under CERCLA § 121(e)(1) permits are not required for on-site response actions. However, compliance with the substantive requirements in the EPA 2107 Construction General Permit (determined to be TBC) is recommended to ensure management of stormwater in order to prevent erosion or unauthorized discharges.	Dewatering or storm water discharges associated with construction activity disturbing one or more acres as defined in 40 CFR 122.26(b)(15) – **TBC**	2022 EPA NPDES General Permit for Discharges from Construction Activities 2022 CGP Permit (epa.gov)
Activities causing fugitive dust emissions	Shall not cause, allow, or permit the emission of particles, or any contaminants in sufficient amounts or of such duration from any process as to be injurious to humans, animals, plants, or property, or to create a condition of air pollution.	Fugitive emissions from construction operations, grading, or the clearing of land – **Applicable**	MDEQ Regulation APC-S-1, Section 3, Paragraph 3

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Waste Generation, Characterization – Primary Waste (e.g., contaminated soil and DNAPL) and Secondary Waste (e.g., wastewaters, contaminated equipment and treatment residuals)[1]			
Characterization of ***solid waste*** (all primary and secondary wastes) and listed hazardous waste determination	Must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps: (a) Must be made at the point of waste generation, before any dilution, mixing, or other alteration of the waste occurs, and at any time in the course of its management that it has, or may have, changed its properties as a result of exposure to the environment or other factors that may change the properties of the waste such that the RCRA classification of the waste may change. (b) Must determine whether the waste is excluded from regulation under 40 CFR § 261.4. (c) Must use the knowledge of the waste to determine whether waste meets any of the listing descriptions under subpart D of 40 CFR Part 261. Acceptable knowledge that may be used in making an accurate determination as to whether the waste is listed may include waste origin, composition, the process producing the waste, feedstock, and other reliable and relevant information.	Generation of solid waste as defined in 40 CFR § 261.2 – **Applicable**	40 CFR § 262.11(a), (b) and (c)
Determination of characteristic hazardous waste	The person then must also determine whether the waste exhibits one or more hazardous characteristics as identified in subpart C of 40 CFR part 261 by following the procedures in paragraph (d)(1) or (2) of this section, or a combination of both.	Generation of solid waste which is not excluded under 40 CFR § 261.4(a) – **Applicable**	40 CFR § 262.11(d)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Determination of characteristic hazardous waste through knowledge	The person must apply knowledge of the hazard characteristic of the waste in light of the materials or the processes used to generate the waste. Acceptable knowledge may include process knowledge (e.g., information about chemical feedstocks and other inputs to the production process); knowledge of products, by-products, and intermediates produced by the manufacturing process; chemical or physical characterization of wastes; information on the chemical and physical properties of the chemicals used or produced by the process or otherwise contained in the waste; testing that illustrates the properties of the waste; or other reliable and relevant information about the properties of the waste or its constituents. A test other than a test method set forth in subpart C of 40 CFR part 261, or an equivalent test method approved by the Administrator under 40 CFR 260.21, may be used as part of a person's knowledge to determine whether a solid waste exhibits a characteristic of hazardous waste. However, such tests do not, by themselves, provide definitive results. Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 CFR 260.10.		40 CFR § 262.11(d)(1)

[1] The State of Mississippi incorporates by reference the federal regulations governing hazardous waste generation, characterization, segregation, and storage. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Determination of characteristic hazardous waste through testing	When available knowledge is inadequate to make an accurate determination, the person must test the waste according to the applicable methods set forth in subpart C of 40 CFR part 261 or according to an equivalent method approved by the Administrator under 40 CFR § 260.21; or and in accordance with the following: (i) Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 CFR § 260.10. (ii) Where a test method is specified in subpart C of 40 CFR part 261, the results of the regulatory test, when properly performed, are definitive for determining the regulatory status of the waste.	Generation of solid waste which is not excluded under 40 CFR § 261.4(a) – **Applicable**	40 CFR § 262.11(d)(2)
	Must refer to 40 CFR Parts §§ 261, 262, 264, 265, 266, 268, and 273 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous – **Applicable**	40 CFR § 262.11(e)
Identifying hazardous waste numbers for small and large quantity generators	Must identify all applicable EPA hazardous waste numbers (EPA hazardous waste codes) in subparts C and D of part 261 of this chapter. Prior to shipping the waste off site, the generator also must mark its containers with all applicable EPA hazardous waste numbers (EPA hazardous waste codes) according to § 262.32.		40 CFR § 262.11(g)
General Waste Analysis	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR §§ 264 and 268.	Generation of RCRA hazardous waste or nonhazardous wastes if applicable under § 264.113(d) for storage, treatment or disposal – **Applicable**	40 CFR § 264.13(a)(1)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under subpart D of this part. This determination may be made concurrently with the hazardous waste determination required in § 262.11 of this chapter. For purposes of part 268, the waste will carry the waste code for any applicable listed waste (40 CFR part 261, subpart D). In addition, where the waste exhibits a characteristic, the waste will carry one or more of the characteristic waste codes (40 CFR part 261, subpart C), except when the treatment standard for the listed waste operates in lieu of the treatment standard for the characteristic waste, as specified in paragraph (b) of this section.	Generation of hazardous waste for storage, treatment, or disposal – **Applicable**	40 CFR § 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 CFR § 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **Applicable**	40 CFR § 268.9(a)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Determinations for land disposal of hazardous waste	Must determine if the waste has to be treated before it can be land disposed. This is done by determining if the hazardous waste meets the treatment standards in §268.40, 268.45, or §268.49. This determination can be made concurrently with the hazardous waste determination required in §262.11 of this chapter, in either of two ways: testing the waste or using knowledge of the waste. If the generator tests the waste, testing would normally determine the total concentration of hazardous constituents, or the concentration of hazardous constituents in an extract of the waste obtained using test method 1311 in ‘‘Test Methods of Evaluating Solid Waste, Physical/Chemical Methods,’’ EPA Publication SW–846, (incorporated by reference, see §260.11 of this chapter), depending on whether the treatment standard for the waste is expressed as a total concentration or concentration of hazardous constituent in the waste’s extract. (Alternatively, the generator must send the waste to a RCRA-permitted hazardous waste treatment facility, where the waste treatment facility must comply with the requirements of §264.13 of this chapter and paragraph (b) of this section.).	Generation of hazardous waste for storage, treatment, or disposal – **Applicable**	40 CFR § 268.7(a)
	Must comply with the special requirements of 40 CFR § 268.9 in addition to any applicable requirements in 40 CFR § 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment or disposal **– Applicable**	40 CFR § 268.7(a)(1)
Characterization of remediation wastes	Obtain a detailed chemical and physical analysis of a representative sample of the hazardous remediation wastes to be managed at the site. At a minimum, the analysis must contain all of the information which must be known to treat, store or dispose of the waste according to this part and part 268 of this chapter and must be kept up to date.	Management of remediation wastes at facility that does not have a RCRA permit – **Applicable**	40 CFR § 264.1(j)(2)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Waste Storage in Containers – Primary Wastes (e.g., excavated contaminated soil and DNAPL) and Secondary Wastes (e.g., wastewaters, contaminated equipment and treatment residuals)[2]			
Temporary on-site storage of hazardous waste in containers	A small quantity generator may accumulate hazardous waste on site without a permit or interim status, and without complying with the requirements of parts 124, 264 through 267, and 270 of this chapter, or the notification requirements of section 3010 of RCRA, provided that all the substantive conditions for exemption listed in this section are met.	Accumulation of RCRA hazardous waste on-site as defined in 40 CFR § 260.10 – **Applicable**	40 CFR § 262.16(a)
Condition of containers	If a container holding hazardous waste is not in good condition, or if it begins to leak, the small quantity generator must immediately transfer the hazardous waste from this container to a container that is in good condition, or immediately manage the waste in some other way that complies with the conditions for exemption of this section.		40 CFR § 262.16(b)(2)(i)
Compatibility of waste with container	Must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be accumulated, so that the ability of the container to contain the waste is not impaired.		40 CFR § 262.16(b)(2)(ii)
Management of containers	(A) A container holding hazardous waste must always be closed during accumulation, except when it is necessary to add or remove waste. (B) A container holding hazardous waste must not be opened, handled, or accumulated in a manner that may rupture the container or cause it to leak.		40 CFR § 262.16(b)(2)(iii)

[2] The State of Mississippi incorporates by reference the federal regulations governing waste generation, characterization, segregation, and storage. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Special conditions for accumulation of incompatible wastes	(A) Incompatible wastes, or incompatible wastes and materials, (see appendix V of part 265 for examples) must not be placed in the same container, unless § 265.17(b) of this chapter is complied with. (B) Hazardous waste must not be placed in an unwashed container that previously held an incompatible waste or material (see appendix V of part 265 for examples), unless § 265.17(b) of this chapter is complied with. (C) A container accumulating hazardous waste that is incompatible with any waste or other materials accumulated or stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.	Accumulation of incompatible wastes, or incompatible wastes and materials on site **– Applicable**	40 CFR § 262.16(b)(2)(v)
Labeling and marking of containers	A small quantity generator must mark or label its containers with the following: (A) The words "Hazardous Waste"; (B) An indication of the hazards of the contents (examples include, but are not limited to, the applicable hazardous waste characteristic(s) (*i.e.,* ignitable, corrosive, reactive, toxic); hazard communication consistent with the Department of Transportation requirements at 49 CFR part 172 subpart E (labeling) or subpart F (placarding); a hazard statement or pictogram consistent with the Occupational Safety and Health Administration Hazard Communication Standard at 29 CFR § 1910.1200; or a chemical hazard label consistent with the National Fire Protection Association code 704); and (C) The date upon which each period of accumulation begins clearly visible for inspection on each container.	Accumulation of RCRA hazardous waste on site as defined in 40 CFR §260.10 **– Applicable**	40 CFR § 262.16(b)(6)(i)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Condition of container	If a container holding hazardous waste is not in good condition, or if it begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition, or manage the waste in some other way that complies with the requirements of this part.	Storage of RCRA hazardous waste in containers – **Applicable**	40 CFR § 265.171
Compatibility of waste with container	Must use a container made with lined materials compatible with waste to be stored so that the ability of the container is not impaired.		40 CFR § 265.172
	Containers must always be closed during storage, except when necessary to add or remove waste. Container must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.		40 CFR § 265.173(a) and (b)
Storage of hazardous waste in a container area	Area must have a containment system designed and operated in accordance with 40 CFR § 264.175(b)	Storage of RCRA hazardous waste in containers with *free liquids* – **Applicable**	40 CFR § 264.175(a)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid	Storage of RCRA hazardous waste in containers that *do not contain free liquids* (other than F021, F022, F023, F026 and F027) – **Applicable**	40 CFR § 264.175(c)(1) and (2)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: • minimizes the need for further maintenance; • controls, minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and • complies with the closure requirements of subpart, but not limited to, the requirements of 40 CFR § 264.178 for containers.	Storage of RCRA hazardous waste in containers – **Applicable**	40 CFR § 264.111
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR § 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – **Applicable**	40 CFR § 264.178
Storage of remediation waste (e.g., excavated contaminated soil) in a Staging Pile			

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, debris)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated. Staging piles must be designated by the Director[3] according to the requirements in this section. *NOTE*: Designation of a staging pile will be part of the CERCLA decision document (e.g., Record of Decision) issued by EPA.	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **Applicable**	40 CFR § 264.554(a)
	For the purposes of this section, storage includes mixing, sizing, blending, or other similar physical operations as long as they are intended to prepare the wastes for subsequent management or treatment.		40 CFR § 264.554(a)(1)
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, debris) *con't*	Staging piles may be used to store hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) based on approved standards and design criteria designated for that staging pile. *NOTE*: Design and standards of the staging pile must be included in CERCLA ROD issued by EPA or Remedial Design document approved by EPA.	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **Applicable**	40 CFR § 264.554(b)

[3] For purpose of on-site CERCLA response action, the designation of a staging pile and the design and standards of the staging pile are made by EPA R4 Superfund Division Director and other delegated EPA R4 officials.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Performance criteria for staging pile	The Director must establish the standards and design criteria for the staging pile in the permit, closure plan, or order. (1) The standards and design criteria must comply with the following: • The staging pile must facilitate a reliable, effective and protective remedy; • The staging pile must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (for example, through the use of liners, covers, runoff/run-on controls, as appropriate). *NOTE*: Design and standards of the staging pile must be included in CERCLA ROD issued by EPA or Remedial Design document approved by EPA.	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(1)(i) and (ii)
Operational limits of a RCRA staging pile	The staging pile must not operate for more than two years, except when the Director grants an operating term extension under 40 CFR § 264.554(i). Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile. Must maintain a record of the date when you first placed remediation waste into the staging pile for the life of the permit, closure plan, or order, or for three years, whichever is longer. *NOTE*: Since the storage time limit is considered a substantive requirement, recordation of date when waste first placed in the staging pile is necessary to demonstrate compliance with time limit.	Storage of remediation waste in a staging pile **– Applicable**	40 CFR § 264.554(d)(1)(iii)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
	The Director may allow a staging pile to operate for up to two years after the hazardous waste is first placed into the pile. Must not use staging pile longer than the length of time designated by the Director in the permit, closure plan, or order ("operating term"), except as provided in paragraph (i) of this section. *NOTE:* Additional time limits for storage will be justified and documented in an ESD or ROD Amendment issued by EPA.		40 CFR § 264.554(h)
	The Director may grant one operating term extension of up to 180 days beyond the operating term limit contained in the permit, closure plan, or order. To justify to the Director the need for the extension, you must provide sufficient and accurate information to enable the Director to determine that continued use of the staging plie: (i) Will not pose a threat to human health and the environment; and (ii) Is necessary to ensure timely and efficient implementation of the remedial actions at the facility.		40 CFR § 264.554(h)(i)(1)
Design criteria for staging pile	In setting standards and design criteria, must consider the following factors: • length of time pile will be in operation; • volumes of waste intended to store in pile; • physical and chemical characteristics of waste to be stored in unit; • potential for releases from the unit hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • potential for human and environmental exposure to potential releases from the unit.	Storage of remediation waste in a staging pile **– Applicable**	40 CFR § 264.554(d)(2)(i)-(vi)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Waste Limitations	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that: • the remediation waste no longer meets the definition of ignitable or reactive under 40 CFR § 261.21 or 40 CFR § 261.23; and • you have complied with 40 CFR §264.17(b); or Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.	Storage of "ignitable" or "reactive" remediation waste in staging pile – **Applicable**	40 CFR § 264.554(e) 40 CFR § 264.554(e)(1)(i) 40 CFR § 264.554(e)(1)(ii) 40 CFR § 264.554(e)(2)
	Must not place incompatible remediation wastes in the same staging pile unless you have complied with 40 CFR § 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 CFR 260.10) in staging pile – **Applicable**	40 CFR § 264.554(f)(1)
	Must separate the incompatible waste of materials, or protect them from one another using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **Applicable**	40 CFR § 264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless the base has been sufficiently decontaminated in compliance with 40 CFR § 264.17(b).		40 CFR § 264.554(f)(3)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Closure of staging pile of remediation waste	Within 180 days after the operating term of the staging pile expires, you must close a staging pile located in a previously contaminated area of the site by removing or decontaminating all: • Remediation waste; • Contaminated containment system components; and • Structures and equipment contaminated with waste and leachate.	Storage of remediation waste in staging pile in *previously contaminated area* – **Applicable**	40 CFR § 264.554(j)(1)(i)-(iii)
	Must decontaminate contaminated sub-soils in a manner that EPA determines will protect human health and the environment.		40 CFR § 264.554(j)(2)
	Must be closed within 180 days after the operating term according to 40 CFR §§ 264.258(a) and 264.111 or 265.258(a) and § 265.111.	Storage of remediation waste in staging pile *in uncontaminated area* – **Applicable**	40 CFR § 264.554(k)
Air emissions from RCRA waste storage units	The requirements of RCRA Subpart CC – *Air Emission Standards for Tanks, Surface Impoundments, and Containers* do not apply to a waste management unit that is solely used for on-site treatment or storage of hazardous waste that is placed in the unit as result of implementing remedial activities required under RCRA § 3004(u) and (v), or § 3008(h), or CERCLA authorities.	Air pollutant emissions with volatile organics from a hazardous waste tank, surface impoundment, or container – **Relevant and Appropriate**	40 CFR § 264.1080(a)(5)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Waste Treatment and Disposal – Primary waste (e.g., contaminated soil and DNAPL) and Secondary Waste (e.g., wastewaters, contaminated equipment and treatment residuals)[4]			
Treatment and Disposal of RCRA hazardous waste (e.g., DNAPL) in an off-site land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR § 268.40 before land disposal.	Land disposal, as defined in 40 CFR § 268.2, of restricted RCRA waste – **Applicable**	40 CFR § 268.40(a)
	All underlying hazardous constituents [as defined in 40 CFR § 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR § 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **Applicable**	40 CFR § 268.40(e)
	To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards of 40 CFR § 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents (including UHCs in the characteristic wastes) in excess of the applicable UTS levels in 40 CFR § 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.	Land disposal of RCRA toxicity characteristic wastes (D004 –D011) that are newly identified (i.e., wastes, soil, or debris identified by the TCLP but not the Extraction Procedure) – **Applicable**	40 CFR § 268.34(f)

[4] The State of Mississippi incorporates by reference the federal regulations governing land disposal restrictions. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Disposal of RCRA – *hazardous waste soil* in a land–based unit	Must be treated according to the alternative treatment standards of 40 CFR § 268.49(c) or according to the UTSs specified in 40 CFR § 268.48 applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted hazardous soils – **Applicable**	40 CFR § 268.49(b)
Treatment of RCRA *hazardous waste soil*	Prior to land disposal, all "constituents subject to treatment" as defined in 40 CFR § 268.49(d) must be treated as follows: • **For non–metals** (except carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90 percent reduction in total constituent concentrations, except as provided in 40 CFR § 268.49(c)(1)(C) • **For metals** and carbon disulfide, cyclohexanone, and methanol, treatment must achieve a 90 percent reduction in total constituent concentrations as measured in leachate from the treated media (tested according to TCLP) or 90 percent reduction in total constituent concentrations (when a metal removal technology is used), except as provided in 40 CFR § 268.49(c)(1)(C) • When treatment of any constituent subject to treatment to a 90 percent reduction standard would result in a concentration less than 10 times the Universal Treatment Standard for that constituent, treatment to achieve constituent concentrations less than 10 times the universal treatment standard is not required. Universal Treatment Standards are identified in 40 CFR § 268.48 Table UTS.	Treatment of restricted hazardous waste soils – **Applicable**	40 CFR § 268.49(c)(1)(A)-(C)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
	In addition to the treatment requirement required by paragraph (c)(1) of this section, prior to land disposal, soils must be treated to eliminate these characteristics.	Soils that exhibit the characteristic of ignitability, corrosivity or reactivity intended for land disposal – **Applicable**	40 CFR § 268.49(c)(2)
	Provides methods on how to demonstrate compliance with the alternative treatment standards for contaminated soils that will be land disposed.	On-site treatment of restricted hazardous waste soils following alternative soil treatment of 40 CFR § 268.49(c) – **TBC**	*Guidance on Demonstrating Compliance with the LDR Alternative Soil Treatment Standards* [EPA 530 –R –02 – 003, July 2002]
Constituents subject to treatment	When applying the soil treatment standards in paragraph (c) of this section, constituents subject to treatment are any constituents listed in § 268.48 Table UTS-Universal Treatment Standards that are reasonably expected to be present in any given volume of contaminated soil, except fluoride, selenium, sulfides, vanadium, zinc, and that are *present at concentrations greater than 10 times the universal treatment standard*. PCBs are not constituents subject to treatment in any given volume of soil that exhibits the toxicity characteristic solely because of presence of metals.		40 CFR § 268.49(d)
Disposal of RCRA characteristic wastewaters in a CWA wastewater treatment unit	Are not prohibited, if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. pursuant to a permit issued under 402 the CWA (i.e., NPDES permitted), unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR §268.40,or are D003 reactive cyanide. *NOTE:* For purposes of this exclusion, a CERCLA on-site wastewater treatment unit that meets all of the identified CWA ARARs for point source discharges from such a system, is considered a wastewater treatment system that is NPDES permitted.	Land disposal of RCRA restricted hazardous wastewaters that hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR §268 – **Applicable**	40 CFR § 268.1(c)(4)(i)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Disposal of RCRA characteristic wastewaters in a POTW	Are not prohibited, if wastes are treated for purposes of the pretreatment requirements of Section 307 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR § 268.40 or are D003 reactive cyanide.	Land disposal of hazardous wastewaters that are hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR § 268 – **Applicable**	40 CFR § 268.1(c)(4)(ii)
Disposal of RCRA *hazardous waste debris* in a land–based unit (i.e., landfill)	Must be treated prior to land disposal as provided in 40 CFR § 268.45(a)(1)-(5) unless EPA determines under 40 CFR § 261.3(f)(2) that the debris no longer contaminated with hazardous waste or the debris is treated to the waste –specific treatment standard provided in 40 CFR § 268.40 for the waste contaminating the debris.	Land disposal, as defined in 40 CFR § 268.2, of restricted RCRA hazardous debris – **Applicable**	40 CFR § 268.45(a)
Operation of a Groundwater Pump and Treatment System – Control of Air Emissions			
Treatment of hazardous waste in Miscellaneous Unit with air emissions	Unit must be located, designed, constructed, operated and maintained, and closed in a manner that will ensure protection of human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect human health and the environment, including, but not limited to, as appropriate, design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit. *NOTE*: On-site CERCLA response action not required to obtain permit. Terms and conditions, design and operating requirements will be specified in a CERCLA document including but not limited to one of the following; Remedial Design, Remedial Action Work Plan.	Treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1 – **Relevant and Appropriate**	40 CFR § 264.601 *Environmental Performance Standards*

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Treatment of hazardous waste in Miscellaneous Unit with air emissions	Protection of human health and the environment includes, but is not limited to: Prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air, considering: (1) The volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates; (2) The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air; (3) The operating characteristics of the unit; (4) The atmospheric, meteorologic, and topographic characteristics of the unit and the surrounding area; (5) The existing quality of the air, including other sources of contamination and their cumulative impact on the air; (6) The potential for health risks caused by human exposure to waste constituents; and (7) The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.	Treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1 – **Relevant and Appropriate**	40 CFR § 264.601(c)(1)-(7)
Monitoring of Miscellaneous Unit	Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies must ensure compliance with §§ 264.601, 264.15, 264.33, 264.75, 264.76, 264.77, and 264.101 as well as meet any additional requirements needed to protect human health and the environment as specified in the permit.	Treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1 – **Relevant and Appropriate**	40 CFR § 264.602

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Air Emissions from a RCRA treatment unit	The requirements of RCRA Subpart AA–Air Emission Standards for Process Vents do not apply to process vents that would otherwise be subject to this subpart when equipped with emission controls and operated in accordance with an applicable Clean Air Act regulation codified under 40 CFR part 60, part 61 or part 63.	Process vents associated with air or steam stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppmw – **Relevant and Appropriate**	40 CFR § 264.1030(e)
	The requirements of RCRA Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers do not apply to a waste management unit that is solely used for on–site treatment or storage of hazardous waste that is placed in the unit as result of implementing remedial activities required under RCRA 3004(u) and (v), or 3008(h), or CERCLA authorities.	Air pollutant emissions with volatile organics from a hazardous waste tank, surface impoundment, or container – **Relevant and Appropriate**	40 CFR § 264.1080(a)(5)
Remediation of soil and/or groundwater contaminated with HAPs such as VOCs	This subpart applies to each new, reconstructed, or existing affected source for your Site Remediation as designated by paragraphs (a)(1) through (4) of this section. (1) ***Process vents***. The affected source is the entire group of process vents associated with the in-situ and ex-situ remediation processes used at your site to remove, destroy, degrade, transform, or immobilize hazardous substances in the remediation material subject to remediation. Examples of such in-situ remediation processes include, but are not limited to, soil vapor extraction and bioremediation processes. Examples of such ex-situ remediation processes include but are not limited to, thermal desorption, bioremediation, and air stripping processes.	Each new, reconstructed, or existing affected source for your Site Remediation – R**elevant and Appropriate**	40 CFR § 63.7882(a)(1)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Remediation of soil and/or groundwater contaminated with HAPs such as VOCs	This subpart applies to each new, reconstructed, or existing affected source for your Site Remediation as designated by paragraphs (a)(1) through (4) of this section. (2) ***Remediation material management units.*** Remediation material management unit means a tank, surface impoundment, container, oil-water separator, organic-water separator, or transfer system, as defined in § 63.7957, and is used at your site to manage remediation material. The affected source is the entire group of remediation material management units used for the site remediations at your site. For the purpose of this subpart, a tank or container that is also equipped with a vent that serves as a process vent, as defined in § 63.7957, is not a remediation material management unit, but instead this unit is considered to be a process vent affected source under paragraph (a)(1) of this section.	Each new, reconstructed, or existing affected source for your Site Remediation – R**elevant and Appropriate**	40 CFR § 63.7882(a)(2)
	(3) Equipment leaks. The affected source is the entire group of equipment components (pumps, valves, etc.) used to manage remediation materials and meeting both of the conditions specified in paragraphs (a)(3)(i) and (ii) of this section. If either of these conditions do not apply to an equipment component, then that component is not part of the affected source for equipment leaks.		40 CFR § 63.7882(a)(3)
	(4) Pressure relief devices. The affected source is any pressure relief device in remediation material service, as defined in § 63.7957. Pressure relief devices meeting the specifications of paragraph (a)(3) of this section are also part of an equipment leaks affected source.		40 CFR § 63.7882(a)(4)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Designation of affected source at CERCLA site	Notwithstanding paragraphs (b) and (c) of this section: Each affected source for your site is ***considered an existing source*** if your site remediation commenced construction or reconstruction under the authority of the CERCLA as a remedial action or a non-time-critical removal action on or before May 13, 2016.	Each new, reconstructed, or existing affected source for your Site Remediation – R**elevant and Appropriate**	40 CFR § 63.7882(d)(1)
	(3) Each affected source for your site is ***considered a new source*** if your site remediation commenced construction or reconstruction under the authority of CERCLA as a remedial action or a non-time-critical removal action after May 13, 2016.		40 CFR § 63.7882(d)(3)
Remediation of soil and/or groundwater contaminated with HAPs such as VOCs	You must control HAP emissions from each new and existing process vent subject to 40 CFR § 63.7885(b)(1) according to emissions limitations and work practice standards in this section that apply to your affected process vents.	Each new and existing *process vent* as defined in § 63.7957[5] subject to § 63.7885(b)(1) – R**elevant and Appropriate**	40 CFR § 63.7890(a) *Emission limitations and work practice standards for process vents*

[5] *Process vent* means any open-ended pipe, stack, duct, or other opening intended to allow the passage of gases, vapors, or fumes to the atmosphere and this passage is caused by mechanical means (such as compressors, vacuum-producing systems or fans) or by process-related means (such as volatilization produced by heating). For the purposes of this subpart, a process vent is neither a pressure relief device (as defined in this section) nor a stack, duct or other opening used to exhaust combustion products from a boiler, furnace, heater, incinerator, or other combustion device. [40 CFR § 63.7957]

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Remediation of soil and/or groundwater contaminated with HAPs such as VOCs	For your affected process vents, you must meet one of the facility-wide emission limit options specified in paragraphs (b)(1) through (4) of this section. If you have multiple affected process vent streams, you may comply with this paragraph using a combination of controlled and uncontrolled process vent streams that achieve the facility-wide emission limit that applies to you. (1) Reduce from all affected process vents the total emissions of the HAP listed in Table 1 of this subpart to a level less than 1.4 kilograms per hour (kg/hr) and 2.8 Mg/yr (3.0 pounds per hour (lb/hr) and 3.1 tpy); or (2) Reduce from all affected process vents the emissions of total organic compounds (TOC) (minus methane and ethane) to a level below 1.4 kg/hr and 2.8 Mg/yr (3.0 lb/hr and 3.1 tpy); or (3) Reduce from all affected process vents the total emissions of the HAP listed in Table 1 of this subpart by 95 percent by weight or more; or (4) Reduce from all affected process vents the emissions of TOC (minus methane and ethane) by 95 percent by weight or more.	Each new and existing *process vent* as defined in § 63.7957[6] subject to § 63.7885(b)(1) – **Relevant and Appropriate**	40 CFR § 63.7890(b) *Emission limitations and work practice standards for process vents*

[6] *Process vent* means any open-ended pipe, stack, duct, or other opening intended to allow the passage of gases, vapors, or fumes to the atmosphere and this passage is caused by mechanical means (such as compressors, vacuum-producing systems or fans) or by process-related means (such as volatilization produced by heating). For the purposes of this subpart, a process vent is neither a pressure relief device (as defined in this section) nor a stack, duct or other opening used to exhaust combustion products from a boiler, furnace, heater, incinerator, or other combustion device. [40 CFR § 63.7957]

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Remediation of soil and/or groundwater contaminated with HAPs such as VOCs	For each affected process vent, except as exempted under paragraph (c) of this section, you must meet one of the options in paragraphs (b)(1) through (3) of this section. (1) You control HAP emissions from the affected process vents according to the standards specified in §§ 63.7890 through 63.7893. (2) You determine for the remediation material treated or managed by the process vented through the affected process vents that the average total volatile organic hazardous air pollutant (VOHAP) concentration, as defined in § 63.7957, of this material is less than 10 parts per million by weight (ppmw). Determination of the VOHAP concentration is made using the procedures specified in § 63.7943. (3) If the process vent is also subject to another subpart under 40 CFR part 61 or 40 CFR part 63, you control emissions of the HAP listed in Table 1 of this subpart from the affected process vent in compliance with the standards specified in the applicable subpart. This provision does not apply to any exemption of the affected source from the emissions limitations and work practice standards allowed by the other applicable subpart.	Each new, reconstructed, or existing *process vents* that comprise the *affected source designated under* 40 CFR § 63.7882[7] – **Relevant and Appropriate**	40 CFR § 63.7885(b) *General Standards for Affected Process Vents*

[7] *Process vents.* The affected source is the entire group of process vents associated with the in-situ and ex-situ remediation processes used at your site to remove, destroy, degrade, transform, or immobilize hazardous substances in the remediation material subject to remediation. Examples of such in-situ remediation processes include, but are not limited to, soil vapor extraction and bioremediation processes. Examples of such ex-situ remediation processes include but are not limited to, thermal desorption, bioremediation, and air stripping processes.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Conditions for process vent exemption from emission standards	A process vent that meets the exemption requirements in paragraphs (c)(1) and (2) of this section is exempted from the requirements in paragraph (b) of this section. (1) The process vent stream exiting the process vent meets the conditions in either paragraph (c)(1)(i) or (ii) of this section. (i) The process vent stream flow rate is less than 0.005 cubic meters per minute (m^3/min) at standard conditions (as defined in 40 CFR § 63.2); or (ii) The process vent stream flow rate is less than 6.0 m^3/min at standard conditions (as defined in 40 CFR § 63.2) and the total concentration of HAP listed in Table 1 of this subpart is less than 20 parts per million by volume (ppmv).	Each new and existing *process vent* as defined in 40 CFR § 63.7957 – R**elevant and Appropriate**	40 CFR § 63.7885(c)(1) *Process Vent Flow Rate Exemption*
Conditions for process vent exemption from emission standards *con't*	You must demonstrate that the process vent stream meets the applicable exemption conditions in paragraph (c)(1) of this section using the procedures specified in 40 CFR § 63.694(m). You must prepare and maintain documentation at your facility to support your determination of the process vent stream flow rate. You must perform a new determination of the process vent stream flow rate and total HAP concentration, as applicable to the exemption conditions for your process vent, whenever changes to operation of the unit on which the process vent is used could cause the process vent stream conditions to exceed the maximum limits of the exemption. *NOTE*: Documentation that process vent meets exemption conditions will be provided in a CERCLA document such as a Remedial Design Report.	Each new and existing process vent as defined in § 63.7957 – R**elevant and Appropriate**	40 CFR § 63.7885(c)(2) *Exemption Verification and Documentation*

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Standards for closed vent systems and control devices used in treatment of VOC contaminated soil and/or groundwater	For each closed vent system and control device you use to comply with the requirements above, you must meet the operating limit requirements and work practice standards in § 63.7925(d) through (j) that apply to the closed vent system and control device. *NOTE:* EPA approval to use alternate work practices under paragraph (j) in 40 CFR § 63.7925 will be obtained in a CERCLA document.	*Closed vent system*[8] *and control devices*[9] as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – R**elevant and Appropriate**	40 CFR § 63.7890(c)

[8] *Closed vent system* means a system that is not open to the atmosphere and is composed of hard-piping, ductwork, connections, and, if necessary, fans, blowers, or other flow-inducing device that conveys gas or vapor from an emissions point to a control device. [40 CFR § 63.7957]

[9] *Control device* means equipment used recovering, removing, oxidizing, or destroying organic vapors. Examples of such equipment include but are not limited to carbon adsorbers, condensers, vapor incinerators, flares, boilers, and process heaters. [40 CFR § 63.7957] Control devices include regenerable carbon adsorption system, non-regenerable carbon adsorption system, condenser, thermal incinerator, catalytic incinerator, and boiler or process heater.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Emission limitations for process vents used in treatment of VOC contaminated soil and/or groundwater	You must demonstrate initial compliance with the emissions limitations and work practice standards in § 63.7890(b) applicable to your affected process vents by meeting the requirements in paragraphs (b) through (d) of this section.	*Process vents* as defined in 40 CFR § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAPs) listed in Table 1 of Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 CFR § 63.7885(c)(1) – **Relevant and Appropriate**	40 CFR § 63.7891(a) *Initial compliance demonstration with emission limitations and work practices*
Monitoring of closed vent systems and control devices used in treatment of VOC contaminated groundwater	For each closed vent system and control device you use to comply with § 63.7890(b), you must monitor and inspect the closed vent system and control device according to the requirements in 40 CFR § 63.7927 that apply to you. *NOTE*: Monitoring program will be developed as part of the CERCLA process and included in an appropriate CERCLA document.	*Closed vent system* and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7892 *Inspection and Monitoring*
Continuous emission compliance	You must demonstrate continuous compliance with the emissions limitations and work practice standards in 40 CFR § 63.7890 applicable to your affected process vents by meeting the requirements in paragraphs (b) through (d) of this section. You must maintain emission levels from all of your affected process vents to meet the facility wide emission limits in 40 CFR § 63.7890(b) that apply to you, as specified in paragraphs (b)(1) through (4) of this section.		40 CFR § 63.7893(a) and (b) *Demonstration of continuous compliance with emission limitations and work practices*
	For each closed vent system and control device you use to comply with 40 CFR § 63.7890(b), you have met each requirement for demonstrating continuous compliance with the emission limitations and work practice standards for a closed vent system and control device in 40 CFR § 63.7928.	*Closed vent system and control devices* as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7893(c)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Standards for closed vent systems and control devices used in treatment of VOC contaminated soil and/or groundwater	For each closed-vent system and control device you use to comply with requirements in §§ 63.7890 through 63.7922, as applicable to your affected sources, you must meet the emissions limitations and work practice standards in this section.	*Closed vent system and control devices* as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – R**elevant and Appropriate**	40 CFR § 63.7925(a) *Emission limitations and work practice standards for closed vent systems and control devices*
	You must comply with paragraph (b)(2) of this section, and paragraph (b)(1) of this section does not apply.	Initial startup date for closed vent system was *after* September 3, 2019 – R**elevant and Appropriate**	40 CFR § 63.7925(b)
	You must comply with paragraph (b)(1) or (2) of this section until January 7, 2021, and after that date, you must comply with paragraph (b)(2) of this section, and paragraph (b)(1) of this section does not apply.	Initial startup date for closed vent system was *on or before* September 3, 2019 – R**elevant and Appropriate**	40 CFR § 63.7925(b)
	For each closed vent system, you must meet the work practice standards in 40 CFR § 63.693(c) *Standards: Closed-vent systems and control devices*.	*Closed vent system* and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – R**elevant and Appropriate**	40 CFR § 63.7925(c)
Standards for closed vent systems and control devices used in treatment of VOC contaminated soil and/or groundwater *con't*	The vent stream required to be controlled shall be conveyed to the control device by either of the following closed-vent systems: (i) A closed-vent system that is designed to operate with no detectable organic emissions using the procedure specified in § 63.694(k) of this subpart; or (ii) A closed-vent system that is designed to operate at a pressure below atmospheric pressure. The system shall be equipped with at least one pressure gauge or other pressure measurement device that can be read from a readily accessible location to verify that negative pressure is being maintained in the closed-vent system when the control device is operating.	*Closed vent system and control devices* as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – R**elevant and Appropriate**	40 CFR § 63.693(c) *Standards: Closed-vent systems and control devices*.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Standards for control devices used in treatment of VOC contaminated soil and/or groundwater	You must control HAP emissions to meet either of the emissions limits in paragraphs (d)(1) or (2) of this section except as provided for in paragraph (f) of this section. (1) Reduce emissions of total HAP listed in Table 1 of this subpart or TOC (minus methane and ethane) from each control device by 95 percent by weight; or (2) Limit the concentration of total HAP listed in Table 1 of this subpart or TOC (minus methane and ethane) from each combustion control device (a thermal incinerator, catalytic incinerator, boiler, or process heater) to 20 ppmv or less on a dry basis corrected to 3 percent oxygen.	For each *control device*[10] other than a flare or a control device used to comply with the facility-wide process vent emission limits in 40 CFR § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7925(d) *Emission limitations for control devices*
	For each control device other than a flare, you must meet each operating limit in paragraphs (g)(1) through (6) of this section that applies to your control device.		40 CFR § 63.7925(g)
	If you use a carbon adsorption system as your control, you must meet each work practice standard in paragraphs (h)(1) through (3) of this section that applies to your control device.		40 CFR § 63.7925(h)
Demonstration of initial compliance with emission limitations and work practice standards	You must demonstrate initial compliance with the emissions limitations and work practice standards in this subpart applicable to your closed vent system and control device by meeting the requirements in paragraphs (b) through (h) of this section that apply to your closed vent system and control device.	*Closed vent system* and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7926(a)

[10] Control devices include regenerable carbon adsorption system, non-regenerable carbon adsorption system, condenser, thermal incinerator, catalytic incinerator, and boiler or process heater.

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Demonstration of initial compliance with emission limitations and work practice standards for *carbon adsorption systems*	You must demonstrate initial compliance with the spent carbon replacement and disposal work practice standards for carbon adsorption systems in § 63.7925(h) if you have submitted as part of your notification of compliance status, specified in § 63.7950, a signed statement that you will comply with each work practice standard that applies to your carbon adsorption system. *NOTE*: Submission of notification of compliance status may be included as part of a monitoring program as part of the CERCLA remedy.	*Closed vent system* and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7926(e)
Monitoring of closed vent systems and control devices used in treatment of VOC contaminated soil and/or groundwater	Must monitor and inspect the closed vent system and control device according to the requirements in 40 CFR § 63.7927 that apply to the affected source. *Note:* Monitoring program will be developed as part of the CERCLA process and results included in an appropriate CERCLA document.	*Closed vent system* and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**.	40 CFR § 63.7892
Discharge of Wastewater from Groundwater Treatment Unit or from Dewatering to POTW			
Treatment system O&M	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used to achieve compliance with the effluent standards. Proper O&M also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters of the state – **Applicable** Discharge of pollutants to POTW – **Relevant and Appropriate**	40 CFR § 122.41(e)
Discharge into POTW *General prohibitions*	A User may not introduce into a POTW any pollutant(s) which cause Pass Through or Interference. These general prohibitions and the specific prohibitions in paragraph (b) of this section apply to each User introducing pollutants into a POTW whether or not the User is subject to other National Pretreatment Standards or any national, State, or local Pretreatment Requirements.	Indirect discharge of pollutants into POTW from Industrial User as defined 40 CFR §403.3 – **Applicable**	40 CFR § 403.5 (a)(1) *National pretreatment standards:* *Prohibited discharges*

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Discharge into a POTW *Specific prohibitions*	In addition, the following pollutants shall not be introduced into a POTW: (1) Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR §261.21; (2) Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0, unless the works is specifically designed to accommodate such Discharges; (3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in Interference; (4) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW; (5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 °C (104 °F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits; (6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through; (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; (8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.	Indirect discharge of pollutants into POTW from Industrial User as defined 40 CFR §403.3 – **Applicable**	40 CFR § 403.5 (b)(1)-(8)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Discharge into POTW *Con't*	(d) *Local limits.* Where specific prohibitions or limits on pollutants or pollutant parameters are developed by a POTW in accordance with 40 CFR § 403.5 (c), such limits shall be deemed Pretreatment Standards for the purposes of section 307(d) of the CWA.	Indirect discharge of pollutants into POTW from Industrial User as defined 40 CFR §403.3 – **Applicable**	40 CFR § 403.5 (d)
Transport and conveyance of collected RCRA wastewater to WWTU located on the facility	Any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to an on-site NPDES-permitted wastewater treatment unit (WWTU) are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment unit [as defined in 40 CFR 260.10] subject to regulation under §402 or §307(b) of the CWA (i.e., NPDES permitted) that manages hazardous wastewaters – **Applicable**	40 CFR § 264.1(g)(6)
General duty to mitigate for discharge of WWTU	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters – **Applicable** Discharge of pollutants to POTW – **Relevant and Appropriate**	40 CFR § 122.41(d)
	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters – **Applicable** Discharge of pollutants to POTW – **Relevant and Appropriate**	
Monitoring requirements for discharges from WWTU	In addition to §122.48 and to assure compliance with effluent limitations, one must monitor, as provided in subsections (i) thru (iv) of §122.44(i)(1). *NOTE:* Monitoring parameters, including frequency of sampling, will be developed as part of the CERCLA process and included in a Remedial Design, Remedial Action Work Plan, or other appropriate CERCLA document.	Discharge of pollutants to surface waters – **Applicable** Discharge of pollutants to POTW – **Relevant and Appropriate**	40 CFR §122.44(i)(1)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
Groundwater Monitoring and Extraction Wells – Installation, Operation, and Abandonment			
Construction of monitoring	Shall follow the construction standards set forth in MDEQ Regulation LW-3, Chap. XI(A)(1)(a), (b), (c), (d), (e), (f), (h), (j), (l), (m), (n), as appropriate.	Installation of wells and boreholes that penetrate water bearing strata or are greater than twenty-five (25) feet in depth including monitoring wells, observation wells, contaminant recovery wells, underground discharge wells, and closed-loop system holes, and pilot boreholes – **Relevant and Appropriate**	MDEQ Regulation LW-3, Chap. XI(A)(1), *DESIGN CRITERIA AND CONSTRUCTION STANDARDS*
Decommissioning of abandoned monitoring well and boreholes	Shall follow decommission procedures related to grouting and casing in accordance with substantive requirements set forth in MDEQ Regulation LW-3, Chap. XIII(F)(1)-(6), as appropriate.	Decommissioning of wells and boreholes that penetrate water bearing strata or are greater than twenty-five (25) feet in depth including monitoring wells, observation wells, contaminant recovery wells, underground discharge wells, and closed-loop system holes, and pilot boreholes – **Relevant and Appropriate**	MDEQ Regulation LW-3, Chap. XIII(F), *Decommissioning procedures*
Decommissioning of abandoned monitoring well and boreholes	Geotechnical boreholes shall be plugged within 30 days after abandonment or cessation of use. All other holes shall be plugged within 180 days after abandonment or cessation of use.		MDEQ Regulation LW-3, Chap. XIII(D)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
	Transportation of Waste		
Transportation of hazardous waste *on-site*	The generator manifesting requirements of 40 CFR §§ 262.20-262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR §§ 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – **Applicable**	40 CFR § 262.20(f)
Transportation of hazardous waste *off-site*	Must comply with the generator requirements of 40 CFR §§ 262.20-262.23 for manifesting, § 262.30 for packaging, § 262.31 for labeling, § 262.32 for marking, § 262.33 for placarding, §§ 262.40 and 262.41(a) for record keeping requirements, and § 262.12 to obtain EPA ID number.	Preparation and initiation of shipment of RCRA hazardous waste off-site – **Applicable**	40 CFR § 262.10(h)
	Must comply with the requirements of 40 CFR §§ 263.11-263.31. A transporter who meets all applicable requirements of 49 CFR §§ 171-179 and the requirements of 40 CFR §§ 263.11 and 263.31 will be deemed in compliance with 40 CFR §263.	Transportation of hazardous waste within the United States requiring a manifest – **Applicable**	40 CFR § 263.10(a)
Transportation of waste samples	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: • the sample is being transported to a laboratory for the purpose of testing; or • the sample is being transported back to the sample collector after testing.	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **Applicable**	40 CFR § 261.4(d)(1) 40 CFR § 261.4(d)(1)((i) 40 CFR § 261.4(d)(1)(ii)

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

ACTION	REQUIREMENTS	PREREQUISITE	CITATION
	In order to qualify for the exemption in paragraphs (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must: • Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements. • Assure that the information provided in (1) thru (5) of this section accompanies the sample. • Package the sample so that it does not leak, spill, or vaporize from its packaging.		40 CFR § 261.4(d)(2)(i) 40 CFR § 261.4(d)(2)(i)(A) 40 CFR § 261.4(d)(2)(i)(B)
Transportation of *hazardous materials*	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR §§ 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **Applicable**	49 CFR § 171.1(c)

ARAR = applicable or relevant and appropriate requirement
ESD = Explanation of Significant Differences
CFR = Code of Federal Regulations
CWA = Clean Water Act of 1972
DEACT = deactivation
DOT = U.S. Department of Transportation
EPA = U.S. Environmental Protection Agency
HAP = hazardous air pollutant
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act
MDEQ = Mississippi Department of Environmental Quality
MSWLF = Municipal Solid Waste Landfill Facility
MS Rule = MDEQ Administrative Rules and Regulations
NPDES = National Pollution Discharge Elimination System
POTW = publicly owned treatment works
RCRA = Resource Conservation and Recovery Act of 1976
TBC = to be considered
TOC = total organic content
UTS = Universal Treatment Standard

Table 2. ACTION SPECIFIC ARARs and TBCs
Kerr McGee Superfund Site OU-3 ROD - Columbus, Mississippi

VOC = volatile organic compound
VOHAP = volatile organic hazardous air pollutant