# PROPOSED PLAN
# KERR-MCGEE CHEMICAL CORPORATION SUPERFUND SITE COLUMBUS, OU-2 COLUMBUS, LOWNDES COUNTY, MISSISSIPPI

This Proposed Plan is not to be considered a technical document but has been prepared to provide an abridged summary to the public.

**You are Invited to Comment on this Proposed Cleanup for the Kerr-McGee Superfund Site, OU-2 located in Columbus, Mississippi**

## INTRODUCTION

This **Proposed Plan** presents the U.S. Environmental Protection Agency's Preferred Alternative and provides the rationale for a **Remedial Action** to address contaminated surface soils in Operable Unit 2 (OU-2), at the Kerr-McGee Chemical Corporation (KMCC) **Superfund** Site (Site) located at 2300 14th Avenue North in Columbus, Lowndes County, Mississippi (Figure 1). The 90-acre Site consists of two primary areas, separated by 14th Avenue North: the Former Plant Area to the north and the Pine Yard to the south. Due to its size and complexity, the Site has been divided into multiple operable units (Figure 2). The first OU (OU-1) was defined as Unsaturated Soils in the areas of the Pine Yards with no **groundwater** contamination and excluded creosote non-aqueous phase liquid (NAPL) contaminated soils. The OU-1 FFS was approved by the EPA and Mississippi Department of Environmental Quality (MDEQ) on September 27, 2018, and August 10, 2018, respectively. The ROD for OU-1 was finalized on May 6, 2019. The OU-1 remedial action began on September 10, 2018, and is proceeding in accordance with the OU-1 Removal Action Work Plan. OU-3 consists of the Former Main Plant Area and a Feasibility Study has been developed.

The second operable unit, OU-2, is the subject of this Proposed Plan. OU-2 includes privately owned residential and commercial properties with surface soils (up to 2 feet [ft] below ground surface [bgs]) that are contaminated by dioxins and furans linked to historical wood-treating operations at the former KMCC facility. The EPA and MDEQ used the OU-1 ROD cleanup level for dioxins and furans as the **Preliminary Remedial Goal** (PRG) for OU-2. Dioxin and furan concentrations that exceed PRGs pose an unacceptable risk to human health. Remediation of OU-2, in conjunction with ongoing ditch removal actions, cleanup efforts in OU-1, and OUs within the Site, will ensure the overall sitewide **cleanup**. This Proposed Plan also proposes no action for the parcels that were sampled and do not pose an unacceptable risk to human health or the environment.

This Proposed Plan also includes summaries of remedial alternatives evaluated in the November 2019 **Focused Feasibility Study (FFS)**. A glossary defining key terms is provided at the end of this document; the key terms appear in bold the first time they are used.

The EPA, the lead agency for Site activities, and MDEQ, the support agency, are issuing this Proposed Plan in compliance with public participation requirements under Section 117 (a) of the **Comprehensive**

**Environmental Response, Compensation, and Liability Act of 1980 (CERCLA**), as amended, 42 United States Code Section 9617, commonly known as Superfund, and the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**, as set forth in 40 Code of Federal Regulations (CFR) Section 300.430 (f)(2).

This Proposed Plan summarizes and identifies key information that can be found in greater detail in the **Remedial Investigation (RI)** and FFS documents, as well as other documents contained in the **Administrative Record** file for this Site. The EPA and MDEQ encourage the public to review these documents to gain a more comprehensive understanding of the Site. The Administrative Record and **Information Repository** is located at the Columbus-Lowndes Public Library at 314 N. Seventh Street, Columbus, Mississippi.

The EPA, in consultation with MDEQ, will select a final remedy for OU-2 in a **Record of Decision (ROD)** after reviewing and considering all information submitted during the **public comment period**. The EPA, in consultation with MDEQ, may modify the Preferred Alternative or select another alternative presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

To ensure the community's concerns are being addressed, a public comment period lasting 30 calendar days will be held. Due to public health concerns related to spread of the COVID-19 virus, the EPA is not planning to hold an in-person public meeting about the Proposed Plan. The EPA and its Superfund site teams are cancelling or postponing in-person public meeting events, door-to-door visits, and other site-related face-to-face interactions to reflect current COVID-19 guidance from federal, state, tribal and local officials. Protecting the health and safety of our staff, contractors, and the communities we serve is our top priority.

Instead, in order to provide members of the community with the information necessary to decide whether and how to comment on the Proposed Plan, the EPA has posted online a pre-recorded video presentation where the Remedial Project Manager for the site presents the Proposed Plan. You may view the presentation, complete with closed captioning, at www.epa.gov/superfund/kerr-mcgee-chemical-columbus. In order to access the video presentation, you will need: A device (phone, tablet, computer) with web access and sound capability. If you cannot access the EPA website, please contact Kyle Bryant/CIC at 404-562-9073 or Bryant.kyle@epa.gov to arrange to receive the information in some other format.

Members of the site team are available to answer questions via email or over the phone, and members of the public are encouraged to call or write. If you have questions about the Proposed Plan, please contact Charles L. King/RPM at 404-562-8931 or king.charlesl@epa.gov.

Through these alternative means, the EPA seeks to provide a full opportunity for public participation and comment without risking public health. However, the EPA will provide the opportunity for a live virtual meeting if the community requests one.

## SITE BACKGROUND

Contaminated media at OU-2 includes surface soil at residential and commercial properties adjacent to the KMCC Site. The former KMCC facility was an industrial wood treating facility operated by KMCC and its predecessors and successors from 1928 to 2003. Most of the Site consists of the property formerly owned and operated by KMCC (the "former KMCC facility"). The former KMCC facility covers approximately 90 acres and includes the Former Plant Area, located southwest of the intersection of 14th Avenue North and Moss Street, and the Pine Yard, located northwest of the same intersection. Structures were visible onsite through at least 2007, but all above-grade structures, other than the current office and operation and maintenance buildings (including one which houses the groundwater treatment system) appeared to have been demolished by 2010. The Kerr-McGee Chemical Corp. facility is closed and access to the Site is restricted by a fence that encloses the entire property.

### Site History

The wood treating facility was originally developed and operated by T.J. Moss Tie Company. Construction of the plant began on August 15, 1928, and the plant was completed in February 1929. KMCC acquired the Site in 1963 and continued wood treating operations until the facility was closed in 2003. Manufactured products included railroad wooden cross ties, switch ties, and preserved timbers. Wood preservatives used in the operation were primarily creosote, creosote coal tar solutions, and pentachlorophenol (PCP).

During wood treating operations, green lumber was received and sorted at the plant, and 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 that was allowed to dry naturally was stored in the green tie storage areas and in the Pine Yard. The Boulton drying process involved subjecting the 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. 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.

After treatment, the wood was placed on a drip track for drying. KMCC installed a drip pad adjacent to the retort to collect excess preservative, or "drippage." KMCC reported that drippage collected on the drip pad was discharged to the production process oil/water separators. Treated lumber was supposed to remain on the drip track for 24 hours; however, former employees claimed that timbers were often taken on rail trams directly to the Pine Yard, immediately after coming out of the retort. Between 1992 and 1996, wood was stored throughout the facility, except for the northern portion of the Pine Yard. In 2003, the volume of wood storage was significantly reduced and by 2004, no wood storage or manufacturing activities were apparent at the Site in aerial photographs.

Based on data collected to date, historical wood-treating operations in the Former Plant Area are understood to have been the primary source of dioxins and furans observed at the Site. Dioxins and

furans are contaminants that can be formed as by-products during the production of PCP and are thus a common contaminant at wood treatment sites, such as Kerr-McGee Columbus, where PCP was used as part of the wood treatment process. Dioxins and furans associated with PCP-based wood treatment solutions can be released to the environment with the release of these solutions (e.g., short-term emission from the retort building due to a gasket failure). In addition, former employees have reported that a fire at a building in the Former Plant Area (formerly located near the current water treatment building) known to have stored PCP may have contributed to a release of dioxins and furans to the air.

Dioxins and furans are also common urban contaminants frequently associated with combustion and are frequently detected in urban soils. Multiple sources can contribute dioxins and furans to the environment, including, but not limited to incinerators (e.g., at waste disposal facilities, hospitals, and other public, private, and industrial facilities), industrial emissions (e.g., coking and sintering processes), open fires, domestic waste and leaf burning, domestic wood and coal combustion, vehicle emissions, and railways (e.g., PCP-treated ties and rail diesel equipment). These sources commonly contribute low levels of dioxins and furans to urban soils and, depending on location-specific considerations (e.g., soils collected from or adjacent to a burn site), can result in localized occurrence of higher concentrations.

Dioxins and furans are characterized by extremely low solubility and volatility, and very high organic carbon partitioning coefficients (Koc). As a result, dioxins and furans are strongly associated with the particulate phase (e.g., soils and sediment) in the environment and are not present at appreciable concentrations in the dissolved phase in water (for example, groundwater, infiltrating rain water, or surface water). Based on sampling results, impacts to OU-2 soils are confined to the surface (0 - 2 ft bgs). As a result of their inherent chemical-specific properties, the **chemicals of concern (COCs)** typically do not migrate, and the materials do not represent a significant source of COC leaching to groundwater.

### History of OU-2 Investigations

Multiple investigations of surface soils at private properties surrounding the former KMCC facility have been conducted dating back to 2010, as summarized below. Figure 3 presents the soil sampling locations for dioxins and furans from the pre-RI, RI, and supplemental sampling for privately owned property soils collected from within the top 1 ft of soil in the Study Area.

Pre-RI and RI soil sampling included samples collected in 2010 by the EPA Resource Conservation and Recovery Act (RCRA) program and by the EPA Superfund program in 2011. Additional sampling was completed by URS Corporation at the Buttons and Bows Day Care playground in 2011. None of the sampling results from these investigations exceeded the EPA's recommended preliminary remediation goal of 1,000 parts per trillion (ppt) toxicity equivalent concentrations of dioxins and furans (TEQdf) that was in effect for residential soils at the time.

However, in 2012, the EPA completed a reassessment of the noncancer toxicity of dioxin and the EPA established a residential PRG of 50 ppt TEQdf which prompted additional investigation of dioxins and furans at the Site from 2014 to 2017.

As part of the **Baseline Human Health Risk Assessment** (HHRA) for the Site, the Multistate Trust reviewed all of data collected through 2017 and determined that a total of 14 samples from 11 different properties had TEQdf concentrations greater than or equal to 50 ppt. Based on the findings of the baseline HHRA, supplemental sampling was recommended by the Multistate Trust to establish the extent of dioxins and furans in soils exceeding the PRG of 50 ppt TEQdf in private properties surrounding the former KMCC facility. This supplemental sampling was completed in 2018 and 2019, and the results of those investigations are available in the "2018-2019 Private Property Dioxin/Furan Sampling Report."

The objective of the 2018-2019 private property soil sampling was to identify whether properties surrounding the former KMCC wood-treating facility have dioxins and furans concentrations in surface soils at levels exceeding the residential PRG of 50 ppt TEQdf. The dioxins and furans cleanup level from the 2019 OU-1 ROD was used as the PRG for dioxins and furans in OU-2. The sampling program was developed based on consideration of historical data (specifically the results of the EPA's 2010/2011 dioxin/furan sampling) and the current conceptual site model for dioxins and furans.

### Previous CERCLA Actions

Multiple CERCLA actions at the Site have been completed since 1986, as is summarized in the Phase II RI Report. In the vicinity of OU-2, creosote and Site-related COCs have been observed in drainage ditches that convey stormwater through the neighborhoods around the Site. The 14th Avenue Ditch, the Eastern Ditch, Southeastern Ditch, and the Southern Ditch have been investigated to date. Several cleanup actions have been completed under CERCLA removal and remedial authority, including: 1) interim measures to remove impacted sediment in the Eastern Ditch along the eastern Former Main Plant Area boundary; 2) remediation of the 14th Avenue Ditch in accordance with a Time Critical Action Memorandum; and 3) remediation of the 7th Avenue Ditch under a past voluntary action (Figure 2). Further investigation is being completed to assess whether additional remediation is needed in the Eastern Ditch and Southern Ditch. Remediation of the Southeastern Ditch will be completed under the Time Critical Action Memorandum.

### History of CERCLA Enforcement Activities

The EPA placed the Site on the Superfund Program's **National Priorities List** (NPL) in 2011. Tronox Inc. (KMCC's successor) resolved its environmental liabilities pursuant to a bankruptcy settlement approved by the Court in 2011, which established the Multistate Trust. In 2014, Anadarko Petroleum Corp. settled with the U.S. Department of Justice to resolve fraudulent conveyance claims related to KMCC's environmental liabilities. The settlements provided funding for the EPA, MDEQ, and the Multistate Trust to continue conducting assessments and cleanup work at the Site. The regulatory history for the Site is summarized in the 2019 FFS for OU-2.

### Public Participation Activities

The EPA, MDEQ, and the Multistate Trust conduct regular Community Advisory Group meetings with the Memphis Town Community Advisory Group as part of the ongoing remedial and removal actions underway at the Site. The Multistate Trust provides community updates through regular factsheets. The EPA and the Multistate Trust maintain websites with additional information at www.epa.gov/superfund/kerr-mcgee-chemical-columbus and columbus.greenfieldenvironmental.com/

The EPA, MDEQ, and the Multistate Trust are using a T.E.A.M. (Together Everyone Accomplishes More) concept with a locals first approach to conduct the cleanup work. To date, over 90 percent of the construction work has been done by local contractors. The EPA, MDEQ, and the Multistate Trust also have conducted several focus group forums to get community input for post-cleanup redevelopment and reuse options.

## SITE CHARACTERISTICS

The Kerr-McGee Columbus Site consists of approximately 90 acres of land located in the northeastern portion of the City of Columbus and includes two areas associated with historic wood-treating operations: the Former Plant Area and the Pine Yard. OU-2 includes privately-owned residential and commercial properties with surface soils (up to 2 ft bgs) that have dioxins and furans concentrations that exceed health-based PRGs. Although the facility ceased operations in 2003 and the process equipment and most structures have been removed, residual creosote, in the form of a **dense non-aqueous phase liquid** (DNAPL), and contaminated soils remain.

### Geography

The Site is located within both the Black Prairie Geographic Region and the Northeastern Hills Region of Mississippi. Columbus, in the northern portion of Lowndes County, is characterized by relatively flat land. Adjacent waterways include Luxapalila Creek east of the Site and the Tombigbee River west of the Site. The entire region is underlain by the Selma Chalk formation, which weathers into a variety of soil types. This region is comprised of prairies and dark fertile soil conducive for agricultural use.

### Topography

The Former Plant Area and Pine Yard areas are generally flat with no visibly discernible slope. The Site vicinity slopes downward toward the south and east, toward Luxapalila Creek, which is located approximately 0.5-mile east of the Site.

### Geology/ Hydrology

The Geologic Map of Mississippi, dated 2011, shows the Site near the boundary of the Tombigbee Sand within the Eutaw Formation. The Tombigbee Sand is described as a massive, fine-grained sand. The Site is underlain by unconsolidated alluvial sediments to a depth of approximately 15 to 25 feet bgs. Below

the alluvial deposits lies the lower-permeability Eutaw Formation, which consists of fine silty sand. Based on reported slug-test and aquifer-test data, it was determined that the upper part of the Eutaw Formation is less permeable than the overlying alluvial deposits at the Site and acts as an aquiclude, limiting the vertical migration of both DNAPL and dissolved phase constituents.

### Nature and Extent of OU-2 Contamination

Between 2010 and 2019, the EPA, MDEQ and the Multistate Trust conducted extensive sampling of off-Site surface soils to evaluate the impact of wood-treating operations on the surrounding properties. The OU-2 Study Area included sampling for dioxins and furans at over 200 samples or decision units (DUs)[1] within 96 nearby properties in the North Neighborhood, Southwest Neighborhood and Southeast Neighborhood (Figure 3). Lab results found that 11 DUs at 11 different properties have dioxins and furans in surface soil requiring cleanup due to concentrations exceeding the PRGs (50 ppt TEQdf), which are EPA-approved, health-based standards established to protect residents and workers. No action is required at the other 83 properties to protect human health or the environment.

In the 11 DUs contaminated above the PRGs in the top 1 foot of soil, the 1 to 2-foot interval was sampled. Three of the 11 DUs also exceeded the PRGs in the 1 to 2 ft bgs samples. The table below summarizes the sampling results for OU-2.

**Summary of Supplemental Sampling Results**

| Location | DUs Sampled | DUs with 0–1 ft bgs Surface Soil TEQdf ≥50 ppt | DUs with 0–2 ft bgs Surface Soil TEQdf ≥50 ppt |
|---|---|---|---|
| Southwest Neighborhood | 37 | 3 | 1 |
| North Neighborhood | 9 | 0 | NA |
| Southeast Neighborhood | 49 | 5 | 2 |

Notes:
NA = not applicable
TEQdf = toxicity equivalent concentrations of dioxins and furans
ppt = parts per trillion
TEQdf was analyzed in 1–2 ft bgs surface soil samples for DUs with TEQdf ≥50 ppt in 0–1 ft bgs surface soils.

[1] Each property identified for sampling was divided into one or more DUs based on potential for human exposure and/or other factors (such as proximity of a portion of the property to the former KMCC facility or drainage ditch that conveys stormwater from the facility). The DUs for each property were determined in consultation with the EPA. In most cases, residential properties were divided into two DUs corresponding to the front yard and the back yard.

Ninety-four properties in the Study Area were evaluated based on anticipated residential land use:

**Southeast Residential Neighborhood**

- Seven DUs in the Southeast Neighborhood posed an unacceptable risk to human health based on residential land use. The observed pattern of dioxin and furan concentrations in OU-2 properties in the Southeast Neighborhood suggests transport via episodic flooding of stormwater from the Eastern and Southeastern ditches, and deposition of particulates to properties adjacent to the ditches. All seven of the DUs exceeding 50 ppt TEQdf in the Southeast Neighborhood are located adjacent to the Eastern, Southeastern, and Southern ditches, while DUs located further from the ditches (e.g., on the other side of the home on residential parcels) were below 50 ppt TEQdf (Figure 4).

**Southwest Residential Neighborhood**

- Four DUs in the Southwest Neighborhood posed an unacceptable risk to human health based on residential land use. The four properties exceeding 50 ppt TEQdf in the Southwest Neighborhood are all located in the vicinity of the former KMCC facility entrance, at the intersection of 21st Street North and 13th Avenue North (Figure 4). In all cases, the DUs exceeding 50 ppt TEQdf abut one or both of these roads. This distribution suggests that these properties were impacted by fugitive dust and/or track out associated with traffic exiting the former KMCC facility. It is also possible that these properties may have been impacted by short-term aerial deposition during a fire or short-term release event at the former facility if the wind was blowing to the west at the time of the event. The impacted properties are topographically higher than the former process area of the KMCC facility, indicating that storm runoff was not a likely source of dioxins and furans to the Southwest Neighborhood.

**No Action DUs in Study Area Based on Residential Land Use**

- Eighty-three of the properties sampled in the Study Area met EPA's criteria for a No Action remedial decision because sampling found no unacceptable risk to human health based on residential land use.

**Properties in Study Area Evaluated Based on Industrial / Commercial Land Use**

Two properties in the Study Area were evaluated based on current and reasonably anticipated future industrial/commercial land use. The EPA used the construction worker PRG of 230 ppt TEQdf to determine if there was an unacceptable risk based on Industrial / Commercial Land Use. Key findings of the supplemental sampling for these properties include:

- Five discrete soil samples were collected from the property east of the former KMCC facility (IDs 18-43 through 18-47). One of the five discrete samples had a concentration of 390 ppt TEQdf. The sample is located in the northern end of the property in the area where the former KMCC facility Drainage Ditch 4 passes through the property (Figure 4). A DU was subsequently defined for the northern portion of this property and sampled using multiple increment sampling in October 2019—resulting in a concentration of 75.9 ppt TEQdf. Because this result

is less than the construction worker PRG (230 ppt TEQdf), the property meets the no action criteria; and

- Six discrete samples were collected from the Former Sanderson Plumbing property (IDs 19-16 through 19-21). One of the six discrete samples had a concentration of 296 ppt TEQdf. The sample is located in the northeast end of the property. The Former Sanderson Plumbing Property is now owned by the State of Mississippi and is excluded from the scope of this Proposed Plan.

### Principal Threat Waste

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)). The “principal threat waste” concept is applied to the characterization of "source materials" at a Superfund site. 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. Examples of principal threat waste include NAPL, DNAPL and highly contaminated soils. The NCP specified that principal threat wastes are to be treated wherever practicable. There are no principal threat wastes known to be present in OU-2 soils.

## SCOPE AND ROLE

Due to its size and complexity, the KMCC Site has been divided into multiple operable units (OUs). The 90-acre Site consists of two primary areas, separated by 14th Avenue North: the Former Plant Area to the north (identified as OU-3) and the Pine Yard to the south (OU-1). The OU-1 was defined as unsaturated contaminated soils in the areas of the Pine Yards with no groundwater contamination and excluded non-aqueous phase liquid (NAPL) contaminated soils. The ROD for OU-1 was finalized on May 6, 2019 and the remedial action is proceeding. The scope of this Proposed Plan is limited to OU-2 surface soils at privately owned residential and commercial properties surrounding the former KMCC facility. The Former Sanderson Plumbing Property is now owned by the State of Mississippi and is excluded from the scope of this Proposed Plan. The overall cleanup strategy proposed for OU-2 is removal of surface soils that contain dioxins and furans at TEQdf concentrations that exceed the health-based cleanup level based upon residential direct exposure. The OU-2 remedial action and the ongoing time-critical removal action of the drainage ditches will address off-facility contaminated areas of the Site.

## SUMMARY OF SITE RISKS

A baseline HHRA was conducted in August 2018 to estimate the risks and hazards associated with the current and future effects of contaminants on human health and the environment. A baseline ecological risk assessment (BERA) was also conducted in 2018 to assess the risks to ecological receptors due to site-related contamination. The purpose of the baseline HHRA and BERA is to identify potential cancer risks and noncancer health hazards and ecological effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these exposures under current (vacant)

and future (residential and industrial) site uses. The HHRA and BERA are summarized in the FFS Report for OU-2 and below.

The BERA did not identify any ecological habitat within OU-2. Therefore, based on the findings of the BERA, it was concluded that there are no ecological risks in OU-2.

### Human Health Risk Assessment

In the HHRA, cancer and non-cancer health hazard estimates are based on reasonable maximum exposure (RME) scenarios. The estimates were developed by considering various health protective estimates about the concentrations, frequency and duration of an individual's exposure to chemicals selected as chemicals of potential concern (COPCs), as well as the toxicity of these contaminants.

**WHAT IS RISK AND HOW IS IT CALCULATED?**

A Superfund human health risk assessment estimates the "baseline risk." This is an estimate of the likelihood of health problems occurring if no **cleanup** action were taken at a site. To estimate the **baseline risk** at a Superfund site, the EPA undertakes a four-step process:

**Step 1: Analyze Contamination**

**Step 2: Estimate Exposure**

**Step 3: Assess Potential Health Dangers**

**Step 4: Characterize Site Risk**

In **Step 1**, the EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and risk-based screening levels help the EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In **Step 2**, the EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, the EPA calculates a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In **Step 3**, the EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. The EPA considers two types of risk: cancer risk and non-cancer 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 as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer from the exposure in question than would normally be expected to from all other causes. For non-cancer health effects, the EPA calculates a "hazard index." The key concept here is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which non-cancer health effects are no longer predicted.

In **Step 4**, the EPA determines whether site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated and summarized. the EPA adds up the potential risks from the individual exposure routes for each media of concern.

The HHRA considered all data collected at the Site through 2017 and identified the data needs that were the basis for the supplemental sampling completed in 2018 and 2019. The results of the supplemental sampling were evaluated in an addendum to the HHRA and are presented in Appendix A of the OU-2 FFS. Contaminant concentrations in surface soils in OU-2 were predicted to pose a potential risk to human receptors.

A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Analyze Contamination; Estimate Exposure; Assess Potential Health Dangers; and Characterize Site Risk (see adjoining box "What is Risk and How is it Calculated").

COPCs were selected by comparing the maximum detected concentrations of each analyte with residential and industrial soil **Regional Screening Levels (RSLs)**. Risks and hazards from groundwater, vapor intrusion, sediment, and surface water from other areas of the site are not presented in this Proposed Plan and will be part of future decisions regarding the Site.

The HHRA was finalized on August 15, 2018. Potentially exposed populations evaluated are future residents, future indoor/outdoor workers, future construction workers, and current and future trespassers. The following receptors and exposure pathways were quantitatively evaluated in the HHRA:

- Residents (future)—incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of particulates and volatile compounds in outdoor air;
- Outdoor workers (future)—incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of particulates and volatile compounds in outdoor air;
- Indoor workers (future)—incidental ingestion of surface soil;
- Construction workers (future)—incidental ingestion of soil, dermal contact with soil, and inhalation of particulates and volatiles in outdoor air. (Exposure to the surface and subsurface soil increments were evaluated separately for construction workers.); and
- Trespasser (current, future)—incidental ingestion of soil and dermal contact with surface soil.

The COPCs in soil evaluated in the HHRA were selected by comparing maximum detected concentrations in soil to risk-based screening levels (inorganic and organic chemicals) and, where available, background sample concentrations (inorganic chemicals only). Risks associated with the COPCs were quantified in the HHRA

Exposures were quantified by estimating potential chemical intake (dose), associated with each potential exposure pathway. Exposure point concentrations were calculated and represent the chemical concentration that a receptor could contact over the exposure period. Exposure parameters that defined the frequency, duration, and magnitude of potential contact with soil were used to estimate dose under reasonable maximum exposure scenarios. Chemical-specific cancer slope factors

and inhalation unit risks of COPCs were used to quantify the toxicity of carcinogens; while reference doses and reference concentrations were used to quantify noncancer toxicity.

### Conclusions of the HHRA

An HHRA that included Study Area properties was submitted to the EPA and MDEQ on April 4, 2018, conditionally approved on June 20, 2018, and finalized on August 15, 2018 (Integral 2018a). No ecological habitat within Study Area properties was identified in the BERA (Ramboll 2018).

Residents, outdoor workers, and construction workers may contact surface soils via incidental ingestion, dermal contact, and inhalation of particulates and volatiles emitted from surface soils. In the future, construction workers may also contact subsurface soils via these same exposure pathways.

The HHRA considered data collected at the Site through 2017. The risk assessment selected chemicals of potential concern (COPCs) for further evaluation by comparing maximum detected concentrations in surface soils (0–2 ft bgs) and subsurface soils (2–10 ft bgs) to residential screening values available from the EPA. If the maximum detected concentration was higher than the screening level, the chemical was selected as a COPC for further evaluation. Based on this screening, for Study Area properties, ten chemicals were selected as surface soil COPCs. No chemical concentrations detected in subsurface soils exceeded residential screening values, and therefore no subsurface COPCs were selected for further evaluation. The HHRA evaluated the potential for excess lifetime cancer risks and noncancer hazards to current and future residential receptors with assumed exposure to surface soils.

The HHRA found that dioxins and furans present in the soil at a subset of Study Area properties resulted in a noncancer hazard index greater than 1 and recommended that additional data be collected to further characterize dioxins and furans in surface soil (Integral 2018). The remainder of the soil COPCs for Study Area properties did not result in an endpoint-specific noncancer hazard index greater than 1. The HHRA concluded that excess lifetime cancer risks from exposure to COPCs in soils in OU-2 did not exceed $1\times10^{-4}$.

The PRGs for dioxins and furans for OU-2 soils correspond to a noncancer target hazard index of 1, which is consistent with EPA's policy for dioxins and furans specifying that noncancer toxicity criteria for tetrachlorodibenzo-p-dioxin (TCDD) will be used to develop site-specific risk-based cleanup levels at Superfund sites. The type and intensity of potential exposure for current/future residents and construction workers at OU-2 is identical to those for OU-1. As a result, the exposure parameters used to derive the OU-1 cleanup levels are identical to those used to characterize OU-2 soils. Therefore, in collaboration with the EPA and MDEQ, the following OU-1 cleanup levels were adopted as the OU-2 PRGs:

- Residential PRG = 50 ppt TEQdf; and
- Construction Worker PRG = 230 ppt TEQdf.

The Study Area includes both residential and commercial/industrial zoning. However, in an abundance of caution, the EPA has determined that the reasonably anticipated future land use of residential is appropriate for most of the Study Area. The residential PRG was applied to the vast majority of the Study Area properties. Eleven areas exceeded the residential PRGS and require remedial action. Eighty-three areas did not exceed the residential PRGS and meet the no action criteria.

Two properties in the Study Area were evaluated based on a current and reasonably anticipated industrial/commercial land use. The construction worker PRG was applied to these properties to determine if there was an unacceptable risk. One property met the criteria for no action based on industrial/commercial land use. The second property, the Former Sanderson Plumbing Property, is now owned by the State of Mississippi and is excluded from the scope of this Proposed Plan.

### Basis for Action

It is the lead agency's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

## REMEDIAL ACTION OBJECTIVES

Before developing cleanup alternatives for a Superfund site, the EPA establishes **remedial action objectives** (RAOs) to protect human health and the environment. RAOs are specific goals to protect human health and the environment. These objectives 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 following RAOs have been identified for OU-2:

- Prevent potential unacceptable risk to humans due to exposure to surface soils (up to 2 ft bgs) with dioxin and furan concentrations above the residential PRG of 50 ppt TEQdf at properties that presently have a residential use or have a reasonable potential for future residential use;
- Prevent potential unacceptable risk to industrial/commercial workers due to potential exposure to surface soils (up to 2 ft bgs) with dioxin and furan concentrations above the PRG of 230 ppt TEQdf at properties assumed to have a future industrial/commercial use;
- Prevent potential unacceptable risk to construction workers from potential exposure to surface and subsurface soils with dioxin and furan concentrations above the construction worker PRG of 230 ppt TEQdf; and
- Prevent/minimize the migration of dioxins and furans from contaminated surface soils through stormwater runoff or wind dispersion of fugitive dust.

## PRELIMINARY REMEDIATION GOALS

PRGs are a range of values that are developed in the Baseline Risk Assessments. Specific PRGs selected in the Feasibility Study are the media-specific concentrations that will achieve the RAOs for the

remedial alternatives. The selected PRGs will result in residual risk levels that satisfy the CERCLA requirements for the protection of human health and the environment and are identified as cleanup levels in a ROD. PRGs are typically based on chemical-specific ARARs or risk-based concentrations if ARARs are not available (or if the ARAR is not sufficiently protective). PRG selection can consider background concentrations if background exceeds a risk-based PRG. PRGs may be further modified through the evaluation of alternatives and the remedy selection process.

The OU-1 ROD included soil cleanup levels for both residential and industrial/commercial land use. The EPA used the residential PRGs for most of the Study Area and used the industrial/commercial PRGs for two properties, based on the EPA's determination of the reasonably anticipated future land uses. For OU-2, the EPA has adopted the OU-1 soil cleanup levels as PRGs as shown below:

**Surface Soil COCs and PRG for Residential and Industrial/Commercial Land Use**

| | Residential | | | Industrial/Commercial | |
|---|---|---|---|---|---|
| COC | PRG (ppt) | Basis | | PRG (ppt) | Basis |
| TEQdf | 50 | nc | | 230 | nc |

Notes: For non-residential soil, the lower of the industrial/commercial and construction worker PRGs are shown.
nc = noncancer basis; noncancer PRGs are based on a target hazard index of 1; COC = chemical of concern; PRG = preliminary remedial goals; TEQdf = toxicity equivalent concentration for dioxins and furans

The PRGs for TEQdfs correspond to a non-cancer target hazard of 1, which is consistent with the EPA's policy for dioxins that specifies that non-cancer toxicity criteria for TCDD will be used to develop site-specific risk-based clean up levels at Superfund Sites.

## SUMMARY OF REMEDIAL ALTERNATIVES

The four remedial alternatives identified in the FFS for OU-2 soils are:

- Alternative 1: No Action—No action provides an assessment of the "as is" condition as a baseline for evaluating active remedial alternatives;
- Alternative 2: Removal and Disposal—This alternative includes the following main elements: excavation of contaminated OU-2 soils, placement of clean backfill, and disposal and/or reuse of excavated soils;
- Alternative 3: Soil Cover— This alternative includes the following main elements: placement of a soil cover consisting of imported clean fill material suitable for residential or commercial/industrial use; and restoration of property as agreed upon with property owners; and
- Alternative 4: In Situ Stabilization— This alternative includes the following main elements: Mixing of a stabilizing reagent (e.g., cement or similar) in the soils to bind the contamination in place; and restoration of property as agreed upon with property owners.

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

- Capital costs – Capital Costs are those expenditures that are required to construct a remedial alternative;
- Operational and Maintenance (O&M) costs – O&M are those post-construction costs necessary to ensure or verify the continued effectiveness of a remedial alternative and are estimated on an annual basis;
- Indirect costs – These 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 – This 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 seven percent and a 30-year time interval; and
- Construction time – This is the time required to construct and implement the alternative and does not include the time required to design the remedy, negotiate performance of the remedy with the responsible parties, or procure contracts for design and construction.

### Alternative 1 - No Action

Estimated Capital Cost: $0
Estimated Annual Operation and Maintenance Cost: NA
Indirect Costs: $0
Net Present Value: $70,000
Estimated Construction Timeframe: 0 year
Estimated Time to Achieve RAOs: RAOs would not be met

The NCP requires that a "No Action" alternative be developed as a baseline for comparing other remedial alternatives. No remedial action or **monitoring** would be performed under this alternative. The No Action alternative provides for an assessment of the environmental conditions if no remedial actions are implemented. Under the No Action Alternative, no funds would be expended for remediation of OU-2 soils.

The minimum activities for the No Action Alternative include the mandatory 5-year reviews over the course of a 30-year period, resulting in a total of six 5-year reviews.

### Alternative 2 - Removal and Disposal

Estimated Capital Cost: $1,702,000 - $2,293,000
Estimated Annual Operation and Maintenance Cost: NA
Indirect Costs: $371,000 - $394,000
Net Present Value: $2,087,000 – 2,701,000
Estimated Construction Timeframe: 3 to 5 months

Estimated Time to Achieve RAOs: 3 to 5 months

Alternative 2 includes the following key elements:

- Excavation of surface soils (up to 2 ft bgs) from private property DUs with dioxin and furan concentrations that exceed the residential PRG (50 ppt TEQdf) (Figure 4);
- Beneficial reuse, onsite consolidation, or offsite disposal of excavated soils. The concentrations of dioxins and furans in all but one of the DUs within OU-2 are less than the construction worker PRG (230 ppt TEQdf) and thus likely may be considered for beneficial reuse as backfill or cover in Site areas on the Former Main Plant Area designated for industrial/commercial land use;
- Beneficial reuse involves applying the excavated contaminated soil (that has been determined not to contain RCRA hazardous waste and meets chemical criteria) as backfill in areas on the Former Main Plant Area where the contaminated media do not pose a risk to human health and the environment. If considered for beneficial reuse, the excavated soils would be temporarily staged in the Former Main Plant Area and analyzed to determine if the material meets the chemical acceptance criteria for beneficial reuse. Soils identified for beneficial reuse will be stockpiled in the areas of the Former Main Plant Area. Beneficial reuse in areas of the Former Main Plant Area that are designated for industrial/commercial land use as part of future Site remedial actions would allow protective and cost-effective management of the OU-2 soils;
- Disposition of OU-2 soils that are unsuitable for beneficial reuse may be accomplished through onsite consolidation on the Former Main Plant Area where the soils would be managed with soils having similar levels of contamination in the Former Main Plant Area until a final remedy is approved for OU-3. Analytical data from the OU-2 areas show that these soils are not a hazardous waste. The consolidated soils will be protectively managed in accordance with relevant RCRA regulations and guidance. Onsite consolidation will be considered during the development of remedial alternatives for OU-3. Under this scenario, excavated OU-2 soils would be managed by consolidating them with similarly contaminated OU-3 soils;
- Alternatively, soils that are unsuitable for beneficial reuse or consolidation may be disposed of offsite at an EPA-approved, RCRA Subtitle D landfill, such as the Golden Triangle Regional Landfill in Starkville, Mississippi;
- Placement and final grading of imported clean backfill material suitable for residential or commercial/industrial use in the excavated areas;
- Restoration of property as agreed upon with property owners;
- Because this alternative involves removal of contaminated soils from OU-2 properties, no long-term O&M or post-remedy monitoring will be required;
- 3- to 5-month implementation time frame; and

- Removal of soils with concentrations exceeding the applicable PRG would be a highly effective and permanent remedy for OU-2 soils and would meet all the CERCLA criteria, as is summarized below.

Key ARARs associated with Alternative 2 include Clean Water Act (CWA) regulations for control of erosion due to stormwater runoff while conducting land disturbing activities, RCRA requirements for characterization of contaminated soil, temporary staging, and transportation/disposal. Work conducted in a 100-yr floodplain will be conducted to minimize adverse impacts per Executive Order 11988 Section 1. *Floodplain Management* and associated FEMA regulations identified as ARARs and **To Be Considered** Guidance (TBC). Final ARARs/TBCs for the selected remedy will be listed in tables in the OU-2 Record of Decision.

### Alternative 3 – Soil Cover

Estimated Capital Cost: $1,114,000
Estimated Annual Operation and Maintenance Cost: NA
Indirect Costs: $359,000
Net Present Value: $1,487,000
Estimated Construction Timeframe: 3 to 5 months
Estimated Time to Achieve RAOs: 3 to 5 months

Alternative 3 includes the following key elements:

- Placement of a soil cover consisting of imported clean fill material suitable for residential or commercial/industrial use;
- Restoration of property as agreed upon with property owners;
- Routine monitoring of the cover integrity and maintenance as required;
- Implementation of institutional controls, where possible to limit activity/use that could disturb the soil cover;
- A 3- to 5-month implementation time frame is anticipated for placement of the soil cover; and
- Covering the soils with concentrations exceeding the applicable PRG would be an effective and permanent remedy for OU-2 soils, however, would not meet all the CERCLA criteria, as is summarized below.

Key ARARs associated with Alternative 3 include CWA regulations for control of erosion due to stormwater runoff while conducting land disturbing activities, RCRA requirements for characterization of contaminated soil, temporary staging, and disposal. Additionally, the MS RCRA landfill requirements for a vegetated cover are relevant and appropriate. Work conducted in a 100-yr floodplain will be conducted to minimize adverse impacts per Executive Order 11988 Section 1. *Floodplain Management* and associated FEMA regulations identified as ARARs and TBC. Final ARARs/TBC for the selected remedy will be listed in tables in the OU-2 Record of Decision.

### Alternative 4 – In Situ Stabilization

Estimated Capital Cost: $1,342,000
Estimated Annual Operation and Maintenance Cost: NA
Indirect Costs: $357,000
Net Present Value: $1,713,000
Estimated Construction Timeframe: 3 to 5 months
Estimated Time to Achieve RAOs: 3 to 5 months

Alternative 4 includes the following key elements:

- Mixing of a stabilizing reagent (e.g., cement or similar) in the soils to bind the contamination in place;
- Restoration of property as agreed upon with property owners;
- Routine monitoring of the treated soils and maintenance as required;
- A 3- to 5-month implementation time frame is anticipated for treatment of the soils; and
- Stabilizing the soils with concentrations exceeding the applicable PRG would be an effective and permanent remedy for OU-2 soils, however, would meet few of the CERCLA criteria, as is summarized below. As a result, Alternative 4 has an overall poor ranking with respect to the CERCLA criteria.

Key ARARs associated with Alternative 4 include CWA regulations for control of erosion due to stormwater runoff while conducting land disturbing activities, RCRA requirements for characterization of contaminated soil, temporary staging, and disposal. Additionally, the MS RCRA landfill requirements for a vegetated cover are relevant and appropriate. Work conducted in a 100-yr floodplain will be conducted to minimize adverse impacts per Executive Order 11988 Section 1. *Floodplain Management* and associated FEMA regulations identified as ARARs and TBC. Final ARARs/TBC for the selected remedy will be listed in tables in the OU-2 Record of Decision.

## EVALUATION OF ALTERNATIVES

Nine criteria identified in the NCP are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy (see table below, Evaluation Criteria for Superfund Remedial Alternatives). This section of the Proposed Plan describes the relative performance of each alternative against seven of the nine criteria, noting how each compare to the other options under consideration. A detailed analysis of the alternatives can be found in the 2019 FFS Report for OU-2.

The remedial alternative selected for a Superfund site must meet the two threshold criteria (Overall Protection of Human Health and the Environment and Compliance with ARARs) as well as attain the best balance among the five evaluation criteria. The EPA, after considering State (MDEQ) acceptance and public comments received on this Proposed Plan, will select the final remedy in the ROD. The EPA's

Preferred Remedial Alternative may be altered or changed based on the two modifying criteria. The nine criteria are as follows:

**EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES**

**THRESHOLD CRITERIA**

***Overall Protectiveness of Human Health and the Environment*** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through ICs, engineering controls or treatment.

***Compliance with*** **Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

**EVALUATION CRITERIA**

***Long-term Effectiveness and Permanence*** considers the ability of an alternative to maintain protection of human health and the environment over time.

***Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment*** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

***Short-term Effectiveness*** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

***Implementability*** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

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

**MODIFYING CRITERIA**

***State/Support Agency Acceptance*** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

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

## THRESHOLD CRITERIA

### Overall Protection of Human Health and the Environment

All alternatives evaluated in the FFS except for Alternative 1 (No Action) would be protective of human health and the environment. The current condition of surface soils for a portion of the OU-2 properties represents a potentially unacceptable risk and does not meet the RAO. Without engineering and controls and institutional controls (in the form of land use restrictions) there is a potential for exposure to OU-2 soils for current and future site users.

Alternatives 2 through 4 will effectively meet the threshold criteria. Alternative 2 will result in conditions that are protective and meet the RAOs by removing OU-2 soils with TEQdf concentrations above the residential PRG and replacing those soils with clean backfill. Under this alternative, excavated soils would be beneficially reused as fill, where appropriate, or, if the soils are unsuitable for beneficial reuse, they either would be consolidated in the Former Main Plant Area or would be transported off-site to a permitted RCRA landfill for disposal.

Alternative 3 will meet the RAOs by isolating OU-2 soils with TEQdf concentrations above the residential PRG beneath a soil cover. Alternative 4 will meet the RAOs by mixing a stabilizing reagent in OU-2 soils with TEQdf concentrations above the residential PRG to bind the dioxins and furans in a monolith—thereby eliminating/limiting potential exposure. Both Alternatives 3 and 4 would leave the dioxin and furan contamination in place and would require implementation of land-use controls in the form of deed restrictions. This would result in a post-remediation condition that would limit the owner's ability to do as they wish with their property and require long-term monitoring to ensure that the integrity of the remedy is maintained.

### Compliance with ARARs

Alternative 1 would not meet compliance with ARARs as no action would be taken. Alternative 2 will comply with federal and any more stringent state ARARs. Alternatives 3 and 4 would comply with federal and state ARARs, however placement of net fill on OU-2 properties located within the 100-year floodplain may result in adverse impacts that would have to be further mitigated per the FEMA regulations identified as ARARs.

## BALANCING CRITERIA

### Long-Term Effectiveness and Permanence

Alternative 1 would not alter the status quo and thus would not achieve the RAOs. Alternative 2 would meet the criteria of long-term effectiveness and permanence through removal of OU-2 surface soils with TEQdf concentrations above the residential PRG. Under Alternative 2, excavated soils would be beneficially reused as backfill or cover on portions of the Former Main Plant Area that are designated for commercial/industrial use or, if portions of the soils were found to be unsuitable for reuse, consolidated onsite or disposed of off-site in an appropriately permitted RCRA landfill. Removal of soils containing TEQdf levels above the residential PRG from OU-2 properties will prevent potential migration or receptor exposure. For these reasons, Alternative 2 is ranked higher for this criterion than the other alternatives.

Alternatives 3 and 4 would meet the criterion of long-term effectiveness and permanence through either isolation or treatment of OU-2 surface soils with TEQdf concentrations above the residential PRG. Both alternatives would leave the contamination in place on the property and would require implementation of land-use controls in the form of deed restrictions. Further, these alternatives would require monitoring and maintenance to ensure the long-term effectiveness and permanence of the

remedy. Such monitoring and maintenance would require access from the property owner, which cannot be assured over the long term and as ownership changes hands. As a result, Alternatives 3 and 4 rank less favorably than Alternative 2 with respect to long-term effectiveness and permanence.

### Reduction of Toxicity, Mobility, and Volume

Alternatives 1 through 3 would not reduce the toxicity, mobility, or volume through treatment, and thus all have been given a poor ranking with respect to this criterion. However, by removing OU-2 soils with TEQdf concentrations above the residential PRG, Alternative 2 would eliminate the volume of soil contamination with dioxin and furan concentrations that pose an unacceptable risk in OU-2. Under this alternative, the volume of contamination would be moved to the Former Main Plant Area or disposed off-site in an approved RCRA landfill. Alternative 3 does not reduce the toxicity, mobility, or volume through treatment since contaminated soil would remain on the impacted properties with a soil cover.

Alternative 4 would reduce the toxicity and mobility of the dioxins and furans in OU-2 soils through treatment, and thus ranks highest with respect to this criterion. However, because Alternative 4 would increase the volume of contaminated media, it only has a moderate ranking with respect to this criterion. Further, although Alternative 4 ranks higher than the other alternatives for this treatment criterion, it is not more protective of human health and the environment than Alternative 2 which removes contaminated soil from the impacted properties.

### Short-Term Effectiveness

Alternatives 2 through 4 would involve the use of conventional construction techniques and would be effective immediately upon completion. The potential for short-term exposures to workers, property owners, and the community will be readily addressed though proper design and execution of the remedial action, including use of well-established best management practices. Many of the potential short-term exposures associated with the implementation of remedial actions are related to the transport of contaminated soils, fill, and reagents. Some of the key factors related to these activities include, but are not limited to:

- Inherent hazards associated with the use of heavy machinery;
- Potential to generate dusts, chemical vapors, and odors that, without proper controls, can represent a hazard or at least a nuisance to both workers and the adjacent community;
- Truck traffic and associated risks (e.g., potential for truck-related accidents) and nuisance (e.g., noise, emissions) posed to the community;
- Noise associated with use of heavy machinery and truck traffic; and
- Potential for release of contaminants to the environment during handling and transport of excavated soils, and due to potential stormwater contact with excavated surfaces and stockpiles.

With well-established best management practices in place, risks associated with these factors would be effectively mitigated.

Although the short-term potential risks associated with a remedial action do not exist under Alternative 1, leaving the surface soils containing TEQdf above the residential PRG in place on OU-2 properties would not achieve the RAOs and thus would be ineffective at protecting human health both in the short- and long-term. Alternatives 2 through 4 would be immediately effective upon completion of the remedial action and achieve the RAOs. Therefore, these alternatives rank higher than the Alternative 1.

### Implementability

This criterion does not apply to Alternative 1 because no remedial actions would be implemented. Alternative 2 is straightforward to implement using readily available and highly reliable technologies and equipment. Alternative 2 does not impede additional remedial actions in the future, in the unlikely event they should be needed. There are no known significant challenges that cannot be overcome associated with coordination and approval for implementation of Alternative 2.

Alternatives 3 and 4 present significant challenges to implement. Both alternatives would raise the elevation of the properties' ground surface and would require special provisions to be compatible with existing structures and other features (e.g., driveways, sidewalks, stairs) on the property. Further, Alternative 4 would likely require special provisions, such as hand mixing, to achieve full treatment of impacted soils on the OU-2 properties. As a result, Alternatives 3 and 4 rank poorly with respect to implementability relative to Alternative 2.

### Cost

**Remedial Alternative Costs**

| ESTIMATED COSTS FOR REMEDIAL ALTERNATIVES | | | | |
|---|---|---|---|---|
| **Activity** | **Alternative #1** | **Alternative #2** | **Alternative #3** | **Alternative #4** |
| Estimated Capital Cost | $0 | $1,702,000 – 2,293,000 | $1,114,000 | $1,342,000 |
| Indirect Cost | $0 | $371,000 - $394,000 | $359,000 | $357,000 |
| Estimated O&M Costs | $70,000 | $15,000 | $15,000 | $15,000 |
| Net Present Value | $70,000 | $2,087,000 – 2,701,000 | $1,487,000 | $1,713,000 |
| Estimated Time to Achieve RAOs | RAOs not achieved | 3-5 months | 3-5 months | 3-5 months |

## MODIFYING CRITERIA

### State Acceptance

State acceptance of the preferred alternative will be addressed in the ROD following review of comments received on the Proposed Plan. MDEQ has indicated a willingness to accept the preferred alternative pending review of any public comments.

### Community Acceptance

Community acceptance of the preferred alternative will be addressed in the ROD following review of comments received on the Proposed Plan.

The diagram below summarizes the results of the detailed evaluation of selected remedial alternatives presented in this Proposed Plan.

**LEGEND**
- ● Excellent
- ◔ Good
- ◒ Fair
- ◕ Poor
- ○ Very Poor

| | | EVALUATION CRITERIA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Threshold | | Balancing | | | | | Modifying | |
| | | Protectiveness | Compliance with ARARs | Long-Term Effectiveness | Short-Term Effectiveness | Reduction of Toxicity, Mobility or Volume | Implementability | Estimated Cost (millions) | Regulatory Acceptance | Community Acceptance |
| **Alternative 1** | No Action | ○ | ○ | ○ | ○ | ○ | ● | 0.07 | ○ | ○ |
| **Alternative 2** | Removal and Disposal | ● | ● | ● | ● | ○ | ● | 2.09-2.70 | ● | ● |
| **Alternative 3** | Soil Cover | ● | ● | ◒ | ● | ○ | ◒ | 1.49 | ○ | ○ |
| **Alternative 4** | In Situ Stabilization | ● | ● | ◔ | ● | ◒ | ◒ | 1.71 | ○ | ○ |

## SUMMARY OF PREFERRED ALTERNATIVE

Using the above information/assumptions with respect to State and Community acceptance, the Agency's **Preferred Remedial Alternative for the Kerr McGee Columbus Site OU-2 is Alternative 2: Removal and Disposal**. The estimated cost for the Preferred Alternative is $2,701,000. The Preferred Alternative will achieve the RAOs by removing soils that pose an unacceptable risk from OU-2. The Preferred Alternative is more implementable and is more effective in the long-term than the other evaluated alternatives.

Alternative 2 includes the following key elements:

- Excavation of surface soils (up to 2 ft bgs) from private property DUs with dioxin and furan concentrations that exceed the residential PRG (50 ppt TEQdf) (Figure 4);
- Beneficial reuse, onsite consolidation, or offsite disposal of excavated soils. The concentrations of dioxins and furans in all but one of the DUs within OU-2 are less than the construction worker PRG (230 ppt TEQdf) and thus likely may be considered for beneficial reuse as backfill or cover in Site areas on the Former Main Plant Area designated for industrial/commercial land use;
- Beneficial reuse involves applying the excavated contaminated soil (that has been determined not to contain RCRA hazardous waste and meets chemical criteria) as backfill in areas on the Former Main Plant Area where the contaminated media do not pose a risk to human health and the environment. If considered for beneficial reuse, the excavated soils would be temporarily staged in the Former Main Plant Area and analyzed to determine if the material meets the chemical acceptance criteria for beneficial reuse. Soils identified for beneficial reuse will be stockpiled in the areas of the Former Main Plant Area. Beneficial reuse in areas of the Former Main Plant Area that are designated for industrial/commercial land use as part of future Site remedial actions would allow protective and cost-effective management of the OU-2 soils;
- Disposition of OU-2 soils that are unsuitable for beneficial reuse may be accomplished through onsite consolidation on the Former Main Plant Area where the soils would be managed with soils having similar levels of contamination in the Former Main Plant Area until a final remedy is approved for OU-3. Analytical data from the OU-2 areas show that these soils are not a hazardous waste. The consolidated soils will be protectively managed in accordance with applicable RCRA regulations and guidance. Onsite consolidation will be considered during the development of remedial alternatives for OU-3. Under this scenario, excavated OU-2 soils would be managed by consolidating them with similarly contaminated OU-3 soils;
- Alternatively, soils that are unsuitable for beneficial reuse or consolidation may be disposed of offsite at an EPA-approved, RCRA Subtitle D landfill, such as the Golden Triangle Regional Landfill in Starkville, Mississippi;
- Placement and final grading of imported clean backfill material suitable for residential or commercial/industrial use in the excavated areas;
- Restoration of property as agreed upon with property owners;
- Because this alternative involves removal of contaminated soils from OU-2 properties, no long-term O&M or post-remedy monitoring will be required;
- 3- to 5-month implementation time frame; and
- Removal of soils with concentrations exceeding the applicable PRG would be a highly effective and permanent remedy for OU-2 soils and would meet all the CERCLA criteria, as is summarized below.

Key ARARs associated with Alternative 2 include Clean Water Act (CWA) regulations for control of erosion due to stormwater runoff while conducting land disturbing activities, RCRA requirements for characterization of contaminated soil, temporary staging, and transportation/disposal. Work conducted in a 100-yr floodplain will be conducted to minimize adverse impacts per Executive Order

11988 Section 1. *Floodplain Management* and associated FEMA regulations identified as ARARs and To Be Considered Guidance (TBC). Final ARARs/TBCs for the selected remedy will be listed in tables in the OU-2 Record of Decision.

Based on the information currently available, the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing criteria. The EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA Section 121(b), 42 U.S.C. §9621(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; and 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. No principal threat wastes are known to be present in OU-2 soils. Excavated soil from the impacted properties is a permanent solution and some soil will be subject to beneficial reuse on the Former Main Plant Area, however; alternative treatment or resource recovery technologies will not be utilized. The EPA will assess the two modifying criteria of state acceptance and community acceptance in the ROD to be issued following the close of the public comment period. The EPA, in consultation with MDEQ, may modify the Preferred Alternative or select another alternative presented in this Proposed Plan based on new information or public comments.

The EPA proposes a No Action decision for:

- Eighty-three of the properties in the Study Area that meet the EPA criteria for a No Action remedial decision because sampling found no unacceptable risk to human health based on residential land use; and
- One property east of the former KMCC facility (containing DU samples 18-43 through 18-47) that meets the EPA criteria for a No Action remedial decision because sampling found no unacceptable risk to human health based on industrial/commercial land use.

## COMMUNITY PARTICIPATION

Due to public health concerns related to spread of the COVID-19 virus, the EPA is not planning to hold an in-person public meeting about the Proposed Plan. The EPA and its Superfund site teams are cancelling or postponing in-person public meeting events, door-to-door visits, and other site-related face-to-face interactions to reflect current COVID-19 guidance from federal, state, tribal and local officials. Protecting the health and safety of our staff, contractors, and the communities we serve is our top priority.

Instead, in order to provide members of the community with the information necessary to decide whether and how to comment on the Proposed Plan, the EPA has posted online a pre-recorded video presentation where the Remedial Project Manager (RPM) for the Site presents the Proposed Plan. You may view the presentation, complete with closed captioning, at www.epa.gov/superfund/kerr-mcgee-chemical-columbus. In order to access the video presentation, you will need: A device (phone, tablet, computer) with web access and sound capability. If you cannot access the EPA website, please contact Kyle Bryant/CIC at 404-562-9073 or Bryant.kyle@epa.gov to arrange to receive the information in some other format.

Members of the site team are available to answer questions via email or over the phone, and members of the public are encouraged to call or write. If you have questions about the Proposed Plan, please contact Charles L. King/RPM at 404-562-8931 or king.charlesl@epa.gov.

Through these alternative means, the EPA seeks to provide a full opportunity for public participation and comment without risking public health. However, the EPA will provide the opportunity for a live virtual meeting if the community requests one.

The EPA is soliciting your involvement in the selection of the site remedy. The public is encouraged to submit any comments pertaining to the Preferred Alternative or the other remedial alternatives described in the Proposed Plan to the EPA for consideration. The final decision regarding the selected remedy will be made after the EPA has taken into consideration all public comments. The EPA may, based upon community input, select a remedy other than the proposed Preferred Alternative. The comments, if relevant to the Proposed Plan, will be addressed in the responsiveness summary section of the ROD.

For further information on the Site, please contact:
Charles King, Remedial Project Manager
(404) 562-8931 or (800) 435-9233
E-mail: King.CharlesL@EPA.gov

Kerisa Coleman, Community Involvement Coordinator
(404) 562-8831 or (800) 435-9233
E-mail: coleman.kerisa@epa.gov

US EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

The Memphis Town Community Advisory Group is an additional point of contact for community engagement.

## DOCUMENT INFORMATION

The Administrative Record contains all the information used by the Agency to select a Remedial Action. Copies of the Administrative Record are available at:

Online Administrative Records: https://semspub.epa.gov/src/collections/04/AR/MSD990866329

Columbus-Lowndes Public Library
314 N. Seventh Street
Columbus, MS 39701

(662) 329-5300
Hours: Monday-Thursday 9am – 7pm
Friday-Saturday 9am – 2 pm

U.S. Environmental Protection Agency Region 4 - Records Center
61 Forsyth Street, SW Atlanta, Georgia 30303-3104
Phone: (404) 562-8816
Hours: Monday-Friday 8 am - 5 pm

## GLOSSARY

**Administrative Record:** Materials, information and documents that provide the basis and support the EPA's selection of a remedial action at Superfund Sites usually placed in the **information repository** near the Site.

**Applicable or Relevant and Appropriate Requirements (ARARs):** Refers to Federal and more stringent State environmental requirements a selected remedy must attain (unless a waiver is justified in accordance with CERCLA Section121(d)(4)) which vary from site to site. Reference 40 CFR 300.5 Definitions of 'Applicable requirements' and 'Relevant and appropriate requirements'.

**Chemical of Concern (COCs):** Chemical constituents associated with a Superfund Site that have been released into the environment and pose an unacceptable risk to human health.

**Cleanup:** Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, **response action**, or corrective action.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):** Also known as **Superfund**, is a federal law passed in 1980 and modified in 1986 by the Superfund Amendment and Reauthorization Act (SARA). The act created a trust fund, to investigate and cleanup abandoned or uncontrolled hazardous waste sites.

**dense non-aqueous phase liquid (DNAPL)** is a denser-than-water NAPL, i.e. a liquid that is both denser than water and is immiscible in or does not dissolve in water.

**Baseline Ecological Risk Assessment (BERA):** A qualitative and quantitative evaluation performed in an effort to define the risk posed to ecological receptors by the presence or potential presence of specific contaminants.

**Focused Feasibility Study (FFS)**: Study conducted after the Remedial Investigation to determine what alternatives or technologies could be applicable to the site specific COCs.

**Groundwater**: Water located beneath the ground surface in soil pore spaces and in the fractures of lithologic formations.

**Baseline Human Health Risk Assessment (HHRA).** The process used to estimate the nature and probability of adverse health effects in humans who may be exposed to hazards in contaminated environmental media, now or in the future.

**Information Repository**: A library or other location where documents and data related to a Superfund project is placed to allow public access to the material.

**Institutional Controls**: Administrative, non-engineering, controls that inform and prevent exposures to human receptors.

**Monitoring:** The periodic or continuous surveillance or testing to determine the level of pollutants in various media.

**National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**: The federal regulation that guides the Superfund program. More commonly called the National Contingency Plan or NCP, is the federal government's blueprint for responding to both oil spills and hazardous substance releases.

**National Priorities List (NPL):** The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

**Operable Unit (OU):** Distinct areas of a site, defined by geographic areas, specific problems, or medium (e.g., groundwater, soil) where a specific action is required.

**Preliminary Remedial Goal (PRG)**: A PRG is the average concentration of a chemical in an exposure area that will yield the specified target risk in an individual who is exposed at random within the exposure area.

**Proposed Plan**: Document that summarizes the RI/FS, the alternatives developed and the proposed Preferred Remedial Alternative and the rationale for its proposal

**Public Comment Period:** The time allowed for the public to express its views and concerns on the information provided in the Proposed Plan and the EPA's proposed Preferred Remedial Alternative.

**Record of Decision (ROD)**: A decision document that selects and describes the remedy that will be implemented at a Site. The ROD is based on information and technical analysis generated during the remedial investigation/feasibility study and consideration of public comments.

**Regional Screening Levels (RSLs)**: RSLs are risk-based screening levels below which health effects are not expected to occur. RSLs are used to identify contaminants that should be evaluated further in the risk assessment process. Exceedance of an RSL does not necessarily mean that a health impact is expected to occur.

**Remedial Action (RA)**: The actual construction or implementation phase of a Superfund site cleanup that follows **remedial design**.

**Remedial Action Objectives (RAOs)**: Provide a general description of what the cleanup will accomplish (e.g., restoration of groundwater to drinking water levels). These goals typically serve as the as the basis for developing remedial alternatives.

**Remedial Investigation (RI):** An investigation conducted to fully characterize the nature and extent of contamination of a release, or threat of release, of hazardous substances, pollutants, or contaminants. In addition, the RI also evaluates risks posed to human health and the environment. The RI gathers the necessary data to support the corresponding FS.

**Superfund**: The common name used for the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended in 1986.

**To Be Considered (TBC):** The "to-be-considered" (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 C.F.R. § 300.400(g)(3).

# FIGURES

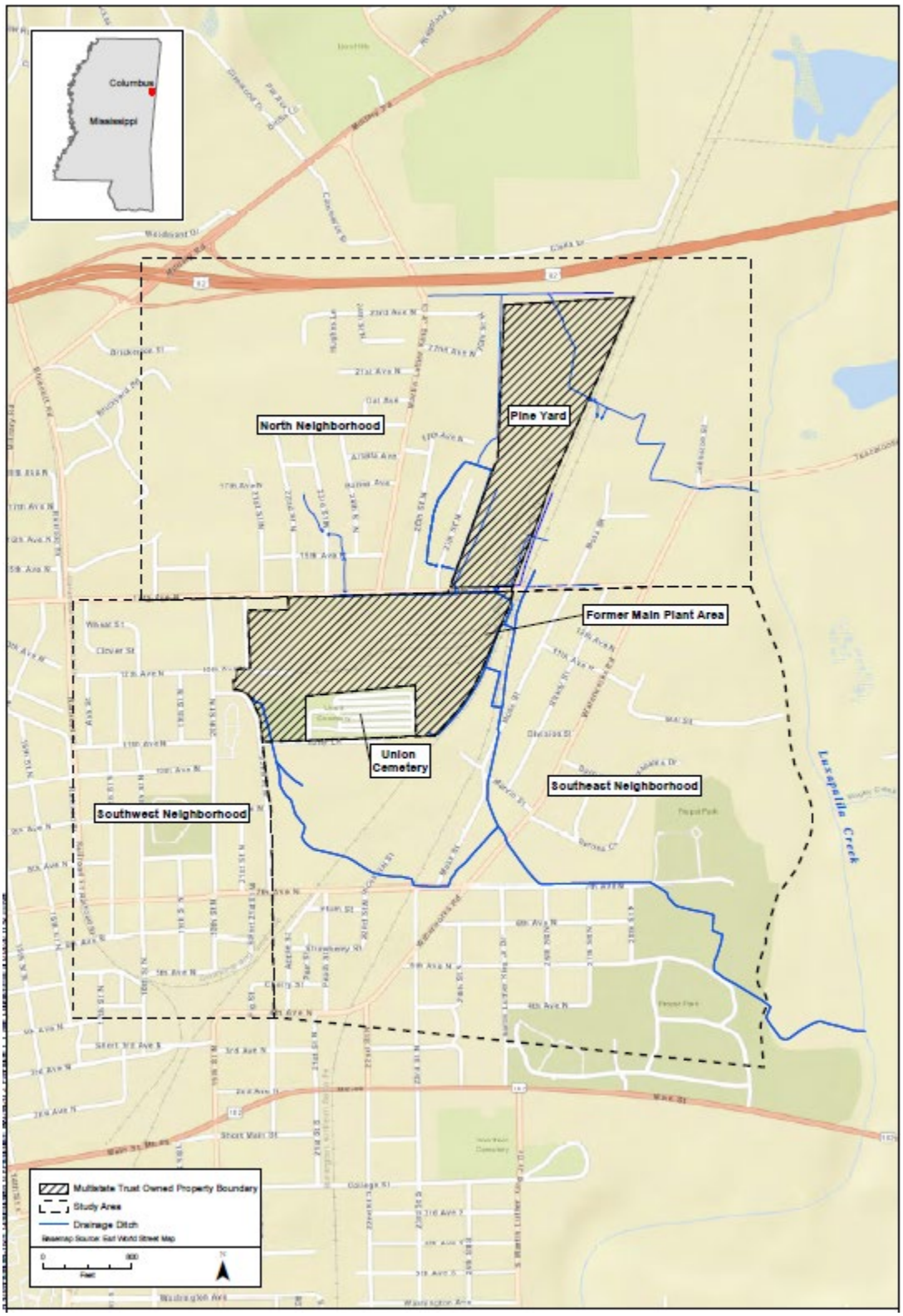


**Figure 1 Site Location**

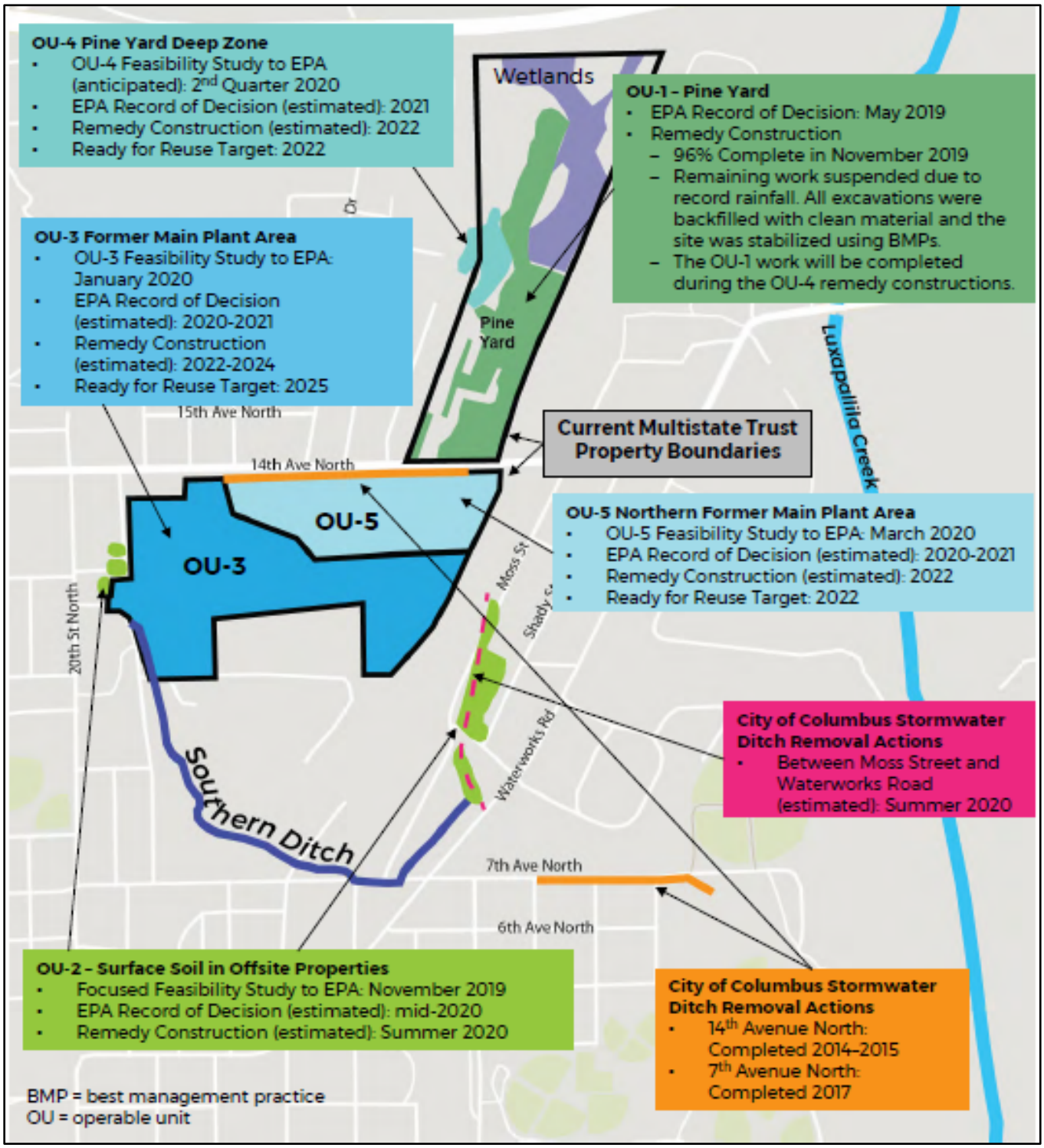


**Figure 2 Location of Operable Units, Site Characteristics**

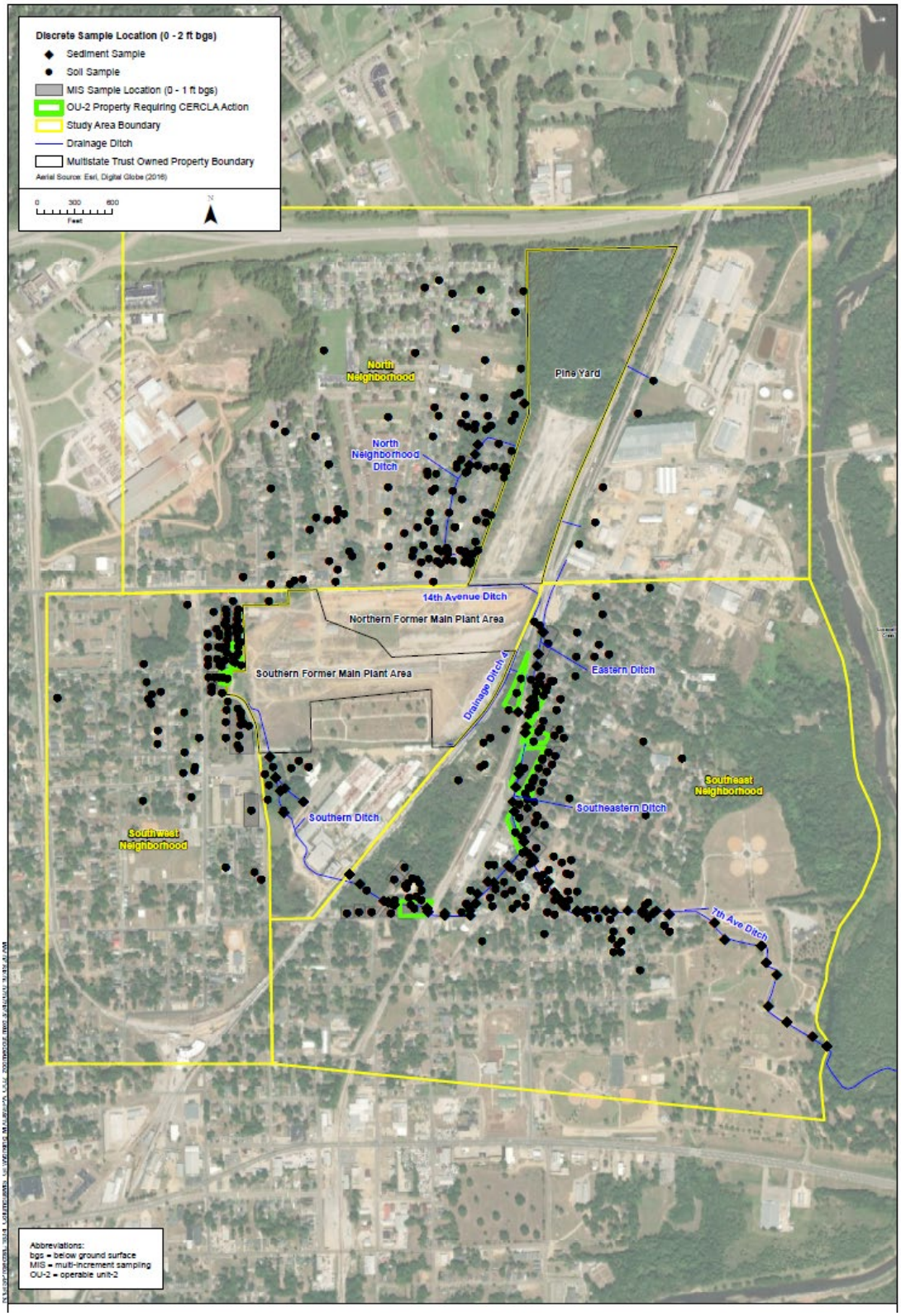


**Figure 3 OU-2 Study Area Soil Sampling Locations**

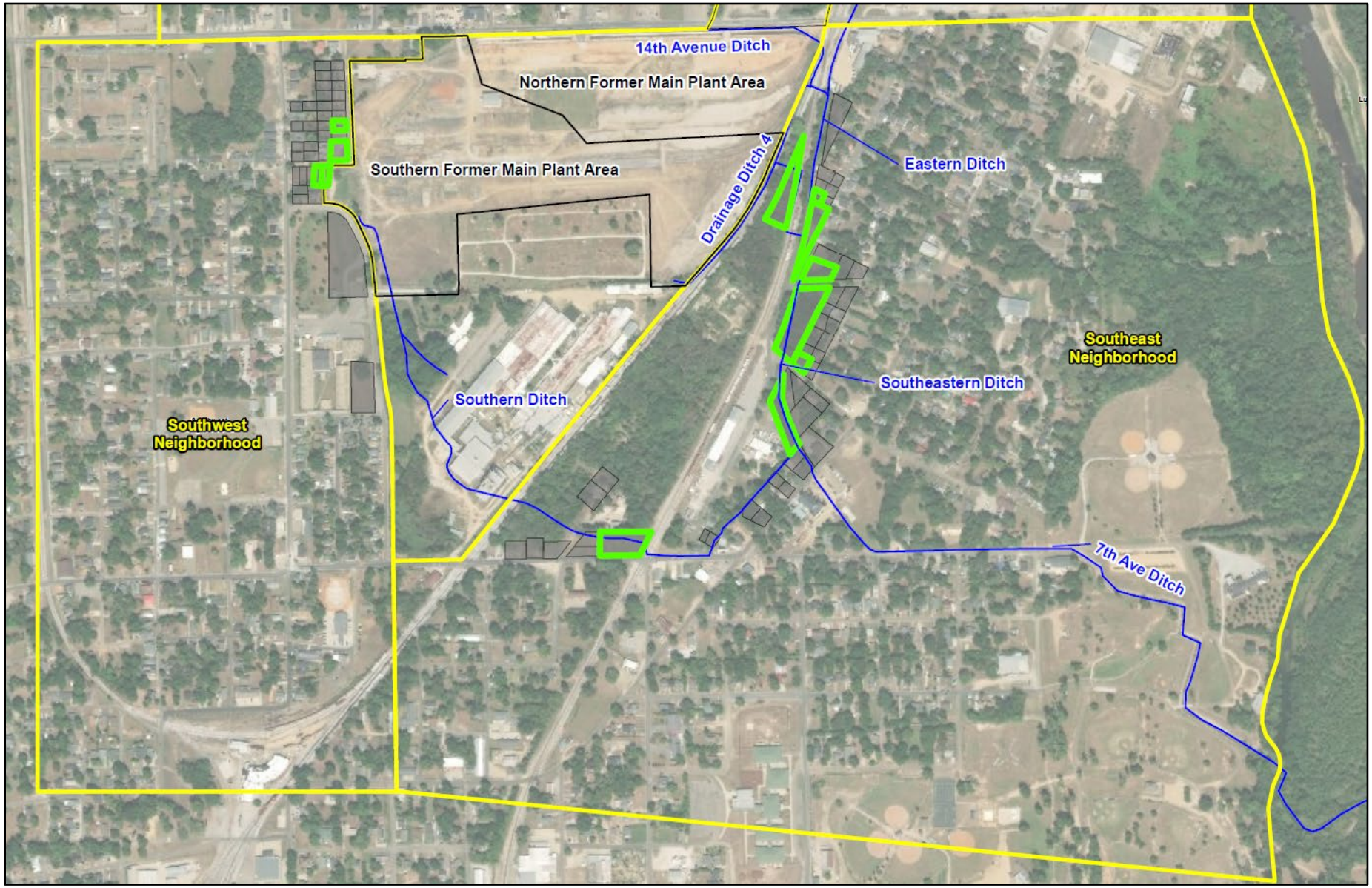


**Figure 4 OU-2 Properties Contaminated Above Residential PRGs**