

**RECORD OF DECISION AMENDMENT
for the
USS LEAD SUPERFUND SITE
ZONE 1
EAST CHICAGO, INDIANA**



I. INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

The U.S. Smelter and Lead Refinery, Inc. Superfund Site is located in the City of East Chicago, Indiana (“the Site”) and was placed on the National Priorities List (NPL) in April 2009. For administrative purposes, the U.S. Environmental Protection Agency has divided the Site into two operable units (OUs) (Figure 1). Operable Unit 1 (OU1) is a predominantly residential neighborhood, which is generally bounded on the north by East Chicago Avenue, on the east by Parrish Avenue, on the south by East 151st Street/149th Place, and on the west by the Indiana Harbor Canal. OU1 has been further subdivided into Zones 1, 2, and 3. *See* Figure 1. Operable Unit 2 (OU2) includes the surface and subsurface of the 79-acre former USS Lead facility as well as groundwater beneath the entire Site. This Record of Decision Amendment (“ROD Amendment”) addresses a portion of OU1 but does not address OU2. OU2 will be the subject of a subsequent Record of Decision.

EPA is the lead agency and the Indiana Department of Environmental Management (IDEM) is the support agency. On November 30, 2012, EPA issued a Record of Decision (ROD) for OU1. The ROD identified the remedy for soils contaminated with lead and arsenic and located within OU1. Since 2012, the remedy outlined in the ROD has been substantially implemented in Zone 2 and Zone 3 of OU1, and in a portion of Zone 1 of OU1 (the Carrie Gosch School)¹. This ROD Amendment sets forth a modified remedy for the remainder of Zone 1, including the area encompassed by the former West Calumet Housing Complex (WCHC), Goodman Park, and a utility corridor located in the western portion of OU1. For purposes of this document, these three areas will be collectively referred to as “modified Zone 1.”

EPA is modifying the November 30, 2012 ROD and issuing this ROD Amendment consistent with the requirements of Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or “Superfund”), as amended, 42 U.S.C. Sections 9601 to 9675, and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Section 300.435(c)(2)(ii). This ROD Amendment was developed after considering State and public comments relating to all of the remedial alternatives evaluated by EPA, including EPA’s then-preferred alternative, Alternative 4B. This ROD Amendment also takes into consideration a Letter of Intent (LOI) executed on November 15, 2019, by the City of East Chicago, Indiana and Industrial Development Advantage, LLC, and a letter from the City of East Chicago to EPA dated December 16, 2019. When read together, the LOI and the letter from the City make it more likely that the future land usage for much of modified Zone 1 will be commercial/industrial and not residential.

This ROD Amendment informs the public and interested stakeholders that EPA has selected as the preferred remedy Modified Alternative 4B (Excavation to 24” plus ICs). Modified Alternative 4B requires a cleanup to residential standards because the current zoning of modified Zone 1 is residential. The ROD Amendment also sets forth a selected, contingent remedy, Alternative 4A

¹ EPA has remediated the following: all 285 residential properties in Zone 3 that required remediation; 480 of the 508 residential properties in Zone 2 thus far known to require remediation; the yard to the south of the Carrie Gosch School; and a utility corridor adjacent to the Carrie Gosch School.

(Excavation to 12” plus ICs). Alternative 4A requires cleanup to commercial/industrial standards. If EPA determines that the future land use is likely to become commercial/industrial, EPA will require implementation of Alternative 4A rather than Modified Alternative 4B. EPA will find that the future land use is likely to become commercial/industrial if (1) the City of East Chicago, Indiana changes the zoning designation for modified Zone 1 from residential to commercial/industrial; and (2) the City and the East Chicago Housing Authority transfer titles to parcels that comprise modified Zone 1 to an entity intending to develop modified Zone 1 for commercial/industrial use. If these two conditions are met, EPA will issue an Explanation of Significant Difference to confirm that these two conditions have been met and will change the selected remedy from Modified Alternative 4B to Alternative 4A.

In the November 2012 ROD, the scope of the remedy was generally limited to “yards.”² Residential properties had front and back “yards.” Larger areas including the WCHC and neighborhood parks were broken up into units, which EPA also referred to as “yards.” Potentially contaminated soil within properties but under houses, streets, sidewalks, and other impermeable surfaces (collectively “hardscapes”) was not covered explicitly by the November 2012 ROD because those structures served, and were expected to continue to serve, as impermeable barriers that prevented residents from ingesting, inhaling or having direct contact with the underlying soils, some of which were contaminated with lead and arsenic.³

In July 2016, the East Chicago Housing Authority (ECHA) applied to the United States Department of Housing and Urban Development (HUD) for approval to demolish the WCHC. In September 2017, HUD approved ECHA’s request. The demolition of WCHC began in 2018 and is now complete. ECHA has removed hardscapes that previously acted as impermeable barriers to residents’ exposure to contaminated soils. Most of the hardscapes in Goodman Park, adjacent to WCHC, have been removed and the remaining hardscapes are very likely to be removed. The remedy in this ROD Amendment addresses the risks to human health and the environment posed by contaminated soils. Unless remedial actions are taken, persons may ingest, inhale, or come into direct contact with lead and arsenic contaminated soils.

This ROD Amendment, including the response to public comments, will become part of the Administrative Record, as required by the NCP (40 C.F.R. Section 300.825(a)(2)). The Administrative Record is available for public review at the following locations:

East Chicago Public Library
2401 East Columbus Drive
East Chicago, IN 46312

East Chicago Public Library
1008 West Chicago Avenue
East Chicago, IN 46312

² “Yards are the risk management unit in OUI.” EPA, USS Lead Record of Decision (Nov. 2012) at 4, note 1 (“2012 ROD”).

³ Even though the scope of the ROD did not include residents’ exposure to contaminated soil under streets and sidewalks, the ROD did provide risk characterization summaries for utility and construction workers for their potential exposure to contaminated soil uncovered during work under streets and sidewalks. See ROD at Tables 5, 6, 8, and 9 (risk characterization summaries for utility and construction workers for carcinogens and non-carcinogens).

The Administrative Record and other relevant reports and documents are also available for public review Monday through Friday between the hours of 8:00 a.m. and 4:00 p.m. at the EPA Region 5 office at the following location:

EPA Region 5 Records Center
77 West Jackson Boulevard – 7th Floor
Chicago, IL 60604

Finally, the Administrative Record is available online at: <https://www.epa.gov/uss-lead-superfund-site>.

II. SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

The USS Lead facility, located in OU2 at 5300 Kennedy Avenue, East Chicago, Indiana, south of modified Zone 1 and Zone 2, was constructed in 1906 and used an electrolytic process (the Betts process) to refine lead bullion shipped predominantly from Midvale, Utah, to East Chicago, Indiana.⁴ Because lead refining produces a number of byproducts, the USS Lead facility also included various secondary metal treatment operations—such as secondary lead smelting. Throughout most of its history, the USS Lead facility accepted scrap lead from a variety of sources for treatment in its secondary lead smelting operations. These secondary lead smelting operations involved a blast furnace. In approximately 1972, the USS Lead facility stopped refining lead bullion and increased its blast furnace capacity to treat more scrap lead material. In 1985, operations ceased at the USS Lead facility.

Starting in 1993, the USS Lead company began a cleanup of its facility. This facility cleanup did not include a cleanup of the residential neighborhoods to the north and northeast now known as OU1. The facility cleanup was conducted under state and federal programs authorized by the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Sections 6901 to 6992k. During the investigation and cleanup of the USS Lead facility under RCRA, it was determined that among other sources of contamination, slag from the blast furnace was routinely placed in piles on the ground at the USS Lead facility and left exposed to the elements. Lead and arsenic contaminated particulate matter was released into the environment in at least three ways: through stacks as fumes from operations, as dust from the baghouses, and as dust from lead waste piles (*e.g.*, slag and baghouse dust).

An Anaconda Copper Mining Company (Anaconda) facility was located immediately north of the USS Lead facility and covered the area later occupied by the WCHC in what is now referred to as Zone 1 of OU1. The Anaconda facility operated three inter-related processes. In 1912, a lead refinery was built on the Anaconda facility, which used a pyrometallurgical process to refine lead bullion that was shipped from Tooele, Utah, to East Chicago, Indiana. In 1919, a white lead plant was constructed at the Anaconda facility to produce white lead for use as an ingredient in lead paint. Finally, in 1922, a zinc oxide plant was added to the Anaconda facility.

⁴ The ROD incorrectly stated that the USS Lead facility was constructed to produce copper. EPA, USS Lead Record of Decision at 7 (Nov. 2012).

As with the USS Lead facility, the Anaconda facility also operated numerous secondary metal treatment processes. Byproducts of these operations included slag, lead waste, and arsenic. Among other sources of contamination, arsenic was burned off and some, but not all, of the arsenic-contaminated particulate matter was recovered in flues and a baghouse. Lead and arsenic contaminated particulate matter was released into the environment from stacks and as fugitive emissions. Operation of the white lead process generated additional lead emissions.

Significant quantities of lead were refined at the Anaconda facility from 1912 until 1946, when Anaconda Copper Mining Company sold the Anaconda facility to Eagle-Picher Company. Eagle-Picher Company appears to have continued operations at the Anaconda facility until at least 1952, though the extent of its operations is largely unknown. Sometime between 1952 and 1970, the Anaconda facility was demolished. In the early 1970s, the WCHC was constructed within the footprint of the former Anaconda facility.

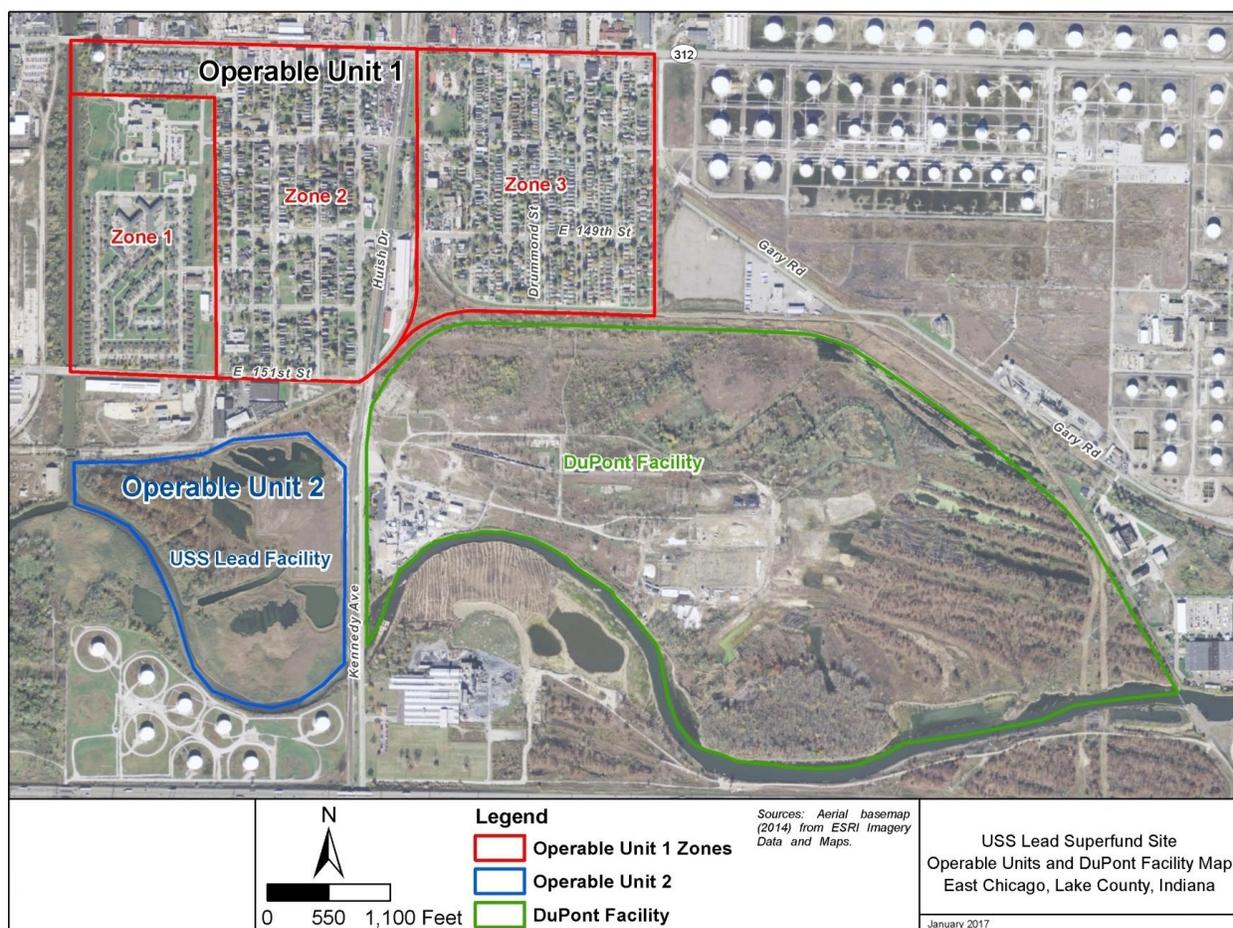


Figure 1 – Overview of USS Lead Superfund Site and Surrounding Area

An E.I. du Pont de Nemours and Company (DuPont) facility, located south of Zone 3 at 5215 Kennedy Avenue, East Chicago, Indiana, was constructed in 1892 to manufacture various organic and inorganic chemicals. Over the course of its operations, the DuPont facility produced over one hundred different chemicals, including lead and calcium arsenate (1910–1949). Lead and arsenic particulate generated from DuPont operations was released into the environment as stack

emissions, precipitator dust, and dust from exposed waste piles stored on the grounds of the DuPont facility. Lead and arsenic from the DuPont facility migrated into OU1. General operations at the DuPont facility contracted significantly during the 1980s and 1990s. Between 2015 and 2018, the DuPont facility was owned and operated by The Chemours Company (“Chemours”), after Chemours was spun off from DuPont. In 2018, Chemours sold the DuPont facility to East Chicago Gateway Partnership LLP. Currently, contamination within the DuPont facility, which lies outside the boundaries of the Site, is being addressed under federal RCRA authorities.

In 2007, EPA transferred responsibility for investigation of off-site impacts from the USS Lead facility from its RCRA program to its Superfund program. The Superfund program performed limited sampling in 2007. The sampling in 2007 identified certain residences with concentrations of lead in soils greater than 1,200 parts per million (ppm). In 2008 and 2011, EPA removed contaminated soils from 29 residential properties in Zones 1, 2 and 3 at which concentrations of lead in soils exceeded 1,200 ppm. In April 2009, EPA placed the Site on the NPL. Inclusion on the NPL meant the Site was eligible for federal funding for remedial response actions. Beginning in June 2009 and concluding in June 2012, EPA performed with federal funds a remedial investigation of OU1, the scope of which is described below.^{5, 6}

In the first phase of the OU1 remedial investigation, EPA collected more than 700 composite and grab soil samples for analysis by X-ray fluorescence (XRF) and sent 20% of these samples to a laboratory to develop a correlation between field XRF analyses and lab analysis of soil. EPA also evaluated soil samples for a full suite of contaminants, including volatile organic compounds (VOCs), semi-VOCs, polychlorinated biphenyls (PCBs) and pesticides.

In the second phase of the remedial investigation, EPA took approximately 190 additional soil samples and sent all of these samples to a laboratory where the lab analyzed the samples for either total metals (including lead and arsenic) or polycyclic aromatic hydrocarbons (PAHs). While evaluating for VOCs, semi-VOCs, PCBs, PAHs, pesticides and total metals, EPA concluded the remedial investigation by identifying lead and arsenic in soil as the contaminants of concern (COCs) for OU1. Please see the Remedial Investigation, Section 5.0, Nature and Extent of Contamination for a description of how EPA selected the COCs.

Based on that investigation and on the corresponding feasibility study, EPA issued its Record of Decision for OU1 on November 30, 2012. The remedy selected in the 2012 ROD included the following elements:

⁵ To date, it appears that soil contamination in the former USS Lead facility has largely been remediated through RCRA corrective action. However, lead and arsenic contamination remains in the dunes and swales along the Grand Calumet River. Pursuant to a 2017 CERCLA Administrative Settlement Agreement and Order on Consent between EPA and USS Lead, remaining contamination in OU2 soils—that is, in the soil within the footprint of the former USS Lead facility - and in the groundwater under the entire Site is the subject of a remedial investigation that began in early 2018. A proposed plan, public comment period, and record of decision for OU2 will be presented to the public at the conclusion of the OU2 remedial investigation and a feasibility study of alternative remedy options.

⁶ In 2011, EPA also performed additional soil removal actions at several residential properties in OU1 based on sampling data collected during the remedial investigation.

- Excavation of soil that contains lead or arsenic in concentrations that exceed the Remedial Action Levels (RALs). For residential areas, the RALs are 400 ppm lead and 26 ppm arsenic; for commercial/industrial areas, the RALs are 800 ppm lead and 26 ppm arsenic. Soil above RALs would be excavated to a maximum depth of 24” below ground surface (bgs).
- Disposal of excavated soil at an off-site Subtitle D landfill. Some excavated soils would require chemical stabilization prior to off-site disposal to address exceedances of the toxicity characteristic (TC) regulatory threshold. Contaminated soil that exceeded the TC threshold would be considered principal threat waste.
- If contaminated soil was identified at a depth greater than 24” bgs, a visual barrier, such as orange construction fencing or a non-woven geotextile liner, would be placed above the contaminated soil before the yard was backfilled with clean soil. Institutional controls (ICs) would be implemented to protect against exposure to contaminated soils beneath the visual barrier that separates clean backfill from impacted soils and to ensure that users of the property were not exposed to contaminated soil that remains at depth.
- Excavated soil would be replaced with clean soil to maintain the original grade. The top 6” of fill would consist of topsoil. Each yard would be restored as close as practicable to its pre-remedial condition.

The remedy set forth in the 2012 ROD applied to “yards” and did not address explicitly potentially contaminated soils beneath hardscapes. See, 2012 ROD at 4; note 1.

Although every lead contamination site is unique, the remedy EPA selected in the 2012 ROD for the USS Lead Site was consistent with remedies selected by EPA at residential lead sites around the country and with the guidelines set forth in a document titled *Superfund Lead-Contaminated Residential Sites Handbook* (“the Handbook”). The Handbook was developed by EPA in 2003 to promote nationally consistent remedies for lead-contaminated residential sites.

III. BASIS FOR THIS DOCUMENT

A. Zone 1 Remediation Status

Consistent with the ROD and with funds provided pursuant to a settlement with two potentially responsible parties embodied in a consent decree entered by the United States District Court, Northern District of Indiana, EPA began remedial design work for Zone 1 and Zone 3. From November 2014 to April 2016, EPA performed remedial design work in Zone 1 and Zone 3 to determine the extent of contamination in the yards of each individual property. Remedial design work includes sampling to create precise blueprints for implementing the selected remedy on a property-by-property basis. Sampling takes place at various “depth” intervals to establish the depth and vertical “cut lines” for the needed excavation. For purposes of remedial design, EPA collected approximately 1,000 soil samples from within Zone 1. Upon review of the validated data, EPA determined that practically all WCHC yards require remediation. In May 2016, EPA

informed the ECHA and the City of East Chicago of those findings. Concurrently, EPA was finishing remedial design work and preparing to mobilize to begin work in Zone 1.

After reviewing the data received from EPA, the City sent a letter in July 2016 to WCHC residents recommending that they relocate from the WCHC. Shortly thereafter, ECHA applied to HUD for approval and funding to demolish the WCHC. In light of these actions, EPA determined that it would be impractical to remediate the WCHC during the summer of 2016. EPA reached this conclusion for two reasons: remediation work would interfere with the relocation of residents and the subsequent demolition of the WCHC and removal of the hardscapes might re-contaminate properties that EPA remediated in Zone 1. In August 2016, HUD announced that it would approve “Tenant Protection Vouchers” for WCHC residents. Tenants could use the vouchers to permanently relocate to anywhere in the United States. Simultaneously, ECHA informed residents that they would have to move out of the WCHC. HUD then issued vouchers, which became effective on September 1, 2016. In early August 2016, the Superintendent of the East Chicago School District announced that the Carrie Gosch Elementary School (Carrie Gosch) located in Zone 1 would close and that all children enrolled at Carrie Gosch would be transferred to a different school outside of the Site.

Instead of cleaning up WCHC soils in 2016, EPA implemented interim risk reduction measures to reduce immediate exposure to contaminated soils by residents of the WCHC. Early measures included: education and intensive community outreach; placement of mulch over exposed soils to serve as a barrier to direct contact and reduce dust migration; and modification of ECHA lawn mowing practices to reduce dust formation and migration.

During the summer of 2016, EPA determined that lead-contaminated soils had been tracked into the apartments of WCHC residents, which resulted in elevated levels of interior lead dust. To address the interior dust issue, EPA implemented the following for all residences in Zone 1: an indoor sampling program; an interior cleaning program; and a temporary relocation program to house residents displaced by the interior cleaning program. Between August 12, 2016, and November 5, 2016, EPA cleaned the interiors of 270 WCHC units and temporarily relocated hundreds of residents while their homes were being cleaned.

In September 2017, HUD approved ECHA’s application to demolish the WCHC. Demolition began in April 2018 and is now complete. The WCHC demolition also resulted in the demolition of most of the hardscapes in Goodman Park. Hardscapes that remain in Goodman Park are likely to be removed.

Because the WCHC, Goodman Park, and the adjacent utility corridor – collectively known as and referred to throughout this document as “modified Zone 1” – are located within or adjacent to the former footprint of the Anaconda facility, the concentrations of lead and arsenic in soils in modified Zone 1 are consistently higher than in Zones 2 and 3. Based on the extent and concentration of lead and arsenic contamination within modified Zone 1, EPA has concluded that when the Anaconda facility was demolished, some wastes and demolition debris were buried in place and leveled off, rather than disposed of off-site. This conclusion is supported by observations of debris identified at depth in soil borings taken by ECHA in preparation for the demolition of

the WCHC.⁷ See, Figure 1-5, Figure 1-6 and Figure 1-7 of EPA's Feasibility Study Addendum (August 2018).

B. Zone 2 and Zone 3 Remediation Status

Consistent with the ROD and the consent decree referenced above, from November 2014 to August 2016, EPA performed remedial design work in Zone 3. The remedial design work generated 285 property-specific drawings to direct excavations at residences in Zone 3. In the fall of 2016, EPA started remediation work in Zone 3 with funding provided under the consent decree. Remediation has continued throughout 2017, 2018 and 2019. EPA has remediated all 285 residential properties in Zone 3 that required remediation. The remaining Zone 3 properties to be remediated consist of non-residential parcels owned and operated by railroads. EPA expects to address these railroad properties in 2020.

In August 2016, EPA began remedial design activities for properties within Zone 2 with federal funds as Zone 2 was not included under the terms of the 2012 consent decree. EPA has generated approximately 597 property-specific drawings to direct excavations at residential properties that require remediation in Zone 2. EPA started cleanup in Zone 2 in the fall of 2016. Throughout 2017, potentially responsible parties (PRPs) continued cleanup in Zone 2 under an administrative consent order.⁸

In January 2018, EPA issued a unilateral administrative order (UAO) to six PRPs. The UAO required the PRPs to complete the soil remediation work at residential properties within Zone 2 with oversight by EPA. All six PRPs provided notice of their intent to comply with the UAO. In Zone 2, EPA, in conjunction with the PRPs, has remediated 480 of the 508 residential properties that require remediation. As of the close of the 2019 construction season, three Zone 2 commercial properties still require sampling. EPA plans to work directly with the property owner of these commercial properties to determine if sampling or access restrictions are appropriate. In 2020, EPA, in conjunction with the PRPs, expects to complete the cleanup of all remaining Zone 2 properties, including the railroad properties.

C. Future Use of the WCHC, Goodman Park, and the Adjacent Utility Corridors

This ROD Amendment applies only to modified Zone 1 of the USS Lead Site and not to Zone 2 or Zone 3, where work is substantially complete. The ROD Amendment applies to the former WCHC, Goodman Park, and the adjacent utility corridor along McCook Avenue. This area is referred to in this document as modified Zone 1 and shown in Figure 2.⁹ This ROD Amendment

⁷ Phase II Environmental Site Assessment West Calumet Housing Complex East Chicago, IN 46312, Amereco Engineering (February 15, 2017).

⁸ Soil remediation work in Zone 2 in 2016 and 2017 was performed pursuant to EPA's time-critical removal authorities. That work was performed consistent with the 2012 ROD.

⁹ The former Carrie Gosch Elementary School, which is located in Zone 1, will remain covered by the remedy selected in the ROD. EPA commenced work at Carrie Gosch in July 2019 and has now concluded this work. No changes in hardscape have occurred at Carrie Gosch and previous sampling has shown limited exceedances of RALs at the Carrie Gosch property.

does not address groundwater beneath modified Zone 1, other than identifying the need for groundwater use restrictions if soil above action levels is left in place at depth at the facility. Groundwater beneath the entire USS Lead Site is being investigated currently and the investigation is being overseen by EPA. Once the groundwater investigation is complete, EPA will determine whether groundwater needs to be addressed. If EPA concludes that groundwater needs to be addressed, it will evaluate options for addressing groundwater.¹⁰



Legend
 Approximate Site Boundary

USS Lead
 East Chicago, Indiana

Figure 2
 Site Layout Map

When EPA selected the current remedy for OU1 and issued the ROD in 2012, it anticipated that for the foreseeable future houses and apartment buildings, along with the other hardscapes including streets, sidewalks and parking areas, would remain in place and act as barriers to ingestion of, inhalation of, and direct contact with contaminated soils. Demolition of the WCHC is now complete and ECHA has removed the buildings and all hardscapes that formerly acted as barriers to inhalation of, ingestion of, and direct contact with contaminated soils. In addition, most

¹⁰ EPA has concluded that it is more protective of human health and the environment to move forward with the cleanup of the contaminated soils within modified Zone 1 than to postpone cleanup until EPA has completed the groundwater investigation. The removal of these materials now will remove an exposure pathway to residents.

of the hardscapes in Goodman Park were demolished and removed. The remaining hardscapes are also likely be removed from Goodman Park.

On August 18, 2016, following the decision by ECHA to demolish the WCHC, EPA wrote the City and asked how the City and ECHA intended to use Zone 1. In a letter dated September 10, 2018, the City advised EPA that it anticipated “providing industrial and commercial opportunities in Zone 1 and quality housing in Zone 2-3.” Mindful of the fact that while Zone 1 had been used for the past four decades for residential purposes but that future use of Zone 1 might transition to commercial or industrial usage, EPA issued a Proposed Plan for modified Zone 1 on or about November 11, 2018, which provided EPA with the flexibility to choose a remedy that reflected and supported the probable future land use, whether residential or commercial/industrial.

Concurrent with the issuance of the Proposed Plan, EPA opened the Proposed Plan for public comment. On November 29, 2018, EPA held a public meeting in East Chicago to discuss the proposed plan. The transcript of the meeting makes clear that EPA told the public that while the preferred remedy set forth in the Proposed Plan – Alternative 4B - requires cleanup of soils to residential standards, if the City and ECHA changed the future use of modified Zone 1, EPA might select a remedy – Alternative 4A - that requires cleanup of soils to the less stringent but still protective commercial/industrial standards.

On January 14, 2019, the City submitted written comments on the Proposed Plan. The Mayor of East Chicago wrote, “My preference for the land uses in Calumet, specifically Zone 1, Goodman Park, and the West Calumet is that present [residential] uses will continue.” On January 14, 2019, the Lake County, Indiana Economic Alliance (LCEA) also submitted written comments on the Proposed Plan. The LCEA stated that it, “strongly supports a cleanup plan that provides flexibility to allow cleanup standards consistent with the commercial/industrial use.” Throughout 2019, the LCEA sent correspondence to EPA alerting EPA to the interest shown by persons in developing modified Zone 1 for commercial/industrial purposes. These communications are included in the Administrative Record.

On November 15, 2019, the City of East Chicago entered into a Letter of Intent (LOI) with Industrial Development Advantage, LLC. The LOI outlined a proposal to acquire most of Zone 1 from the City and ECHA. The LCEA provided a copy of the LOI to EPA shortly after November 15, 2019.

On December 16, 2019, the City of East Chicago wrote EPA and acknowledged that it had signed the LOI and that the LOI envisioned development of Zone 1 for a logistics and distribution campus and warehousing complex. The letter noted, “None of the property will be used for residential purposes.”

EPA has included all of these communications in the Administrative Record and has considered the content of these communications in developing this ROD Amendment. On the basis of these communications, EPA has concluded it is likely that the end use of modified Zone 1 will change from residential to commercial/industrial and that this ROD Amendment should reflect the possibility of a change in land use.

IV. DESCRIPTION OF NEW ALTERNATIVE

The closure and subsequent demolition of the WCHC has exposed soils that had previously been buried beneath buildings and hardscapes. These changes within modified Zone 1 have required EPA to prepare an addendum to the 2012 Feasibility Study and issue this ROD Amendment. The original remedy chosen in November 2012 called for the excavation of contaminated soils down to two feet, the off-site disposal of the soils in an appropriate landfill, the restoration of the excavated properties, and the imposition of ICs. The 2012 ROD anticipated that hardscapes would remain in-place and soils beneath hardscapes would not be remediated. This ROD Amendment describes the elements of a cost-effective remedy, accounts for the possibility that the future land use may change from residential to commercial/industrial and ensures consistent response actions at all of the properties contained in modified Zone 1.

In 2012, EPA identified the Remedial Action Objective (RAO) as follows:

Reduce to acceptable levels human health risk from exposure to contaminants of concern (COCs) in impacted surface and subsurface soils through ingestion, direct contact, or inhalation exposure pathways, assuming reasonable anticipated future land-use scenarios.¹¹

This ROD Amendment adopts this same RAO. Because the RAO specifically incorporates assumptions about “reasonable anticipated future land-use scenarios,” the RAO – reduce to acceptable levels human health risk from exposure to contaminants of concern – is the same regardless of whether the future use is residential, commercial/industrial, or some combination of those uses. Whether the future use of Zone 1 remains residential or becomes commercial/industrial, it is not necessary to change the RAO. The RAO remains the same whether the futures use of modified Zone 1 is residential or commercial/industrial: reduce to acceptable levels human health risk from exposure to contaminants of concern.

The contaminants of concern (COCs) within modified Zone 1 are lead and arsenic. *See* ROD at 17. EPA identified lead and arsenic as the contaminants of concern among potential contaminants at the Site during the initial remedial investigation. Neither the surficial changes within the WCHC nor any information obtained since completion of the initial remedial investigation require EPA to modify the COCs. The principal COCs within modified Zone 1 were and remain lead and arsenic.

The Remedial Investigation, performed by EPA and completed in June 2012, assessed whether along with lead and arsenic EPA should include PAHs as COCs. *See* Remedial Investigation, Section 5.0, Nature and Extent of Contamination. After careful consideration, EPA determined that PAHs should not be considered COCs and that the only appropriate COCs were lead and arsenic. EPA reached this conclusion because exposure pathways to PAHs and other organic chemicals will be addressed by the removal of lead and arsenic under either a commercial or residential use scenario. Consequently, the 2012 ROD identified lead and arsenic as the only COCs.

¹¹ See ROD at 35.

Information developed by Amereco, a contractor retained by ECHA to perform work in connection with the demolition of the WCHC and reported to EPA in 2017 does not persuade EPA that other contaminants should be identified as COCs. Amereco detected three PAHs – (benz(a)anthracene, benzo(a)pyrene, and dibenz(a)anthracene) – above the IDEM residential direct contact screening levels at a depth of 4 feet bgs. Amereco also detected benzo(a)pyrene at another location 6 feet bgs. The presence of these contaminants at depth in the reported concentrations do not present a threat to human health or the environment. Persons are unlikely to ingest, inhale, or come into direct contact with these PAHs at depth.

EPA calculated the Remedial Action Levels (RALs) for lead in soil using the Integrated Exposure Uptake Biokinetic (IEUBK) model. See ROD at page 35. Default exposure assumptions were used to calculate an acceptable lead concentration for residential and industrial/commercial properties. ROD at 35–36. The lead RAL is 400 ppm for residential properties and 800 ppm for industrial/commercial properties using the IEUBK. ROD at 36. This RAL for lead is identical to the RAL for lead that EPA has used for the residential lead cleanup at the Jacobsville Neighborhood Soil Contamination Site in Evansville, Indiana.

Arsenic, both naturally occurring and industrially generated, is present at the Site and within modified Zone 1. EPA does not require the cleanup of naturally occurring contamination at or below background concentrations. As a result, EPA considered site-specific background concentration data and Illinois metropolitan background concentration data when determining the RAL for arsenic. ROD at 16, 36. EPA determined that the upper bound concentration for naturally occurring arsenic at the Site is 26 ppm. ROD at 36. Therefore, EPA set the RAL for arsenic at 26 ppm for both residential and commercial/industrial properties. ROD at 36.

Through the collection of more than 1,000 soil samples between 2012 and 2019 as part of the remedial design work, EPA has substantially increased its knowledge about the extent and degree of the contamination in Zone 1. These samples were composite samples collected from ground level down to 30” bgs in 6” intervals.¹² The consolidated results of all remedial investigation and remedial design sampling in Zone 1 are presented in Table 1.

In issuing this ROD Amendment, EPA has considered whether a revision to the assessment of risk to human health and the environment is warranted because of the demolition of structures and hardscapes within modified Zone 1. EPA has concluded that it is not necessary to revise the assessment of risk to human health and the environment included in the 2012 ROD.¹³ The same risks that existed in 2012 exist today: the risk of ingestion, the risk of direct contact with contaminated soils, and the risk of inhalation of lead and arsenic contaminated dust.

¹² Composite soil samples are a mixture of several cores of soil, 6 inches in length, taken within a distributed area of a back or front yard. EPA did not sample below 30” bgs during remedial design because, as described earlier, exposure risks to residents are generally limited to the top 24” bgs. In this case, EPA sampled down to 30” bgs in order to establish where ICs would be necessary.

¹³ Section 2.7 of the ROD includes a Summary of Site Risks. ROD at 15–35. Additional information can be found in the Human Health Risk Assessment (HHRA), included as Appendix E to the ROD.

Table 1: Summary of Zone 1 Sampling Results		
Contaminant/Depth	Average (ppm)	Median (ppm)
Lead at 0-6 in.	1601.8	831.0
Lead at 6-12 in.	3721.8	1821.0
Lead at 12-18 in.	5397.0	2066.5
Lead at 18-24 in.	5203.7	1830.0
Lead at 24-30 in.	3590.2	1449.5
Arsenic at 0-6 in.	59.8	46.0
Arsenic at 6-12 in.	113.7	66.0
Arsenic at 12-18 in.	141.3	69.5
Arsenic at 18-24 in.	165.3	66.5
Arsenic at 24-30 in.	189.5	70.0

As the results in Table 1 indicate, the average concentrations of lead and arsenic in each of the six -inch intervals down to 30” bgs are in excess of the lead and arsenic RALs for both residential and commercial/industrial uses. Therefore, EPA has concluded that to be protective for residential usage, all soils within modified Zone 1 above the RALs for lead and arsenic will need to be excavated down to 24” bgs.¹⁴ To be protective for commercial/industrial usage, all soils within modified Zone 1 above the RALs for lead and arsenic will need to be excavated down to 12” bgs. The RALs for commercial/industrial usage are less stringent than the RALs for residential usage because the assumption is that workers at and visitors to a commercial/industrial facility within modified Zone 1 will be on-site and potentially exposed to lead or arsenic for fewer hours each week than will be persons who might reside within modified Zone 1.

In addition to the removal of soils above RALs, for a residential cleanup, ICs will need to be put in place for contamination remaining above RALs below 24” or 12” bgs across the entirety of modified Zone 1. Based on EPA experience, a minimum of 12” of clean soil should be used to establish an adequate barrier from contaminated soil in a residential yard and 12” in a commercial/industrial context for the protection of human health. The rationale for establishing a minimum cover thickness of 12” is that the top 12” of soil in a residential yard is considered to be available for direct human contact. Most typical activities of children and adults in residential properties do not extend below a 12-inch depth. However, gardening is an activity in which both adults and children engage, and EPA has concluded that if modified Zone 1 is used for residential purposes, 24” of clean soil cover is necessary to adequately protect human health in areas used for gardening. Since EPA cannot know which areas within modified Zone 1 may be used for gardening and to establish a barrier sufficient for all residential yard use, including gardening, EPA has elected to require excavation down to 24” bgs for the entirety of modified Zone 1. However,

¹⁴ Nothing in this proposed amendment will preclude additional remedial design sampling as appropriate after issuance of the ROD Amendment. Additional sampling for purposes of remedial design may identify areas within the top 24” of modified Zone 1 that do not contain lead or arsenic above the remedial action limits.

EPA may approve excavation to a depth of less than 24” bgs for residential yards if further sampling during the remedial design phase demonstrates that one or more areas within modified Zone 1 do not contain concentrations of lead or arsenic above the remedial action limits.

The demolition of the WCHC disturbed surficial soils that EPA had previously sampled and analyzed. Virtually all of the demolished structures were slab-on-grade construction without basements. Demolition activities involved the removal of above-grade structures. Once ECHA removed above-grade structures, it also removed hardscapes. These hardscapes, like streets, sidewalks and parking areas, only extended a few inches bgs. While the demolition work disturbed the top few inches of soil within modified Zone 1, the work was not so substantial as to alter the conclusion reached by EPA on the basis of pre-demolition data: virtually all soils within modified Zone 1 in the zero to 24-inch horizon are above remedial action levels and will need to be excavated and disposed of off-site.

Finally, in preparing this ROD Amendment, EPA deemed unnecessary development of an alternative cleanup standard. The exposure risk scenarios – ingestion, inhalation and direct contact – have not changed since the 2012 ROD. Since 2012, EPA has documented the concentrations of lead throughout the top 24” of soil in modified Zone 1. The known concentrations of lead throughout the top 24” of soil in modified Zone 1 are above the current RAL of 400 ppm for residential use and the RAL of 800 ppm for industrial/commercial use. These known concentrations of lead are expected to require the excavation of virtually all soil within either the top 12” inches for industrial/commercial use or the top 24” for residential use of the area within modified Zone 1. Adopting an even more stringent cleanup standard for lead (less than 400 ppm for residential or 800 ppm for commercial/industrial) would be unlikely to result in a more comprehensive cleanup since it is anticipated that under the current 400 ppm standard virtually all soil within the top 24” of modified Zone 1 will be excavated and removed. Similarly, under a commercial/industrial scenario, virtually all soil within the top 12” of modified Zone 1 will be excavated and removed.

A. Screening of Potential Remedial Alternatives

The remedial alternatives described below are cleanup options that EPA evaluated in the Feasibility Study Addendum to achieve the RAOs for modified Zone 1. The Feasibility Study Addendum and other information used in the development of the alternatives are in the Administrative Record. Below is a list of initial alternatives that EPA evaluated:

POTENTIAL REMEDIAL ALTERNATIVES	
1	No Action – Required by National Contingency Plan as a baseline for comparison
2	Institutional Controls (ICs) only
3A	12" on-site soil cap and ICs
3B	On-site asphalt cap and ICs
4A	Excavation of contaminated soils and other material exceeding industrial/commercial standards in the top 12”, off-site disposal, <i>ex-situ</i> treatment options, and ICs

4B	Excavation of contaminated soils and other material exceeding residential standards in the top 24", off-site disposal, <i>ex-situ</i> treatment options, and ICs
4C	Excavation of contaminated soils and other material exceeding residential standards above groundwater, off-site disposal, <i>ex-situ</i> treatment options, and ICs
4D	Excavation of contaminated soils and other material exceeding residential standards down to native sand, off-site disposal, and <i>ex-situ</i> treatment options
5	<i>In-situ</i> treatment by chemical stabilization
6*	Soil washing/chemical separation
* Evaluated in a separate technical memorandum and not in the Feasibility Study Addendum.	

In accordance with National Contingency Plan (NCP), 40 C.F.R. Section 300.430, and EPA Remedial Investigation/Feasibility Study guidance, the potential remedial alternatives identified above were screened against three broad criteria: (1) effectiveness, both short-term and long-term; (2) implementability, including technical and administrative feasibility; and (3) relative costs, including capital and operation and maintenance (O&M) costs. The purpose of the screening evaluation was to reduce the number of alternatives selected for a more thorough analysis. See 40 C.F.R. Section 300.430(e)(7).

EPA eliminated from further consideration Alternative 2 (ICs) and Alternative 5 (*in-situ* treatment by chemical stabilization) because they would not effectively reduce human health risks. Specifically, Alternative 2 was eliminated because it would leave lead and arsenic contamination in place without providing a protective barrier to prevent human receptors from ingesting, inhaling or coming into direct contact with lead or arsenic. Alternative 5 was eliminated because EPA found there is insufficient evidence supporting the long-term effectiveness of *in-situ* stabilization. Additional discussion of the screening of these alternatives can be found in the Feasibility Study Addendum.

EPA eliminated from further consideration Alternative 6 (soil washing) because it satisfied none of the screening criteria. Capital costs associated with constructing a soil washing facility are prohibitive and only limited amounts of contaminated materials could be effectively processed. Implementation of soil washing would also be technically difficult and significantly prolong the cleanup. Additional discussion of the screening of the alternatives can be found specifically in the Feasibility Study Addendum, entitled Soil Washing Alternatives Screening Technical Memorandum and the Administrative Record including the Responsiveness Summary.

B. Institutional Controls

ICs are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. With the exception of Alternative 4D (Excavation to native sand), all remedial alternatives evaluated for modified Zone 1 leave some contaminated soil in place at depth beneath a cap or soil cover. Consequently, all alternatives, other than Alternative 4D, will require ICs.

This ROD Amendment has selected Modified Alternative 4B as the preferred remedy for residential redevelopment and Alternative 4A as the preferred remedy for commercial/industrial

redevelopment. Both remedies will require ICs, though the ICs required by these remedies are not identical.

Comments received by the general public and the City of East Chicago, Indiana raised the concern that modified Zone 1 would be remediated and then in the future be developed for residential purposes. Work associated with residential redevelopment would include the pouring of concrete footers at a depth of 36” bgs; installation of gas and electrical mains at a depth of 48””; and installation of a water main at a depth of 72” bgs. Construction workers would encounter contaminated soils at depth under this scenario. Because the soils at depth are contaminated, the cost of performing this work would be greater than if the soils were not contaminated. The increased costs of construction would be borne eventually by the residents of the community in the form of increased rents or increased purchase prices and mortgage payments. The comments characterized this increase in the costs of residential construction as a shifting of the burden for remediation from potentially responsible parties (PRPs) to the community.

In response to these comments, EPA calculated the cost of ICs to manage contaminated soils that may be encountered at depths of greater than 24” during residential redevelopment. EPA estimates that these costs total \$2,018,710. To calculate these costs, EPA used a hypothetical residential development that included 184 homes.¹⁵ The following describes the tasks deemed to be essential and assumptions used to calculate the costs to manage contaminated soil as part of the soil ICs after the initial phase of a residential excavation remedy has been implemented:

- The installation of footers for all of the 184 homes would require excavating to a width of 12”, a depth of 36”, and a total length of 1,850’.
- Utility service lines (water, gas and electric) would be installed at each of the 184 homes and would require excavating to a width of 36”, a depth of 36”, and a length of 30’ for each of the 184 homes.
- Gas and electric mains would need to be installed and would require excavating to a width of 24”, a depth of 48” bgs, and a total length of 724’.
- A new water main would require excavating to a width of 12”, depth of 72” bgs, and a total length of 724’.
- Water management during excavation activities.

¹⁵ EPA estimated 184 homes because 92 homes were present on one-half of the former WCHC, while multi-story apartments were present on the other half of the former WCHC. EPA doubled the number of houses located in one-half of the former WCHC to estimate the number of homes that might be built across the entirety of the site and assumed only single-family construction. The actual cost of IC-required soil management efforts will depend on the final development plans and may differ from EPA’s estimates based on assumptions EPA made here for purposes of cost comparison. The Indiana Residential Code, 675 Indiana Administrative Code 14-4.3, requires all one- or two-family dwellings in Lake County, Indiana to place footings at least 36” bgs for protection from frost heave. EPA assumed that all the soils excavated below 24” bgs (contaminated soils to a depth of 24” bgs having previously been removed) to place footings and utilities would be contaminated and that the contaminated soils would be disposed of off-site in an approved landfill.

- Hauling and disposal of hazardous material (30% of soil below 24”).
- Hauling and disposal of non-hazardous material (70% of soil below 24”).
- Preparation of a Land Use Control Implementation Plan (mid-level staff with senior review).
- Meetings with relevant agencies (senior staff and attorneys).
- Site restoration and cleanup.
- Demobilization of personnel and equipment.
- Procurement of construction contractor bonds.
- Project management and construction oversight (7 months).

In Appendix B, EPA has set forth detailed costs for IC-required management of contaminated soils that may be encountered during residential redevelopment. These contaminated soils, if not properly managed, could pose a risk to nearby residents or construction workers and would be likely to shift the burden of the contamination from the PRPs to the local community. Consequently, EPA is requiring in this ROD Amendment that the ICs outlined above be included as part of the remedy in Modified Alternative 4B.

If the City changes the zoning designation for modified Zone 1 from residential to commercial/industrial, and the City and the East Chicago Housing Authority transfer ownership to an entity intending to develop modified Zone 1 for commercial/industrial use, EPA will change the selected remedy from Modified Alternative 4B to Alternative 4A. As with Modified Alternative 4B, ICs will be an important part of Alternative 4A to ensure long-term protectiveness. The ICs for Alternative 4A will not be identical to those detailed for Modified Alternative 4B. However, the ICs will be protective of human health and the environment. Alternative 4A will require the owner of parcels within modified Zone 1 intended for commercial/industrial development to record consistently with Indiana law an environmental restrictive covenant (ERC). In the ERC, the property owner will agree to not develop the property for residential use and to use it only for commercial or industrial purposes. The ERC will also provide notice to the public and future prospective owners that contaminated soils exist below 12”.

Persons excavating at depths of greater than 12” for commercial/industrial development will be alerted by the ERC and a visual barrier that they are excavating below clean soils. Prospective owners and operators on the modified Zone 1 properties are subject to existing rules and regulations governing the management of soils that are potentially hazardous. Such rules and regulations include compliance with regulations promulgated by the Occupational Safety and Health Administration to protect the health and safety of construction workers. These rules and regulations also include provisions for the handling, transportation and disposal of hazardous waste promulgated by the State of Indiana and promulgated pursuant to the Resource Conservation and Recovery Act, 40 U.S.C.A. Section 6901 to 6992k. Alternative 4A does not require a person to submit to EPA for approval a Site Safety Plan or Soil Management Plan. Persons may, however, want to submit such plans to EPA for review and comment. Persons who encounter contaminated soils must comply with all applicable laws and regulations. Future property owners may also want to take reasonable steps to stop any continuing release and prevent any threatened future release to maintain their status as bona fide prospective purchasers or other defenses against liability. PRPs will not be required to either perform or fund work associated with the excavation of soils at depths of greater than 12” as part of implementing Alternative 4A of this ROD Amendment.

Each of the Alternatives, including Alternative 4D, is likely to require ICs to prohibit the use of groundwater beneath modified Zone 1. EPA has estimated that it will cost \$21,000 to draft and record an ERC with the terms outlined above and included this cost in each cost estimate.

C. Description of Remedial Alternatives

Following the demolition of the WCHC, EPA evaluated seven alternatives to address soil contamination, including a No Action Alternative. See 40 C.F.R. Section 300.430(e)(9)(iii). The No Action Alternative is required to be evaluated to establish a baseline for comparison of all other alternatives. In addition to the No Action Alternative, EPA evaluated in detail two containment alternatives and four excavation alternatives. All six of these alternatives include an off-site disposal component. These six alternatives and the No Action Alternative are described below:

Alternative 1 – No Action	
Estimated Volume of Material Excavated:	None
Estimated Capital Cost:	\$0
Estimated O&M Cost:	\$0
Estimated Contingency:	\$0
Estimated Present Worth:	\$0
Estimated Construction Time:	None

Under Alternative 1, no action would be taken to address contaminated materials within modified Zone 1.

Alternative 3A – 12” On-Site Soil Cap and Institutional Controls	
Estimated Volume of Material Excavated:	None
Estimated Capital Cost:	\$4,192,778
Estimated Cost of Groundwater ICs (ERC)	\$21,000
Estimated O&M Cost:	\$360,206
Estimated Contingency (10%):	\$457,398
Estimated Present Worth:	\$5,031,382
Estimated Construction Time:	5 months

Alternative 3A requires installation of a 12-inch thick soil cap topped with sod or seed. The cap would be tied into grade along the perimeter of modified Zone 1. The soil cap would prevent direct contact with contaminated soil. ICs would be implemented to maintain the integrity of the soil cap and to protect future residents (if any), workers or visitors to modified Zone 1, and utility and construction workers, from unacceptable risks related to exposure to contaminated soil. A groundwater use restriction would also likely be necessary. Because all contaminated soil would be left in place, EPA would conduct five-year reviews of this remedy.

Alternative 3B – On-Site 4” Asphalt Cap and Institutional Controls	
Estimated Volume of Material Excavated:	None
Estimated Capital Cost:	\$14,848,304
Estimated Cost of Groundwater ICs (ERC)	\$21,000
Estimated O&M Cost:	\$3,245,936
Estimated Contingency (20%):	\$3,623,048
Estimated Present Worth:	\$21,738,288
Estimated Construction Time:	7 months

Alternative 3B requires installation of a 4” thick asphalt cap constructed atop a 3” subbase layer, which would be tied into grade along the perimeter of modified Zone 1. The asphalt cap would prevent direct contact with contaminated soil. A storm water collection and conveyance system would be included with the asphalt cap to prevent local flooding. ICs would be implemented to maintain the integrity of the asphalt cap and to protect future residents (if any), workers or visitors to modified Zone 1, and utility and construction workers, from unacceptable risks related to exposure to contaminated soil. A groundwater use restriction would also be necessary; EPA has estimated that it will cost \$21,000 to secure a groundwater use restriction. Because all contaminated soil will be left in place, EPA would conduct regular five-year reviews of this remedy. EPA estimated the O&M Cost would include on-going repairs to the asphalt cap, which would weather and crack over time. EPA used a 20% contingency rate because the uncertainty around the quantity of stormwater and the cost of collecting and controlling stormwater runoff from an impermeable asphalt cap.

Alternative 4A – 12” Industrial/Commercial Excavation and Disposal	
Estimated Volume of Material Excavated:	81,473 yd ³
Estimated Capital Cost:	\$12,485,122
Estimated Cost of Groundwater ICs (ERC)	\$21,000
Estimated O&M Cost:	\$360,206
Estimated Contingency (10%):	\$1,272,007
Estimated Present Worth:	\$14,150,000
Estimated Construction Time:	5 months

Alternative 4A requires excavation of contaminated soils that exceed the industrial/commercial RALs (800 ppm for lead and 26 ppm for arsenic) down to a maximum depth of 12” bgs. Following excavation to a depth of 12”, a visual barrier will be installed to alert persons that they may encounter contaminated soils below the barrier. Excavated areas will be backfilled with clean material to grade and restored with sod or seed unless construction of an impermeable surface will commence over the area within 90 days of restoration to grade. Contaminated soils will be disposed of at an off-site Subtitle D or Subtitle C landfill, as appropriate. *Ex-situ* treatment may

be used to chemically stabilize the approximately 50% of soils that exceed the toxicity characteristic (TC) regulatory threshold (5 mg/L) after toxicity characteristic leaching procedure (TCLP) testing as necessary to meet off-site disposal requirements. Alternative 4A will require the owner of parcels within modified Zone 1 intended for commercial/industrial development to record consistently with Indiana law an ERC. In the ERC, the property owner will agree to not develop the property for residential use and to use it only for commercial or industrial purposes. The ERC will also provide notice to the public and prospective owners that contaminated soils exist below 12". A groundwater use restriction will also likely be necessary unless it can be demonstrated that other controls prohibit the installation of drinking water wells within modified Zone 1. Because contaminated soil will be left in place, EPA will conduct regular five-year reviews to make sure the remedy remains protective of human health and the environment.

Modified Alternative 4B (Selected) – 24” Residential Excavation and Disposal Plus Soil and Groundwater ICs	
Estimated Volume of Material Excavated:	157,947 yd ³
Estimated Capital Cost (w/o 2% bond cost):	\$23,300,351 ¹⁶
Estimated Costs for Soil and Groundwater Institutional Controls (ERC) (w/o 2% bond cost):	\$2,018,710
Estimated O&M Cost:	\$360,206
Estimated Contingency (10%):	\$2,617,965
Estimated Present Worth (rounded):	\$28,800,000
Estimated Construction Time:	7 months (excluding redevelopment)

EPA has developed Modified Alternative 4B in response to public comments received on the Proposed Plan during the public comment period. Comments were received about the need in the course of residential development to excavate soils to depths of 36” bgs in order to install footers, of 48” bgs to install gas and electric lines, and of 72” bgs to install a water main. These comments also caused EPA to consider the risks posed to construction workers potentially exposed to contaminated soils and to nearby residents who might be impacted by excavation work within lead- and arsenic-contaminated soils.

Consistent with Alternative 4B in the proposed remedy, Modified Alternative 4B requires excavation of contaminated soils that exceed the residential RALs (400 ppm for lead and 26 ppm for arsenic) down to a maximum depth of 24”, backfilling of excavated areas with clean material to grade, including placement of top soil in the uppermost 6”, and restoration of disturbed areas with sod or seed. Contaminated soils would be disposed of at an off-site Subtitle D or Subtitle C landfill, as appropriate. If necessary to meet off-site disposal requirements, *ex-situ* treatment may be used to chemically stabilize contaminated soils that exceed the toxicity characteristic (TC) regulatory threshold (5 mg/L) after toxicity characteristic leaching procedure (TCLP) testing. Based on the sampling data, EPA has assumed that 51% of the soils excavated from within the zero to 24” bgs horizon will require treatment prior to disposal.

¹⁶ Capital costs consist of the following: \$150,000 (Prep) + \$22,797,351 (Phase 1) + \$53,000 (Restoration) + \$300,000 (Project Management) = \$23,300,351.

In addition to excavation of soil above the RALs to a depth of 24", Modified Alternative 4B also includes IC-required soil management measures to prevent recontamination of clean soil during future development and protect future residents, and utility and construction workers, from unacceptable risks related to exposure to contaminated soil at depths below 24" bgs. EPA's cost estimate for the soil management ICs assumes: (1) redevelopment as described above (184 homes each with 36-inch-deep footers and utility service lines, 48 inch-deep gas and electric mains, and 72 inch-deep water mains; (2) soil at depths below 24" bgs requiring excavation under future development assumptions is assumed to be contaminated (41,960 cubic yards); and (3) approximately 30% of the soil excavated from within the 24" bgs to 36" bgs horizon, and the 24" bgs to 72" bgs horizon (i.e., those soils that require future management under the ICs) will need to be disposed of as hazardous material, which is more costly.¹⁷ In order to implement these IC-required soil management measures, contaminated soil at depths greater than 24" bgs in the impacted areas would be excavated and disposed of off-site to allow for construction of footers during redevelopment. Those deeper soils would be accessed by removing the top 24" bgs of top soil and clean fill. The top soil and clean fill would be staged near the excavation and replaced after the removal of the contaminated soil below 24" bgs. The cost of staging the top soil and clean fill has been included in the estimated cost of the ICs for Modified Alternative 4B.

Based on the above assumptions, EPA has estimated that the additional costs associated with IC-required soil management for Modified Alternative 4B and administrative costs associated with implementing potential groundwater restriction ICs (not including procurement of a 2% bond) would be \$2,018,710, an amount equal to approximately 7% percent of the total cost of the site remedy. For Modified Alternative 4B, EPA has used a relatively low Estimated Contingency of 10% because the construction of the remedy outlined in Modified Alternative 4B mirrors work performed in Zone 2 and Zone 3, which provides EPA with a greater level of confidence about the estimated costs for Modified Alternative 4B. After accounting for the initial excavation to 24" bgs, the IC costs to be incurred at the time of redevelopment, and the Estimated Contingency, the total rounded cost for Modified Alternative 4B is \$28,800,000.

EPA arrived at this total cost figure for Alternative 4B by aggregating the cost of excavating to a depth of 24" bgs and restoring these areas (\$22,797,351) + the cost of the soil and groundwater ICs (\$2,018,710) + the cost of project management (\$300,000) + the cost of operation and maintenance for 30 years (\$360,206) + a 10% cost contingency (\$2,617,965).

In response to public comments that the State building code requires 36" footers for future residential development, EPA also estimated the cost of excavating and disposing of off-site all contaminated soils within modified Zone 1 to a depth of 36" bgs. Excavation of all contaminated soils to a depth of 36" bgs would allow a developer to install footers anywhere within modified Zone 1. However, because of the risk of leaving contaminated soil at depths below 36", ICs would still be necessary to prevent recontamination of clean soil during future development and protect

¹⁷ This assumption is based on a review of the concentrations of lead and arsenic in soils within modified Zone 1. Soils within the zero to 24" bgs horizon contain higher concentrations of lead than do soils in the 24" bgs to 36" bgs horizon, or the 24" bgs to 72" bgs horizon.

future residents, and utility and construction workers, from unacceptable risks related to exposure to contaminated soil at depths below 36” bgs.

EPA’s cost estimate for the soil management ICs under this scenario of excavation all contaminated soils to a depth of 36” assumes: (1) redevelopment as described above (184 homes served by 48 inch-deep gas and electric main lines and 72 inch-deep water mains); (2) all soil requiring excavation under future development assumptions is contaminated (376 cubic yards); and (3) approximately 30% of the soil below 36” requiring future excavation would need to be disposed of as hazardous material that requires more costly disposal. Based on the above assumptions, EPA has estimated that the costs associated with managing soils through ICs for excavation below 36” and administrative costs associated with implementing a groundwater restriction IC would be \$56,737¹⁸. Excavating to a depth of 36” bgs would increase the likelihood of encountering groundwater that would not be present when digging to only 24”, rendering the 36” excavation more difficult and costly to implement and contributing to a higher Estimated Contingency cost of \$3,152,760 for this option. After accounting for the initial excavation to 36” bgs, the soil and groundwater IC costs, and the Estimated Contingency, the total estimated cost for excavation to a depth of 36” bgs would be \$34,680,000 (rounded), which is \$5,880,000 more costly than the Modified Alternative 4B described above.

Digging to a depth of 36” bgs rather than to a depth of 24” bgs does not differ significantly in terms of long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; or short-term effectiveness. Both excavation to 36” bgs and to 24” bgs when coupled with ICs would ensure that both approaches complied with Applicable or Relevant and Appropriate Requirements (ARARs). EPA has concluded that excavation to a depth of 24” bgs is protective of human health and the environment. The extra cost associated with digging to a uniform depth of 36” bgs would not result in a proportional increase in the protectiveness of the remedy.

Alternative 4C –Residential Excavation to Groundwater and Disposal	
Estimated Volume of Material Excavated:	228,408 yd ³
Estimated Capital Cost (w/o 2% bond cost):	\$32,468,840 ¹⁹
Estimated Costs for Institutional Controls (w/o 2% bond cost):	\$43,436
Estimated O&M Cost:	\$360,206
Estimated Contingency (20%):	\$6,702,746
Estimated Present Worth (rounded):	\$40,220,000
Estimated Construction Time:	9 months (excluding redevelopment)

Alternative 4C requires excavation of contaminated soils that exceed the residential RALs (400 ppm for lead and 26 ppm for arsenic) down to groundwater, backfilling of excavated areas with

¹⁸ This cost figure does not include 2% bond costs.

¹⁹ Capital costs consist of the following: \$150,000 (Prep) + \$31,815,840 (Phase 1) + \$53,000 (Restoration) + \$450,000 (Project Management) = \$32,468,840.

clean material to grade, and restoration of excavated areas with sod or seed. EPA did not include in the estimate costs for managing groundwater since excavation would cease once groundwater was encountered. Contaminated soils would be disposed of at an off-site Subtitle D or Subtitle C landfill, as appropriate. If necessary to meet off-site disposal requirements, *ex-situ* treatment may be used to chemically stabilize contaminated soils that exceed the toxicity characteristic (TC) regulatory threshold (5 mg/L) after toxicity characteristic leaching procedure (TCLP) testing. Based on the sampling data, EPA assumed that 44% of the soils excavated in the zero to groundwater horizon would require treatment prior to disposal.

In addition to excavation of contaminated soils down to groundwater, ICs would be implemented to protect future residents, and utility and construction workers, from unacceptable risks related to exposure to contaminated soil at depth. Assuming redevelopment described above (184 homes each with 36-inch deep footers), contaminated soil would need to be removed for the installation of a water main 72” bgs. The amount of soil to be removed and disposed of off-site for the installation of a water main would be 161 cubic yards. EPA has assumed that 30% of the soil in the groundwater to 72” bgs horizon would need to be disposed of as hazardous material and estimated that the costs associated with IC-required soil management measures would be \$22,436. A groundwater use restriction would also be necessary and cost an estimated \$21,000. The total cost of soil and groundwater ICs (not including procurement of a 2% bond) is estimated to be \$43,436.

EPA would conduct regular five-year reviews of this remedy since contaminated soil/material remains on-site. EPA estimated the 30-year O&M Cost would be low (\$360,206) as the soil cap is durable and not expected to require much on-going maintenance.

In connection with Alternative 4C, EPA has used an Estimated Contingency of 20%. EPA has used a contingency estimate (\$6,702,746) for Alternative 4C that is higher than the contingency factor for Modified Alternative 4B (\$2,617,965). It has done so because it has concluded that the uncertainties associated with the costs of digging to groundwater are greater than are the uncertainties of digging to a depth of 24” bgs. Alternative 4C costs \$11,420,000 more than Modified Alternative 4B.

Alternative 4D – Residential Excavation to Native Sand and Disposal	
Estimated Volume of Material Excavated:	245,186 yd ³
Estimated Capital Cost (w/o 2% bond costs):	\$38,055,895 ²⁰
Estimated Cost of Groundwater ICs:	\$21,000
Estimated O&M Cost:	\$0
Estimated Contingency (25%):	\$9,706,503
Estimated Present Worth (rounded):	\$48,530,000
Estimated Construction Time:	14 months

²⁰ Capital costs consist of the following: \$250,000 (Prep) + \$36,952,895 (Phase 1) + \$253,000 (Restoration) + \$600,000 (Project Management) = \$38,055,895.

Alternative 4D requires excavation of contaminated soils that exceed the residential RALs (400 ppm for lead and 26 ppm for arsenic) down to native sand, backfilling of excavated areas with clean material to grade, and restoration of excavated areas with sod or seed. Contaminated soils would be disposed of at an off-site Subtitle D or Subtitle C landfill, as appropriate. If necessary to meet off-site disposal requirements, *ex-situ* treatment may be used to chemically stabilize contaminated soils that exceed the toxicity characteristic (TC) regulatory threshold (5 mg/L) after toxicity characteristic leaching procedure (TCLP) testing. Based on sampling data, EPA assumed that 43% of the soils excavated within the zero to 24" bgs horizon would require treatment prior to disposal. Because no contaminated soils would remain in place, no soil ICs nor five-year reviews would be required. An IC restricting the use of groundwater will likely be required for this and all other remedies. EPA has included expenses associated with securing groundwater use restriction ICs (\$21,000) in its cost estimate for each remedy. EPA will be in a position to determine the need for a groundwater IC after it has completed the groundwater RI currently underway.

EPA estimated the O&M Cost would be zero because all contamination would be removed and there would be no on-going maintenance. EPA used a 25% contingency rate because the cost of excavating to native sand is relatively difficult to estimate with precision. The slopes of the excavation may need to be reinforced with steel sheet piles to keep the excavation from collapsing and the challenges of capturing and treating groundwater, as necessary, are difficult to estimate. EPA has estimated a contingency cost of \$9,706,503. Alternative 4D costs \$19,730,000 more than Modified Alternative 4B.

V. EVALUATION OF ALTERNATIVES

EPA must select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. See CERCLA Section 121(b)(1), 42 U.S.C. Section 9621(b)(1). Remedial actions selected by EPA shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further releases which, at a minimum, assures protection of human health and the environment. Such remedial actions shall be relevant and appropriate under the circumstances presented by the release or threatened release of such substance, pollutant, or contaminant. See CERCLA Section 121(d), 42 U.S.C. Section 9621(d).

As set forth in the NCP at 40 C.F.R. Section 300.430(e)(9)(iii), EPA uses nine criteria to evaluate the different remedial alternatives individually and against each other to select a remedy. This section summarizes the relative performance of each alternative against the nine criteria, noting how each compare with the other options under consideration.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES	
Threshold Criteria	Overall Protection of Human Health and the Environment considers whether an alternative adequately protects human health and the environment.
	Compliance with ARARs considers whether an alternative meets applicable Federal and State environmental statutes, regulations, and other requirements.
Primary Balancing 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 considers an alternative’s use of treatment to reduce the harmful effects of principal contaminants, the ability of contamination 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 an alternative.
	Cost considers the total present cost of an alternative over time, including capital and annual operations and maintenance costs.
Modifying Criteria	State/Support Agency Acceptance considers whether the State agrees with EPA’s analyses and recommendations.
	Community Acceptance considers whether the local community agrees with EPA’s analyses and preferred alternative.

A. Threshold Criteria

1. Overall Protection of Human Health and the Environment

Potential pathways of exposure to lead and arsenic in contaminated soils include ingestion, inhalation, and direct contact.

Alternative 1 (No Action) provides no improvement over current conditions, provides no risk reduction, and would not be protective of human health or the environment. Because Alternative 1 does not meet this threshold criterion, EPA does not discuss it further in this section nor has EPA chosen it as the Selected Remedy.

Alternative 3A (On-Site 12” Soil Cap), Alternative 3B (On-Site 4” Asphalt Cap), Alternative 4A (Excavation to 12” for Commercial/Industrial with ICs), Modified Alternative 4B (Excavation to 24” with ICs), Alternative 4C (Excavation to groundwater with ICs) and Alternative 4D (Excavation to native sand with ICs) each protect human health and the environment by addressing the potential pathways of exposure to contaminated soils: ingestion, inhalation, and direct contact.

Ingestion of contaminated soils within modified Zone 1 is a primary exposure route under either a residential or commercial use scenario. Residents may be exposed to contaminants in soils through ingestion of homegrown produce or through direct ingestion of contaminated soil that may cling to their hands. Children digging and playing in contaminated soils are likely to ingest soil contaminated with lead and arsenic and the soil clings to their hands and toys, which they then put into their mouths. Alternatives 3A, 3B, 4A, 4B, 4C and 4D are all considered effective at preventing ingestion by residents, including children, who would live or play within modified Zone 1. Alternatives 3A and 3B rely on either a soil or asphalt cap, and compliance with ICs for protectiveness. Alternatives 4A, 4B and 4C would achieve protectiveness through the removal of contaminated soils, placement of a clean soil cover, and imposition of ICs. Alternative 4D would be marginally more protective of construction workers' health since all contaminated materials, including debris, would be excavated down to native sand and disposed of off-site. Like all other Alternatives, Alternative 4D is likely to include ICs that restrict the use of groundwater beneath modified Zone 1.

In either a residential or commercial/industrial context, direct contact can also result from property maintenance activities, recreational activities, gardening, landscaping, or excavating. Children digging and playing in contaminated soils – even along the periphery of a commercial/industrial use - are likely to have direct contact with lead and arsenic as the soil may cling to their skin. Each of the alternatives under consideration would prevent direct contact by covering or removing the contaminated soils. However, with the exception of Alternative 4D (Excavation to native sand), direct contact may result from unauthorized excavation activities because contaminated soils would remain in place at depth under either an asphalt or soil cap. Direct contact through authorized excavation activities by future residents or commercial/industrial workers/tenants, and utility and construction workers, would be managed through the imposition of ICs required by Alternatives 3A, 3B, 4A, 4B, and 4C. The specific elements of the ICs required for various alternatives are set forth above in Section IV.B., above. Alternative 4D may require an IC that restricts the use of groundwater beneath modified Zone 1 even though it calls for the removal of all contaminated soils.

Exposure through inhalation would most likely occur through windborne transportation of contaminated dust and soil. Lead and arsenic have a strong tendency to adsorb to soil particles and may migrate on airborne soil particles. Each of the alternatives considered by EPA would prevent exposure to contaminated dust by either covering or removing and covering contaminated soils. Each of the alternatives under consideration would prevent exposure to future residents or commercial/industrial workers/tenants, and utility and construction workers, through the imposition of ICs.

Alternative 3A (On-Site 12" soil cap), Alternative 3B (On-Site 4" asphalt cap), Alternative 4A (Excavation to 12" for Commercial/Industrial with ICs), Modified Alternative 4B (Excavation to 24" with ICs), Alternative 4C (Excavation to groundwater with ICs) and Alternative 4D (Excavation to native sand with ICs) address potential exposure to contaminants by either covering or removing and covering contaminated soil. Alternatives 3A and 3B would leave contaminated soil behind under either a soil or asphalt cover. Alternative 4A would leave contaminated soils at depths greater than 12" bgs. Modified Alternative 4B would leave contaminated soils at depths

greater than 24” bgs. Alternative 4C would likely leave contaminated soils below the groundwater elevation. Where contaminated soil remains at depth, EPA would rely on ICs (including, as possibilities, restrictive covenants, laws or regulations, or other controls), which would require that digging below the layer of clean soil be authorized, and require sampling, soil management, and transportation and disposal of contaminated materials encountered during authorized excavation activities to prevent or protect against exposure.

The requirement that EPA consider whether the remedy is protective of human health and the environment is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(A).

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Applicable or Relevant and Appropriate Requirements (ARARs) are any environmental standards, requirements, criteria, or limitation under federal law that are either legally applicable to the contaminants of concern, or that are relevant and appropriate under the circumstances of the release. ARARs also include any state environmental or facility siting laws that are more stringent than federal requirements. ARARs can be chemical-specific, action-specific, and/or location specific. EPA has concluded that Alternatives 3A, 3B, 4A, 4B, 4C, and 4D would all achieve or comply with the identified ARARs. EPA has identified ARARs in Appendix C.

The requirement that EPA consider whether the remedy complies with ARARs is set forth at 40 C.F.R. Section 300.430(e)(2)(i)(A) and (e)(9)(iii)(B).

B. Primary Balancing Criteria

3. Long-term Effectiveness and Permanence

Alternative 3A (On-Site 12” soil cap), Alternative 3B (On-Site 4” asphalt cap), Alternative 4A (Excavation to 12” for Commercial/Industrial with ICs), Modified Alternative 4B (Excavation to 24” with ICs), Alternative 4C (Excavation to groundwater with ICs), and Alternative 4D (Excavation to native sand) would meet the Remedial Action Objective (RAO) under all future use scenarios and provide long-term effectiveness and permanence once implemented.

Alternatives 3A and 3B would achieve long-term effectiveness by covering the contaminated soils, implementing ICs, and requiring operation and maintenance (O&M) to ensure and verify the ongoing effectiveness of the cap remedy. Implementation of Alternatives 3A and 3B would introduce topographic changes to the properties within modified Zone 1 – WCHC, Goodman Park, and the utility corridor – that must be maintained to prevent erosion and potential exposure to contaminated soils that remain in place. Because contamination remains in place, O&M is critical to the protectiveness of the remedies described in Alternatives 3A and 3B. Construction or redevelopment on the soil or asphalt cap may be difficult with the change in grade. The cap would be constructed with modest slopes to facilitate the collection of stormwater runoff.

Alternative 4A (Excavation to 12” for Commercial/Industrial with ICs), Modified Alternative 4B, and Alternative 4C, and Alternative 4D, which all involve excavation of contaminated soils, would

achieve long-term effectiveness by removing soils that exceed RALs from within modified Zone 1 and disposing of them at a licensed, off-site disposal facility. Modified Alternative 4B would leave contaminated materials at depths greater than 24” bgs. Alternative 4C would leave contaminated materials in place below the groundwater table. Both Alternatives 4B and 4C would include a soil cover over contaminated soils at depth. Any materials exceeding RALs that are left in place would require ICs and O&M to ensure the continued protectiveness of the remedy. Alternative 4D does remove all contaminated materials to the depth of native, uncontaminated sand. It is likely to require ICs to restrict the usage of groundwater.

Alternatives 3A, 3B, 4A, 4B, 4C and 4D are all remedies that use proven technologies – caps or soil excavation – and meet the requirements for long-term effectiveness and permanence. Compared to Alternatives 3A (On-Site 12” soil cap) and 3B (On-Site 4” asphalt cap), Alternative 4A (Excavation to 12” for Commercial/Industrial), Modified Alternative 4B (Excavation to 24” with ICs), Alternative 4C (Excavation to groundwater with ICs), and Alternative 4D (Excavation to native sand with possible ICs) provide an additional level of protectiveness because contaminated material above RALs will be removed. Despite the different excavation depths, Alternative 4A (Excavation to 12” for Commercial/Industrial), Modified Alternative 4B and Alternative 4C provide comparable levels of permanence and protectiveness and both establish a barrier sufficient for either commercial/industrial or all residential yard use, including gardening, for the entirety of modified Zone 1. Alternative 4D provides the greatest degree of long-term effectiveness and permanence because all soil exceeding RALs would be removed. Consequently, O&M would not be required to maintain the remedy described in Alternative 4D. Alternative 4D would not require soils ICs but might still require an IC restricting groundwater usage.

The requirement that EPA consider in the remedy selection process the long-term effectiveness and permanence of a remedy is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(C).

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Some of the soils located within modified Zone 1 exceed the toxicity characteristic (TC) regulatory threshold (5 mg/L) after toxicity characteristic leaching procedure (TCLP) testing. These soils are considered principal threat wastes because of their toxicity and potential to leach and migrate to groundwater. This criterion expresses a preference for remedies that reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible encapsulation, or reduction of total volume of contaminated media.

The cap alone remedies, Alternatives 3A and 3B, do not reduce the toxicity, mobility, or volume of contaminated materials since no treatment is applied. The excavation and restoration remedies, Alternatives 4A, 4B, 4C and 4D, will reduce the mobility of contaminated soils that are excavated and exceed the TC regulatory threshold for lead by requiring *ex-situ* treatment of these soils prior to disposal. Through treatment, the toxicity of the material would be reduced but the volume of contaminated materials would not be reduced. Alternative 4D (Excavation to native sand) would result in the greatest volume of contaminated soils being treated, followed by Alternative 4C (Excavation to groundwater plus ICs), then Modified Alternative 4B (Excavation to 24” plus ICs). Alternative 4A would result in excavation of the least amount of contaminated soil. Treated

contaminated soils or contaminated soils that do not exceed the TC regulatory threshold would be disposed of at an off-site Subtitle D (non-hazardous) landfill.

Though there is a preference for treatment of soils that exceed the TC regulatory threshold for lead, EPA may determine that it is impractical to treat contaminated soils that exceed the TC regulatory threshold for lead prior to disposal at a Subtitle D (non-hazardous) disposal facility. Instead, such soils would be disposed of off-site at a Subtitle C (hazardous waste) disposal facility. If contaminated soils are disposed of off-site at a Subtitle C facility, neither Alternative 3A, 3B, 4A, 4B, 4C, or 4D would reduce the toxicity, mobility, or volume of contaminated materials.

The requirement that EPA consider in the remedy selection process the potential to reduce toxicity, mobility, or volume through treatment is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(D).

5. Short-term Effectiveness

EPA does not expect any unacceptable short-term risks to the general public, surrounding community, or workers implementing the remedy from the implementation of any of the alternatives evaluated.

Alternative		Time to Implement
3A	Soil Cap	5 months
3B	Asphalt Cap	7 months
4A	12" Excavation	5 months
4B	24" Excavation	7 months
4C	Groundwater Excavation	9 months
4D	Native Sand Excavation	14 months

Potential short-term impacts associated with these alternatives include exposure to lead-contaminated soils, either through the generation of lead dust or direct contact. Potential short-term impacts also include implementation-related risks and impacts, such as traffic

and noise, increased wear on local roads, and implementation-related accidents. Short-term risks and impacts increase with the amount of work to be performed and the time required to perform the work necessary to implement a remedy. However, these risks can be reduced by implementing a project-specific health and safety plan, keeping excavation areas properly wetted to reduce the creation of dust, planning truck routes to minimize disturbances to the surrounding community, and implementing other best management practices.

Alternatives 3A and 3B require the least disturbance of lead-contaminated soils and have the shortest construction times. Compared to Alternatives 3A and 3B, which require either a soil or asphalt cap, Alternatives 4A, 4B and 4C, which all require excavation of contaminated materials, present greater short-term impacts because of the amount of materials moved to and from modified Zone 1, as well as the increased duration of construction. Alternative 4D presents the most risk to those implementing the remedy and the community because it has the longest duration of excavation and off-site disposal (14 months) and an increased level of technical difficulty of implementation associated with managing groundwater that is expected to seep into excavations down to the depth of native sand, a depth which is often below the water table.

The requirement that EPA consider in the remedy selection process the short-term effectiveness of the remedy is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(E).

6. Implementability

This criterion considers the technical and administrative feasibility of an alternative and the availability of required goods and services. Technical feasibility considers the ability to construct and operate a technology and its reliability, the ease of undertaking remedial actions, and the ability to monitor the effectiveness of a remedy. Administrative feasibility considers the ability to obtain approvals from other parties or agencies and the extent of required coordination with other parties or agencies.

Alternative 3A, Alternative 3B, Alternative 4A, Modified Alternative 4B, Alternative 4C, and Alternative 4D are all proven and can be readily implemented. Each has been used successfully for other environmental cleanup projects. In addition, Alternative 3A, Alternative 4A, Modified Alternative 4B, and Alternative 4C could all be completed using readily available, conventional earth-moving equipment. Most of the necessary services and construction materials are expected to be readily available. Qualified commercial contractors with experience are available locally to perform the work. Many local contractors now have experience having worked in Zones 2 and 3.

Alternative 3B (Installation of a 4" asphalt cap) is more difficult to implement than Alternative 3A (On-Site 12" Soil Cap), Alternative 4A, Modified Alternative 4B, and Alternative 4C, since it requires more detailed civil and remedial design plans to maintain safe grading along the periphery of the property and to install a storm water management system. Alternative 4C is also more difficult than Alternative 4A or Modified Alternative 4B (Excavation to 24" plus ICs) because it requires excavation of materials at the groundwater table. Implementation of Alternative 4C may necessitate dewatering, which will increase the difficulty of excavating the contaminated materials.

Alternative 4D (Excavation to native sand) would be the most difficult to implement because of the challenges associated with excavating below the groundwater table. The difficulty of maintaining side slope stability of the excavation, the need to continuously dewater the excavation, and the possibility that treatment of the contaminated groundwater would be necessary has led EPA to conclude that implementing Alternative 4D (Excavation to native sand) is more difficult than implementing any of the other actively-considered Alternatives.

The requirement that EPA consider in the remedy selection process the difficulty or ease of implementing the remedy is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(F).

7. Cost

Alternative		Capital Cost	Institutional Controls	O&M	Contingency	Total Cost
3A	Soil Cap	\$4,192,778	\$21,000	\$360,206	\$457,398	\$5,031,382
3B	Asphalt Cap	\$14,848,304	\$21,000	\$3,245,936	\$3,623,048	\$21,738,288
4A	12" Excavation	\$12,485,122	\$21,000	\$360,206	\$1,286,633	\$14,150,000

4B	24" Excavation	\$23,300,351	\$2,018,710	\$360,206	\$2,617,965	\$28,800,000
4C	Groundwater Excavation	\$32,468,840	\$43,436	\$360,206	\$6,702,746	\$40,220,000
4D	Native Sand Excavation	\$38,055,895	\$21,000	\$0	\$9,706,503	\$48,530,000

Present-value costs are used to account for the different implementation times. Generally, costs increase as more contaminated material is excavated and as technical difficulty increases. More technically difficult alternatives also require greater contingencies. Alternative 4D is the costliest remedy to implement because it results in the greatest amount of excavation and is the most technically difficult to implement because of the difficulty of digging below the groundwater table. Because of this greater level of difficulty, EPA has added a greater level of variability to the cost estimate for Alternative 4D.

The requirement that EPA consider cost in the remedy selection process is set forth at 40 C.F.R. Section 300.430(e)(9)(iii)(G) and 42 U.S.C. Section 9621(a).

C. Modifying Criteria

8. State/Support Agency Acceptance

The State of Indiana, through the Indiana Department of Environmental Management, has provided a letter that states it concurs in the selection of Modified Alternative 4B (Excavation to 24" plus ICs) with the option to shift to Alternative 4A under the circumstances outlined below. The letter is contained in Appendix D.

9. Community Acceptance

A Responsiveness Summary is contained in Appendix A to this ROD Amendment. The Responsiveness Summary contains EPA's response to the public comments received during the comment period. The comment period began on November 12, 2018 and ended on March 13, 2019. EPA held public meetings on November 29, 2018, and January 13, 2019, to present EPA's preferred remedy, answer questions, and accept public comments. The public comment period was interrupted by, and extended because of, the shutdown of portions of the federal government in late 2018 and early 2019. Though received after the close of the public comment period, EPA has included in the Administrative Record documents received from the City of East Chicago pertaining to proposed changes to the future use of modified Zone 1.

Several comments submitted by the public requested that EPA choose Alternative 4D (Excavation to native sand) and redevelop the site for residential housing. The City of East Chicago submitted comments stating that the future use for Zone 1 would be residential and EPA should implement Alternative 4D. Subsequent communications from the City advise that the future use of modified Zone 1 is likely to be commercial/industrial. In addition to correspondence from the City, EPA

also received comments from one or more persons interested in redeveloping the property for commercial use. The preference for Alternative 4D is premised on the belief that excavating to native sand would facilitate redevelopment and be more protective of human health. EPA has found that alternatives 3A (Soil Cap), 3B (Asphalt cap), 4A (Excavate to 12” bgs plus ICs), 4B (Excavate to 24” bgs plus ICs), 4C (Excavate to groundwater plus ICs) and 4D (Excavate to native sand) are each protective of human health.

In response to public comments, EPA has expanded the scope of the ICs required by several of the alternatives, including Modified Alternative 4B (Excavate to 24” bgs plus ICs). The IC-mandated soil management measures will help protect utility and construction workers during any residential redevelopment of modified Zone 1, and the cost estimates for Modified Alternatives 4B and 4C account for the costs of a second phase of excavation during a residential redevelopment effort. The actual cost of the IC-mandated soil management measures will depend on the final development plans and may differ from the estimate made by EPA for cost comparison purposes. EPA’s selection of Modified Alternative 4B attempts to account for concerns raised by the community during the public comment period around risks posed and costs incurred in the course of residential redevelopment. The community did not raise concerns about costs incurred in the course of commercial/industrial redevelopment as such costs will not be borne by the community in the form of higher rents or purchase prices. Rather, such costs will be shouldered by the potentially liable parties and the commercial/industrial developer. The ICs required by Alternative 4A are set forth above in Section IV.B.

EPA is hopeful that with a better understanding of the benefits of Modified Alternative 4B (Excavation to 24” plus ICs) the remedy will find broader community acceptance. Similarly, EPA is optimistic that the public will recognize that Alternative 4A will be protective of human health and the environment if modified Zone 1 is developed for commercial/industrial purposes.

The requirement that EPA consider in the remedy section process the modifying criteria of State support and community acceptance of the remedy is set forth at 40 C.F.R. Section 300.430(e)(9)(H) and (I) and 300.430(f)(i)(C).

VI. EPA’S SELECTED ALTERNATIVE

Alternative 3A (On-Site soil cap with ICs), Alternative 3B (On-Site asphalt cap plus ICs), Alternative 4A (Excavation to 12” for Commercial/Industrial with ICs), Modified Alternative 4B (Excavation to 24” plus ICs), Alternative 4C (Excavation to groundwater plus ICs), and Alternative 4D (Excavation to native sand plus ICs) is each protective of human health and the environment under likely use scenarios. All the alternatives, except for No Action, would comply with ARARs. EPA has carefully evaluated the threshold criteria, balancing criteria, and modifying criteria discussed above for each alternative in accordance with the NCP, 40 C.F.R. Section 300.430(e)(9)(iii).

The future use of the properties within modified Zone 1 is currently residential. However, EPA has recently received two documents. The first document is a Letter of Intent dated November 15, 2019, between a developer and the City of East Chicago, Indiana, which lays out a proposed

commercial/industrial development for most of modified Zone 1. The second is a letter dated December 16, 2019, from the City of East Chicago, Indiana to EPA stating that the City envisioned development of Zone 1 for a logistics and distribution campus and warehousing complex. The letter from the City noted, “None of the property will be used for residential purposes.” Read together, the two documents have caused EPA to conclude that a sufficient level of certainty exists that an actual change in future land use to industrial/commercial is more probable than not to occur.

Consequently, EPA has selected a remedy that is contingent upon the future use of Modified Zone 1. As long as the titles to the parcels that comprise modified Zone 1 are held by the City of East Chicago, Indiana and the East Chicago Indiana Housing Authority and the designated zoning for modified Zone 1 is residential, EPA selects as its preferred remedy Modified Alternative 4B (Excavation to 24” plus ICs). If, however, the City and ECHA convey title to an entity for the purpose of commercial redevelopment and the City modifies the zoning for modified Zone 1 from residential to commercial/industrial, EPA will issue an Explanation of Significant Difference, which confirms that the conditions have been met to trigger the contingent remedy, and change the selected remedy to Alternative 4A. Future land use determinations are not made by EPA. The future use of land is generally a decision made at the level of local government. EPA remedy selection reflects the expressed desire of the local government and is consistent with the local government’s interest in retaining its authority to determine the future land use of contaminated properties within its jurisdiction.

EPA has concluded that for a residential use scenario, Modified Alternative 4B (Excavation to 24” plus ICs) achieves the best balance of the threshold and balancing criteria out of all of the remedial alternatives. Modified Alternative 4B requires excavation of contaminated soils and other material exceeding residential cleanup standards in the top 24”, off-site disposal, includes *ex-situ* treatment options, requires placement of a 24” soil cover, and, at the time of any residential redevelopment work, requires implementation of ICs that will require remedial soil management measures.

EPA has concluded that for a commercial/industrial scenario, Alternative 4A achieves the best balance of the threshold and balancing criteria. Alternative 4A requires excavation of soils and other material exceeding the commercial/industrial RALs in the top 12”; off-site disposal, including *ex-situ* treatment options; and placement of a visible barrier between the new, clean fill and contaminated soil at depths greater than 12” bgs.

EPA has selected Modified Alternative 4B (Excavation to 24”) and Alternative 4A rather than Alternative 4C (Excavation to groundwater) or Alternative 4D (Excavation to native sand) because it has concluded that digging deeper than either 24” or 12” across the entirety of modified Zone 1 is not meaningfully more protective of potential residents or other users of the properties. Neither Alternative 4C nor Alternative 4D provides significantly greater protection to residents from ingestion, inhalation, or direct contact threats to lead or arsenic.

While costing significantly more than Modified Alternative 4B (\$28,800,000) or Alternative 4A (\$14,150,000), neither Alternative 4C (\$40,220,000) nor Alternative 4D (\$48,530,000) provides significantly greater protection to future residents, tenants or local residents. Alternative 4C costs approximately \$11,420,000 more than Modified Alternative 4B and approximately \$26,070,000 than Alternative 4A. Alternative 4D costs approximately \$19,730,000 more than Modified

Alternative 4B and approximately \$34,380,000 than Alternative 4A. It is important to note that Alternative 4A pertains to a commercial/industrial future use scenario while Modified Alternative 4B, Alternative 4C and Alternative 4D all pertain to residential future use scenarios. Consequently, a cost comparison between Alternative 4A and the other three alternatives is of limited value.

Given these disparities in costs and the fact that neither Alternative 4C nor Alternative 4D is significantly more protective of human health or the environment than is Modified Alternative 4B or Alternative 4A, EPA has determined that Modified Alternative 4B is a more cost-effective residential remedy and Alternative 4A is a more cost-effective commercial/industrial remedy than either Alternative 4C or Alternative 4D. Like Alternative 4C and Alternative 4D, Modified Alternative 4B is protective of human health and the environment if the future use is residential and Alternative 4A is protective of human health and the environment if the futures use is commercial/industrial.

Under the selected remedy set forth in Modified Alternative 4B, the removal of 24” of contaminated soil and the replacement with 24” of clean fill and top soil will prevent direct human contact and exposure to contaminated soil left at depths of greater than 24”. Where contaminated soil remains at depths greater than 24” bgs, this ROD Amendment requires ICs in the form of an ERC. Under the selected remedy set forth in Alternative 4A, the removal of 12” of contaminated soil and the replacement with 12” of clean fill and topsoil will prevent direct human contact and exposure to contaminated soil left at depths of greater than 12”. Where contaminated soil remains at depths greater than 12”, this ROD Amendment requires ICs in the form of an ERC, which restricts to commercial/industrial use the future use of the property.

The ICs for Modified Alternative 4B will include proprietary controls requiring that persons who dig below 24” bgs for the purpose of residential redevelopment (1) be authorized, (2) conduct soil sampling, (3) adhere to proper soil management practices, and (4) properly transport and dispose of contaminated materials off-site. These requirements will reduce the likelihood that workers or adjacent residents will be exposed to lead or arsenic contaminated soils during redevelopment work. The ICs will require a person who desires to dig below 24” bgs to submit to EPA and implement a Soil Management Plan that addresses the requirements of this paragraph.

Based on the over 1000 samples collected as part of remedial design in modified Zone 1 prior to 2016, EPA’s preferred remedial alternatives, Modified Alternative 4B and Alternative 4A, are likely to require the excavation of virtually all soils in the top 24” or top 12” within modified Zone 1. *See* Table 1. In addition, based on prior sampling, which indicates the presence of lead and arsenic above RALs at depths 12” and 24” bgs, *see id.* ICs, dependent upon the alternative to be implemented, will be put in place across modified Zone 1. The ICs for Alternative 4A are set forth above in Section IV.B.

EPA has concluded that it can implement Alternative 4A or Modified Alternative 4B without the need for additional sampling. Nothing in this ROD Amendment, however, is intended to preclude a person from collecting additional sampling to develop more detailed designs for excavation within modified Zone 1.

EPA estimates that Modified Alternative 4B will cost \$28,797,613 and take seven months to excavate contaminated soils to 24” bgs and restore modified Zone 1 to grade, with a second phase of remedial excavation and soil management occurring in conjunction with a residential redevelopment. EPA made these cost and time estimates assuming the excavation of all soils down to 24” bgs, and some additional soils at more than 24 bgs.

For a residential use scenario, EPA prefers Modified Alternative 4B (Excavation to 24” plus ICs) over the other possible alternatives because it is protective of human health and the environment, complies with the regulatory criteria, is consistent with a residential future use of the property, and can be implemented within a relatively short time frame and at lower cost than Alternative 4C (Excavation to groundwater plus ICs) and Alternative 4D (Excavation to native sand plus ICs), the other residential excavation alternatives.

EPA estimates that Alternative 4A will cost \$14,150,000 and take five months to excavate contaminated soils to 12” bgs and restore modified Zone 1 to grade. For a commercial/industrial use scenario, EPA prefers Alternative 4A (Excavation to 12” plus ICs) over the other possible alternatives because it is protective of human health and the environment, complies with the regulatory criteria, is consistent with a commercial/industrial future use of the property, and can be implemented within a relatively short time frame.

Alternative 4A costs less than every alternative other than Alternative 3A (12” On-Site Soil Cap and Institutional Controls). Alternative 3A may require a storm water management system to manage run-off from an impermeable cap. Alternative 4A, which is finished with 12” of clean fill and top soil, will retain more precipitation than will Alternative 3A. Alternative 3A would also leave in place 12” of contaminated material that might be a source of groundwater contamination, in part because a soil cap will not significantly impede the infiltration of rain or snowmelt into contaminated soils.

VIII. SUPPORT AGENCY COMMENTS

The State of Indiana has stated in a letter that it concurs with EPA’s selection of Modified Alternative 4B as the Selected Remedy as long as title to the parcels that comprise modified Zone 1 remain with the City and ECHA, and the zoning designation for modified Zone 1 remains residential. If the City and ECHA convey title to those parcels that comprise modified Zone 1 to an entity that intends to develop modified Zone 1 for commercial/industrial purposes and the City changes the zoning designation of modified Zone 1 from residential to commercial/industrial, then the State concurs in EPA designated Alternative 4A as the contingent remedy. Appendix D contains the concurrence letter from the Indiana Department of Environmental Management.

IX. STATUTORY DETERMINATIONS

Section 121 of CERCLA, 42 U.S.C. Section 9621, and the NCP set forth five criteria that must be met by a selected remedy. EPA must select remedies that (1) protect human health and the environment, (2) comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), (3) are cost effective, and (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent

practicable, (5) recognize 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 five statutory requirements.

Protection of Human Health and the Environment

The Selected Remedy, Modified Alternative 4B (Excavate to 24” bgs plus ICs) if the future use remains residential and Alternative 4A (Excavate to 12” bgs plus ICs) if the future use becomes commercial/industrial, will both protect human health and the environment through excavation and off-site disposal of contaminated soil, replacement of excavated soil with clean fill/topsoil, and the addition of ICs including a visible barrier at depth to warn persons of potential contamination below the visible barrier. If Modified Alternative 4B is implemented, ICs will prohibit a person from disturbing soils below 24” unless the excavation of deeper soil is performed as a CERCLA response action in accordance with this ROD Amendment. For example, residential redevelopment can occur within modified Zone 1, but ICs will require that any digging below 24” bgs for the purposes of redevelopment will require sampling, proper soil management, and appropriate transportation and disposal of contaminated materials to protect construction workers and adjacent residents from unacceptable exposure to contaminants. Alternative 4A will require the recording of an ERC that prohibits future residential development of the property and restricts future use to commercial/industrial.

Modified Alternative 4B and Alternative 4A will each eliminate the direct contact and inhalation threats of exposure posed by soils contaminated with lead and arsenic through the removal of contaminated soil and the replacement of the contaminated soil with clean fill and topsoil. The clean fill and topsoil will create a barrier between persons and contaminated soils. There are no significant short-term threats associated with the Selected Remedy since engineering controls and air monitoring will take place during the remediation and minimize the risk of exposure to airborne contaminants by reducing the likelihood of off-site migration of lead or arsenic contaminated dust. Modified Alternative 4B and Alternative 4A both present slightly fewer short-term risks than do either Alternative 4C or Alternative 4D. Alternatives 4C and 4D both take longer to implement than Alternative 4A or Modified Alternative 4B, which results in more sustained traffic and noise impacts to nearby residents and pose greater risks to construction workers because each requires deeper excavations and exposure to the concomitant hazards.

Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy calls for excavating the entire 50.5 acres that comprise modified Zone 1 to a depth of either 24” bgs or 12” bgs, depending upon the futures land use, and off-site disposal of the contaminated soil in a permitted landfill unless further sampling is performed and demonstrates that excavation of the entire 50.5 acres to a depth of 24” bgs is not necessary. Approximately 51% of the excavated soils will be treated to reduce the mobility. ICs will also be put in place. Appendix C presents all the ARARs and any non-binding criteria that are To Be Considered (TBC). This Selected Remedy complies with all ARARs.

Cost-Effectiveness

EPA has concluded that the Selected Remedy, either implementation of Modified Alternative 4B (Excavation to 24" plus ICs) or implementation of Alternative 4A (Excavation to 12" plus ICs), is cost-effective. In making this determination, EPA used the following NCP definition: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (40 C.F.R. Section 300.430(f)(1)(ii)(D)). EPA made this determination by evaluating the "overall effectiveness" of all alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). These alternatives included: Alternative 3A, Alternative 3B, Modified Alternative 4B, Alternative 4C and Alternative 4D. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; and short-term effectiveness).

EPA then compared overall effectiveness with the projected costs to determine cost-effectiveness. EPA found that the overall costs of Modified Alternative 4B and Alternative 4A are proportional to the overall effectiveness of these alternatives, and has concluded that Modified Alternative 4B represents the most cost-effective alternative for eliminating the primary threats to human health and the environment if the future land use remains residential and that Alternative 4A represents the most cost-effective alternative for eliminating the primary threats to human health and the environment if the future land use becomes commercial/industrial.

The cost associated with the Modified Alternative 4B is \$28,800,000. Implementing Modified Alternative 4B will protect human health and the environment. Alternative 4C (Excavation to groundwater) is approximately \$11,420,000 more expensive than Modified Alternative 4B and does not provide a significant increase in protection of human health and the environment. Alternative 4D (Excavation to native sand) is approximately \$19,730,000 more expensive than Alternative 4B and is only slightly more protective since ICs will be used with the Modified Alternative 4B to prevent future exposure to contaminated soils at depth. EPA finds that the combination of excavation and off-site disposal found in Alternative 4A and Modified Alternative 4B when coupled with the ICs described in Section IV.B. of this ROD Amendment will provide overall levels of protection comparable to Alternative 4C or 4D at a significantly lower cost.

The risk to human health and the environment is posed primarily by ingestion, inhalation and direct contact with contaminated soils. Residents will not be exposed to contaminated soils at a depth. Construction and utility workers who may be exposed to contaminated soils at depth will be protected by well-defined ICs.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner within modified Zone 1. Modified Alternative 4B (Excavation to 24" plus ICs)(for residential future use) and Alternative 4A (Excavation to 12" plus ICs)(for commercial/industrial future use) each represent the best synthesis of the five balancing criteria when future use is factored into the equation, while also

considering the statutory preference for treatment as a principal element and State and community acceptance. Both remedies are consistent with remedies selected at other sites contaminated with lead around the country.

Implementation of either Alternative 4A or Modified Alternative 4B is estimated to treat through stabilization approximately 50 percent of the soils contaminated with lead and arsenic at concentrations that would fail the toxicity characteristic leaching potential (TCLP) test. Stabilization of soils contaminated with lead and arsenic will reduce the mobility of contaminants prior to off-site disposal in a permitted landfill. Neither Modified Alternative 4B nor Alternative 4A present any short-term risks if persons carrying out the work implement the proper engineering controls and air monitoring. The remedies set forth in Alternative 4A and Modified Alternative 4B – excavation and off-site disposal coupled with a soil cover and remedy-specific ICs – are remedies commonly used at other Superfund sites around the country contaminated with lead and arsenic.

Preference for Treatment as a Principal Element

EPA has estimated that approximately 50% of the soils excavated from the top 12” to 24” feet within modified Zone 1 will require stabilization prior to disposal in an off-site landfill. Both Alternative 4A and Modified Alternative 4B address principal threats through the use of stabilization. By treating a significant portion of the excavated soils, EPA satisfies the statutory preference for remedies that employ treatment as a principal element.

Five-year Review Requirements

Implementation of either Alternative 4A or Modified Alternative 4B will result in hazardous substances, pollutants, or contaminants remaining within modified Zone 1 above levels that allow for unlimited use and unrestricted exposure. EPA will conduct a statutory review within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

X. PUBLIC PARTICIPATION COMPLIANCE

EPA has met the public participation requirements set out in the NCP, 40 C.F.R. Section 300.435(c)(2)(ii). The Agency issued a notice of availability of the proposed amendment to the ROD in the Northwest Indiana Times on November 11, 2018 and February 4, 2019. EPA provided a 120-day public comment period on the proposed amendment to the ROD. EPA posted the proposed ROD Amendment on the USS Lead internet web page and placed copies of the proposed ROD Amendment in all Administrative Record repositories. The public comment period ran from November 12, 2018 through March 13, 2019. EPA held two public meetings to present EPA’s preferred remedy and receive public comments. These public hearings were held on November 29, 2018, and February 13, 2019. Transcripts of the meeting, including public comments, have been made public and are in the Administrative Record. Appendix A contains a Responsiveness Summary in which EPA has responded to all oral and written comments.

At the time of the public comment period the preferred remedy set forth in the Proposed Plan was Alternative 4B. The NCP anticipated situations – like the situation here – in which EPA receives new information (proposed change in the future use of modified Zone 1) that significantly changes the basic features of the remedy after publication of the proposed plan and prior to adoption of the selected remedy in the [amended] record of decision.

The NCP provides EPA with two options: proceed without further public comment or proceed with additional public comment. If EPA determines that the changes to the final remedy could be reasonably anticipated by the public based on the alternatives and other information available in the proposed plan or the supporting analysis and information in the administrative record, EPA may revise the final remedy without seeking additional public comment on the revised remedy. See 300.430(f)(3)(ii)(A).

Here, the public could reasonably anticipate a potential for change in future use and modification of the remedy because of a change in the future use of modified Zone 1 based upon information in the Administrative Record. The Administrative Record includes: (1) the Proposed Plan (November 2018), which referenced the prospect of a change in future use and a revised remedy to accommodate a change in future use; (2) testimony at the public hearing (November 29, 2018), in which the Remedial Project Manager reminded the public that while the current use was residential, the future use could change to commercial/industrial; (3) an EPA-published Fact Sheet (November 2018), which discussed the consequences of a change in the future land use; and (4) an EPA-published Frequently Asked Questions publication (February 2019), which identified the possibility that EPA would structure a ROD Amendment to allow for a second remedy that would be contingent on future conditions.

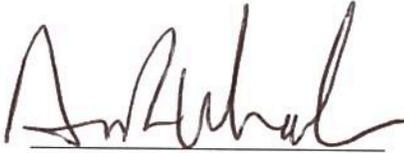
The Administrative Record also includes the following statements by the City of East Chicago: (1) a letter dated September 10, 2018, identifying the future use of Zone 1 as commercial/industrial; (2) a letter dated January 14, 2019, identifying the future use of Zone 1 as residential; (3) a Letter of Intent between the City and a developer for the commercial/industrial redevelopment of Zone 1 dated November 15, 2019; and (4) a letter dated December 16, 2019, identifying the future use of Zone 1 as commercial/industrial.

Finally, the Administrative Record includes communications from the Lake County Indiana Economic Alliance (LCEA) in support of a remedy decision flexible enough to accommodate commercial/industrial redevelopment of Zone 1. These communications from the LCEA are dated January 14, 2019; March 11, 2019; June 19, 2019; and September 23, 2019.

XI. AUTHORIZING SIGNATURE

Unless circumstances change as set forth in this ROD Amendment, the selected remedy is Modified Alternative 4B. If the City and ECHA transfer title of the parcels that comprise modified Zone 1 to an entity that intends to develop modified Zone 1 for commercial/industrial purposes and the City changes the zoning designation for modified Zone 1 from residential to

commercial/industrial, then EPA will issue an Explanation of Significant Difference, which confirms that the conditions have been met to trigger the contingent remedy, and select as the remedy Alternative 4A. EPA has determined that both Modified Alternative 4B (Excavation to 24" plus ICs) if the future use is residential and Alternative 4A (Excavation to 12" plus ICs) if the future use is commercial/industrial are protective of human health and the environment, compliant with all ARARs, and provide the best balance of the five balancing criteria. The State of Indiana concurs with EPA's determination. Therefore, I approve the issuance of this ROD Amendment for the U.S. Smelter and Lead Refinery, Inc. Superfund Site.



Andrew R. Wheeler
Administrator

3-24-2020
Date

Appendix A
Responsiveness Summary

**Responsiveness Summary
USS Lead Superfund Site
Introduction**

In November 2018, the U.S. Environmental Protection Agency issued a Proposed Plan for response actions to address soil contamination in Zone 1 of the USS Lead Superfund Site in East Chicago, Indiana. The Proposed Plan suggested modifications to the Record of Decision issued by EPA in 2012, in light of the changed conditions within Operable Unit 1, Zone 1 of the USS Lead Site. Issuance of the Proposed Plan was followed up with public meetings on November 29, 2018 and February 13, 2019, which coincided with an extended period during which EPA received comments from the public. Following the close of the public comment period, EPA reviewed the public comments and began to revise the Proposed Plan based upon comments received from the public. Shortly before issuing an Amendment to the 2012 Record of Decision, EPA was provided a Letter of Intent (LOI) executed on November 15, 2019, by the City of East Chicago, Indiana and Industrial Development Advantage, LLC. On December 16, 2019, EPA received a letter from the City of East Chicago to EPA. EPA has included the LOI and the letter from the City along with a series of communications from the Lake County Indiana Economic Alliance (LCEA) in the Administrative Record. These documents inform some of EPA's responses to public comments about the future use of Modified Zone 1 and the selection of the most appropriate remedy.

Comments and responses have been grouped into broad categories below. The placement of a particular comment into a particular category was done solely to facilitate review by the public by providing topical structure to the comments and responses. Placement of a comment into one category rather than another was not meant to convey that EPA was giving greater or lesser weight to any specific comment. All comments were carefully considered. Some members of the public also submitted general questions and observations about matters other than the selection of the remedy for Modified Zone 1. To the extent that these general questions and observations did not address the selection of a remedy for Modified Zone 1 of the USS Lead Superfund and were therefore beyond the scope of these proceedings, EPA did not include or address such comments or observations in this Responsiveness Summary.

Process

Comment: The public participation process for the proposed ROD Amendment has failed to afford all residents an opportunity to present oral comments.

Response: All community members have had the opportunity to provide written comments and many community members have had the opportunity to provide oral comments. EPA has met the public participation requirements set out in NCP 300.435(c)(2)(ii). The Agency issued a notice of availability of the proposed amendment to the ROD in the Northwest Indiana Times on November 11, 2018 and February 4, 2019. EPA provided a 120-day public comment period on the proposed amendment to the ROD. EPA posted the ROD Amendment on the USS Lead internet web page and placed copies of the ROD Amendment in all Administrative Record repositories. The public comment period ran from November 12, 2018 through March 13, 2019.

EPA held two public meetings to present EPA's preferred remedy and take public comments. These public hearings were held on November 29, 2018, and February 13, 2019. Transcripts of the meeting, including public comments, have been made public and are in the Administrative Record. Appendix A contains a Responsiveness Summary in which EPA has responded to both the written and verbal comments received at the two public meetings.

Comment: More public meetings are needed between residents and East Chicago city and school officials.

Response: EPA is not impeding public meetings between residents and East Chicago city and school officials. The National Contingency Plan (NCP), 40 C.F.R. Part 300, requires EPA to solicit public comment before selecting a final remedy. After issuing the Proposed Plan for modified Zone 1, EPA held two meetings with the public. The first meeting was on November 12, 2018, and the second on February 13, 2019. The public comment period on the Proposed Plan ran from November 12, 2018, through February 13, 2019. The comments received from the public, the local citizens groups, the City and potentially responsible parties have been compiled in this Responsiveness Summary, along with EPA's responses to the comments. EPA's responsibilities in selection of a remedy do not include the coordination of meetings between residents and local officials for purposes beyond those authorized by Superfund and its implementing regulations.

Comment: EPA should be responsive to the people of East Chicago and that simply leaving the decision regarding the future use of modified Zone 1 to the owners is totally insufficient.

Response: EPA does not make land use decisions. The mission of the EPA is to protect human health and the environment. Historically, land use decisions have been reserved to the owner of the property subject to local limitations such as zoning ordinances. Here, the properties that make up modified Zone 1 are owned by the East Chicago Housing Authority (ECHA) and City of East Chicago. Both ECHA and the City have the authority to determine the future use of the properties that comprise modified Zone 1. As recently as January 14, 2019, the City advised EPA that it intended the properties that comprise modified Zone 1 to be developed for residential purposes. On June 19, 2019, EPA received correspondence from the Lake County Economic Alliance stating that it is talking with persons interested in commercial redevelopment within modified Zone 1. On November 21, 2019, the Lake County Indiana Economic Alliance (LCEA) provided EPA with a LOI from Industrial Development Advantage, LLC (IDA) to the Mayor of the City of East Chicago, Indiana. The LOI outlined the business terms of IDA's proposal to buy most of modified Zone 1 from the City. On December 16, 2019, the City sent EPA a letter confirming that it had signed the LOI and that it now envisioned a logistics and warehousing campus within Modified Zone 1 and that it no longer anticipated residential usage within Modified Zone 1.

Comment: The contingency provisions within Alternative 4B allows EPA to circumvent further public input by allowing EPA to switch plans after the expiration of the comment deadline.

Response: The contingency provisions set forth in the Proposed Plan allowed the public to have input on the selection of a remedy for Modified Zone 1 by informing the public that a contingent remedy might be necessary because of a future change in land use. The Proposed Plan included a description of Alternative 4A (Excavation to 12” plus Institutional Controls), which is an appropriate remedy where the primary risks arise from contaminated soils and the end use is commercial/industrial. In the Proposed Plan and at the public meeting held on November 29, 2018, EPA reminded the public that there continued to be uncertainty about the future use of Modified Zone 1. Because of that uncertainty, EPA Remedial Project Manager, Tom Alcamo, urged the public to review and comment on all of the alternatives outlined in the Proposed Plan.

EPA has met the public participation requirements set out in the NCP, 40 C.F.R. Section 300.435(c)(2)(ii). The Agency issued a notice of availability of the proposed amendment to the ROD in the Northwest Indiana Times on November 11, 2018 and February 4, 2019. EPA provided a 120-day public comment period on the proposed amendment to the ROD. EPA posted the proposed ROD Amendment on the USS Lead internet web page and placed copies of the proposed ROD Amendment in all Administrative Record repositories. The public comment period ran from November 12, 2018 through March 13, 2019. EPA held two public meetings to present EPA’s preferred remedy and receive public comments. These public hearings were held on November 29, 2018, and February 13, 2019. Transcripts of the meeting, including public comments, have been made public and are in the Administrative Record. Appendix A contains a Responsiveness Summary in which EPA has responded to all oral and written comments.

At the time of the public comment period the preferred remedy set forth in the Proposed Plan was Alternative 4B. The NCP anticipated situations – like the situation here – in which EPA receives new information (proposed change in the future use of modified Zone 1) that significantly changes the basic features of the remedy after publication of the proposed plan and prior to adoption of the selected remedy in the [amended] record of decision.

The NCP provides EPA with two options: proceed without further public comment or proceed with additional public comment. If EPA determines that the changes to the final remedy could be reasonably anticipated by the public based on the alternatives and other information available in the proposed plan or the supporting analysis and information in the administrative record, EPA may revise the final remedy without seeking additional public comment on the revised remedy. See 300.430(f)(3)(ii)(A).

Here, the public could reasonably anticipate a potential for change in future use and modification of the remedy because of a change in the future use of modified Zone 1 based upon information in the Administrative Record. The Administrative Record includes: (1) the Proposed Plan (November 2018), which referenced the prospect of a change in future use and a revised remedy to accommodate a change in future use; (2) testimony at the public hearing (November 29, 2018), in which the Remedial Project Manager reminded the public that while the current use was residential, the future use could change to commercial/industrial; (3) an EPA-published Fact Sheet (November 2018), which discussed the consequences of a change in the future land use; and (4) an EPA-published Frequently Asked Questions publication (February 2019), which identified the

possibility that EPA would structure a ROD Amendment to allow for a second remedy that would be contingent on future conditions.

The Administrative Record also includes the following statements by the City of East Chicago: (1) a letter dated September 10, 2018, identifying the future use of Zone 1 as commercial/industrial; (2) a letter dated January 14, 2019, identifying the future use of Zone 1 as residential; (3) a Letter of Intent between the City and a developer for the commercial/industrial redevelopment of Zone 1 dated November 15, 2019; and (4) a letter dated December 16, 2019, identifying the future use of Zone 1 as commercial/industrial.

Finally, the Administrative Record includes communications from the Lake County Indiana Economic Alliance (LCEA) in support of a remedy decision flexible enough to accommodate commercial/industrial redevelopment of Zone 1. These communications from the LCEA are dated January 14, 2019; March 11, 2019; June 19, 2019; and September 23, 2019.

Comment: EPA should postpone the comment deadline and hold a second public meeting after the federal government shutdown ends.

Response: EPA extended the deadline for public comment to March 13, 2019 and held a second public meeting because of the partial government shutdown in late 2018 and early 2019.

Comment: EPA should not include in Alternative 4B a contingency plan in the event the intended land use is changed by local authorities from residential to commercial/industrial usage.

Response: EPA has issued a Record of Decision Amendment (ROD Amendment) that selects Modified Alternative 4B (Excavate to 24" plus ICs) as the remedy as long as Modified Zone 1 is developed for residential use. The ROD Amendment provides flexibility if the future land use changes to commercial/industrial. If the City changes the zoning designation for Modified Zone 1 from residential to commercial/industrial and the City and ECHA transfer title to the parcels of property that comprise Modified Zone 1, then EPA will issue an Explanation of Significant Differences (ESD). The ESD will identify the change in circumstances and change the selected remedy from Modified Alternative 4B to Alternative 4A (Excavation to 12" plus ICs). The ROD Amendment expresses no preference with respect to the future redevelopment of Modified Zone 1. By removing uncertainty and making clear to the City, ECHA, the public, prospective developers, and the potentially liable parties what the cleanup standards are for both residential and commercial/industrial redevelopment, EPA facilitates the return of Modified Zone 1 to productive use without undo delay.

Comment: EPA has failed to sufficiently solicit and incorporate community input regarding the members of the community's preferred future use of Zone 1.

Response: EPA's role is primarily to protect human health and the environment. While community acceptance is one criterion to consider in selecting a remedy, EPA cannot dictate to the property owners – the City and East Chicago Housing Authority - the preferred future use for

modified Zone 1. The community may choose to inform the property owners, the East Chicago Housing Authority and the City of East Chicago, of their views about the preferred future use of modified Zone 1. CERCLA does not authorize EPA to solicit and incorporate community input regarding the preferred future use of modified Zone 1. EPA is not authorized to make local land use decisions. Historically, land use decisions have been reserved to the owner of the property subject to local limitations such as zoning ordinances. Here, the properties that make up modified Zone 1 are owned by ECHA and the City of East Chicago. Both ECHA and the City have the authority to determine the future use of the properties that comprise modified Zone 1.

Comment: EPA will ignore the voice of the community and fail to consider meaningfully the community acceptance criterion if it selects remedy Alternative 4B (Excavate to 24" plus ICs). (Source, CAG, January 14, 2019).

Response: EPA has not ignored the voice of the community nor failed to meaningfully consider the community acceptance criterion in selecting Modified Alternative 4B (residential) or Alternative 4A (commercial/industrial). EPA did evaluate all the public comments and has crafted Modified Alternative 4B based on public comments. Modified Alternative 4B now requires as part of the remedy, management of soils below two feet during the excavation of footers, utility lines and a water main. When selecting a remedy, EPA is required to determine the overall protectiveness of a remedy after balancing the long-term effectiveness and permanence of the remedy, the reduction in toxicity, mobility of the contaminants, or volume through treatment, and short-term effectiveness. Modified Alternative 4B (residential) and Alternative 4A (commercial/industrial) are both cost-effective as their costs are proportional to their overall protectiveness. Modified Alternative 4B (residential) and Alternative 4A (commercial/industrial) are the best balance of these criteria. Community acceptance has been considered in the remedy selection, but community acceptance is not the sole criteria by which EPA selects a remedy.

Comment: EPA continues to downplay and dismiss the seriousness of the contamination in Zone 1.

Response: EPA does not now and has never downplayed or dismissed the seriousness of the contamination in modified Zone 1 or anywhere else within the USS Lead Superfund Site. In 2008, EPA sought to list the Site on the NPL and in 2009 succeeded in listing the Site on the NPL. Between 2009 and 2012, EPA committed federal funds to perform the Remedial Investigation and Feasibility Study for OU1. In 2012, EPA issued a ROD setting forth the remedy for OU1, Zones 1, 2 and 3. In 2013, EPA engaged the support of the DOJ to begin negotiations with potentially responsible parties to secure funding for work in OU1. In 2014, EPA entered a Consent Decree in federal district court that committed private parties to funding work in OU1. In 2015, EPA intensified its investigation of soils in OU1 in order to create design documents to direct excavation in hundreds of residential yards and Zone 1. In 2016, EPA met with the City to develop procedures so work could commence. When the City and ECHA elected to close the West Calumet Housing Complex, EPA undertook unprecedented efforts to clean the interiors of the residents' apartments including temporarily relocating the residents. In 2018, EPA developed a Proposed Plan for modified Zone 1, which accounted for the changed

circumstances in Zone 1. Now, in 2020, EPA is issuing an Amended ROD to address changed conditions in Modified Zone 1.

Comment: Increases in the volume of soil being removed and the expected increase in cost can be documented in an Explanation of Significant Differences (ESD) and does not require a ROD Amendment.

Response: CERCLA cleanups are governed by the regulations set forth in the National Contingency Plan (NCP). Section 300.435(c)(2) states that after the adoption of the ROD, if the remedial action or enforcement action taken, or the settlement or consent decree entered into, differs significantly from the remedy selected in the ROD . . . [EPA] . . . shall either (i) publish an explanation of significant differences when the differences significantly change but do not fundamentally alter the remedy selected in the ROD; or (ii) propose an amendment in the ROD if the differences fundamentally alter the basic features of the selected remedy with respect to scope, performance, or costs. EPA considers the closing and subsequent demolition of the West Calumet Housing Complex a fundamental change to the original ROD. While an ESD and a ROD Amendment share much in common, the ROD Amendment process includes much more robust public involvement provisions. See, 40 C.F.R. Sections 300.435(c)(ii)(A)-(H). The ROD Amendment process also involves use of the nine criteria to compare the original remedy and the new proposed remedies. See, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, Chapter 7*. In this instance, EPA wanted to involve the community as fully as possible in the remedy selection process. EPA also wanted to compare the selected remedies – Modified Alternative 4B and Alternative 4A - with other remedies favored by the public including excavation to groundwater and excavation to native sand. Relying on an Explanation of Significant Differences would not have allowed for such a comparison among potential remedies.

Comment: EPA should have evaluated a remedy that called for the placement of 12 inches of clean soil over Zone 1.

Response: Before selecting the remedy set forth in the Amended ROD, EPA considered ten possible actions (including a No Action alternative). Alternative 3A called for the placement of a 12” on-site soil cap over the entirety of modified Zone 1. EPA did not consider a remedy that called for excavation to a depth of only 12” though it did consider remedies that called for excavation to 24”, excavation to groundwater, and excavation to native sand. EPA rejected Alternative 3A (placement of a 12” soil cap) because it concluded that a 12-inch cap was not sufficiently protective if the future use was residential. The placement of 12 inches of clean soil over contaminated soil at depth offers some protection to human health but EPA has concluded that 12 inches of soil in an area designated for residential use is not sufficiently protective of human health nor is placement of only 12 inches of soil. Under a residential use scenario, it is foreseeable that some of the residents will be children and that children will dig to depths of greater than 12 inches bgs. It is also foreseeable that adults may garden and excavate or otherwise come into contact with soils at a depth of greater than 12 inches bgs. EPA selected Modified Alternative 4B (Excavation to 24” plus ICs) in part because EPA concluded that the placement of a 24” barrier between human receptors (future residents and their guests) was

sufficiently protective and that a 12” barrier was insufficiently protective. EPA has selected Alternative 4A (Excavation to 12” plus ICs) in the event the future use of Modified Zone 1 becomes commercial/industrial. EPA has concluded that for commercial/industrial use, Alternative 4A (Excavation to 12” plus ICs) is protective of human health and the environment, and cost-effective. EPA has also concluded that the public will be more accepting of a remedy that requires removal of source material in the top 12” than it would be of a remedy that left in place all contamination.

Comment: EPA should consider a 12 or 18-inch excavation in its evaluation of alternatives under a residential use scenario.

Response: In the 2012 ROD, EPA evaluated an array of options and selected a remedy that called for excavation to a depth of 24” bgs. EPA has implemented this remedy at over 500 residences in Zone 2 and Zone 3, combined. Excavating to a depth of 12” or 18” in Modified Zone 1 would be inconsistent with the remedy implemented in Zone 2 and Zone 3. As outlined above, while a 12” or 18” barrier provides some protection to human health and the environment, EPA deemed most appropriate a 24” barrier when the current or future use is residential. Within Modified Zone 1, soils are contaminated with lead and arsenic above actions levels at depth in the 18” to 24” horizon. EPA concluded that it was important to remove contaminated soils to a depth of 24” bgs. The placement of 12” of clean soil over contaminated soil at depth is protective of human health when the use is commercial/industrial, but EPA has concluded that excavation of 12” of soil is not sufficiently protective of human health within modified Zone 1 if the future use is residential. Under a residential use scenario, it is foreseeable that some of the residents will be children and that children will dig to depths of greater than 12” bgs. It is also foreseeable that adults may garden and excavate or otherwise come into contact with soils at a depth of greater than 12” bgs. Modified Alternative 4B, the chosen remedy if the future use remains residential, which requires excavation to a depth of 24” bgs, is consistent with the remedies implemented in OU1, Zones 2 and 3 (Excavation to 24” bgs plus ICs). Alternative 4A, which requires excavation to a depth of 12” bgs, will be protective of human health if the future use is commercial/industrial. Please see, ROD Amendment, Appendix D, for a summary of remedies at lead-contaminated residential sites.

The Selected Remedy

Application of Remedy Selection Criteria

Comment: The balancing criteria required by CERCLA and the National Contingency Plan (NCP) favor Alternative 4D (excavation of contaminated soil to native sands) over Alternative 4B (Excavation to 24” plus ICs).

Response: EPA has set forth in the ROD Amendment the basis for the selection of Modified Alternative 4B if the future use is residential and Alternative 4A if the future use is commercial/industrial. The manner in which EPA applied the balancing criteria is described in the ROD Amendment, Section V. Evaluation of Alternatives. Efforts to summarize or

paraphrase the ROD Amendment here in this Responsiveness Summary may not provide a clear and complete explanation of EPA's decision-making process.

Comment: EPA's selection of Alternative 4B (Excavation to 24" plus ICs) represents a preference for polluters over impacted people and the environment.

Response: EPA's selection of Modified Alternative 4B if the future use is residential and Alternative 4A if the future use is commercial/industrial does not represent a preference for polluters over impacted people and the environment. Modified Alternative 4B (Excavation to 24" plus ICs) and Alternative 4A (Excavation to 12" plus ICs) are both protective of human health and the environment and cost-effective remedies. Selection of these remedies reflects a sound balance of the nine criteria EPA is required to consider under the NCP. For a more complete description of the basis for the selection of Modified Alternative 4B and Alternative 4A, please see the ROD Amendment.

Finally, the NCP requires EPA to select a remedy that protects public health and the environment, complies with ARARs, and is a cost-effective remedy. A remedy is cost-effective if its costs are proportional to its overall protectiveness under balancing criteria set out in the NCP.

Comment: EPA's preferred remedy does not meet the threshold criteria of adequately protecting human health and the environment.

Response: EPA's preferred remedy – Modified Alternative 4B (residential) and Alternative 4A (commercial/industrial) - meets the threshold criteria of adequately protecting human health and the environment. The term "threshold criteria" can be found at 40 C.F.R. 300.430(f)(i)(A). This section states, "Overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived) are threshold requirements that each alternative must meet in order to be eligible for selection." EPA's preferred remedies, Modified Alternative 4B (Excavation to 24" plus ICs) and Alternative 4A (Excavation to 12" plus ICs), meet the threshold criteria by adequately protecting human health and the environment while complying with ARARs. For a more complete discussion of the manner in which EPA evaluated the threshold criteria, please see the ROD Amendment.

Comment: The balancing criteria are best met here by selecting Alternative 4D.

Response: EPA has concluded that the balancing criteria are best met by selecting Modified Alternative 4B (Excavation to 24" plus ICs) if the future use is residential and, if the future use is commercial/industrial, Alternative 4A (Excavation to 12" plus ICs). The term "primary balancing criteria" is found at 40 C.F.R. 300.430(f)(i)(B). This section reads, "The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost." EPA has concluded that for residential usage the balancing criteria considered collectively favor Modified Alternative 4B (Excavation to 24" plus ICs) over Alternative 4D (Excavation to native sand). Alternative 4D does not provide significantly more protectiveness, long term effectiveness and permanence than Modified Alternative 4B. The reduction of toxicity and mobility in the

contaminants disposed off-site are the same in Alternative 4D as in Modified Alternative 4B while the remaining contaminated soil at depth does not have an exposure pathway and its nature not mobile. The volume of contaminants remaining at the site will be greater but not a source of exposure due to its depth and controls under the remedy. Alternative 4D's implementability will be more difficult and costs greater than Modified Alternative 4B. Alternative 4D does not provide significantly more protectiveness while its costs are much higher than Modified Alternative 4B and not proportional its overall protectiveness. For a more complete discussion of the manner in which EPA evaluated the balancing criteria, please see the ROD Amendment. EPA has concluded that for commercial/industrial usage the balancing criteria considered collectively favor Alternative 4A.

Comment: EPA should accord little weight to the criteria of Implementability.

Response: The NCP requires EPA to consider and balance the criteria of implementability against other criteria. CERCLA Section 121 and the NCP at 40 C.F.R. 300.430 dictate how EPA must select a remedy. EPA is directed to consider implementability as one of the five balancing criteria. Here, it is an important evaluation criterion because it is difficult to implement Alternative 4D (Excavate to native sand). For a more complete discussion of the manner in which EPA evaluated the criteria of implementability, please see the ROD Amendment.

Comment: EPA has relied on two flawed assumptions when calculating the cost differential between Alternative 4B and Alternative 4D.

Response: EPA did not rely on flawed assumptions when calculating the costs associated with Modified Alternative 4B and Alternative 4D. The difficulty excavating at depth in Alternative 4D requires the use of a larger contingency (30%) than Modified Alternative 4B, which has a 10% contingency. EPA has used cost data from the residential cleanup in Zones 2 and 3 as a basis for justifying a smaller contingency. The high level of uncertainty involved with excavating at depth and excavating in groundwater requires a larger contingency. Even if EPA used a similar contingency for Alternative 4D, the cost difference would still be substantial. However, to make the cost comparison more accurate, between the close of the public comment period and the issuance of the ROD Amendment, EPA estimated the cost of managing soils at depths below 24" during residential redevelopment of Modified Zone 1. EPA found that soil management during residential construction would add approximately 7% to the cost of Modified Alternative 4B. The costs calculated for Modified Alternative 4B and alternative 4D follow EPA guidance and are within the +50% to -30% cost range for a Feasibility Study. For a more complete discussion of the manner in which EPA calculated the cost differential between Modified Alternative 4B and Alternative 4D, please see the ROD Amendment.

Comment: EPA ignored the long-term, saved costs associated with Alternative 4D.

Response: EPA did not ignore the long-term, saved costs associated with Alternative 4D in evaluating all the alternatives. EPA added to Modified Alternative 4B the costs associated with the management of contaminated soils below two feet in connection with the excavation of footers, utility lines and a water main. This added approximately 7% to the costs associated with

Alternative 4B. Even after adding in these costs, Modified Alternative 4B would be approximately \$19,730,000 million less expensive than Alternative 4D.

Comment: Alternative 4D (Excavation to native sand) will be less expensive in the long run than Modified Alternative 4B (Excavation to 24” plus ICs).

Response: EPA has concluded that the overall cost of Modified Alternative 4B is likely to be significantly less expensive in the long run than Alternative 4D. EPA added the costs of soil management for residential redevelopment. The addition of soil management for the construction of a residential complex would add approximately 7% to the cost. With the addition of the cost of soil management during redevelopment to Modified Alternative 4B, Modified Alternative 4B is still approximately \$19,730,000 million less expensive than Alternative 4D.

Comment : Citizens, community leaders and organizations in and around East Chicago are very concerned about the selection of Modified Alternative 4B (Excavation to a depth of 24” plus ICs) because it lacks sustainable protectiveness, permanence, and community acceptance. EPA should use this opportunity to do the following:

- a. Overcome the belief many have that choosing Modified Alternative 4B, the EPA is expressing to the community EPA values the polluters’ interests more than the public health and wellbeing of the residents.
- b. Clean the site in a way that will make it safe for future use by selecting the most protective remedy – option 4D (Excavation to native sand) - and completely removing all contaminated soil. Only 4D permanently protects the community.
- c. The selection of Modified Alternative 4B seems to shift the costs (specifically the long-term costs) from the Responsible Parties to the community, both residents and the city. As part of CERCLA, the EPA identified the responsible parties who are responsible for the true costs of complete and total cleanup, however by proposing Modified Alternative 4B, you are reducing their costs and increasing the future costs to the home owners and future home builders and the city.
- d. The old Carrie Gosch Elementary School property needs to be included in the 4D remediation with the rest of Zone 1.
- e. The EPA has inadequately at best, engaged the community or local government about potential ICs as recommended in your guidance. The EPA needs to show the community they truly care about its options and engage with the community at a higher more open and transparent level.
- f. The EPA should address groundwater contamination now. By only going down 2 feet, EPA is essentially ignoring groundwater contamination, vapors and related; and insuring that future contamination will return as it already has in numerous lots you have “cleaned” in Zones 2 and 3.
- g. The EPA has disregarded its own guidance, *Institutional Controls: A Site Manager’s Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*, which essentially tells EPA to state clearly which IC’s it would use, which ones would be required of the residents, city or developers, and

what EPA's clearly stated objectives are and lack of full disclosure to the people most impacted.

- h. The EPA's application of the residential standard of 24 inches is totally inappropriate in the USS Lead Superfund site, specifically Zone 1 at this time, due to the issues the EPA has faced in their cleanup of properties in Zones 2 and 3 not being completely cleaned and experiencing additional contamination after the cleanup. The 24 inches is making some egregious assumptions including no one will need to dig below 24 inches, no accounting for groundwater recontamination of the soil, among others including the strong potential for future costs which will need to be placed in the laps of residents, developers and local government.
- i. The past and on-going health issues of the residents, including the children and seniors will not be addressed with the cursory 24-inch residential standard since it has been shown in numerous ways to not be sufficient depth for total cleanup. ATSDR and EPA should be very concerned about the impact on people as well as the environment.
- j. Alternative 4D (Excavation to native sand) is the best alternative, regardless of issues of money.

Response: By selecting Modified Alternative 4B (Excavation to 24" plus ICs) if the future use is residential and Alternative 4A if the future use is commercial, EPA is not expressing to the community that it values the polluters' interests more than the public health and wellbeing of the community. EPA has selected Modified Alternative 4B and Alternative 4A in accordance with CERCLA and, to the extent practicable, the NCP. (See Section 121(a) of CERCLA.) As set forth more fully in the ROD Amendment, EPA uses nine criteria to evaluate the different remedial alternatives individually and against each other in order to select a remedy. (See also, 40 C.F.R. Section 300.430(e)(9)(iii).) EPA has concluded that Modified Alternative 4B (Excavation to 24" plus ICs) if the future use is residential and Alternative 4A if the future use is commercial/industrial are the remedies that balance best the nine criteria. For a more complete discussion of the manner in which EPA selected Modified Alternative 4B and Alternative 4A, please see the full ROD Amendment.

EPA must ensure that it can demonstrate, on the administrative record, that its selection of the response action is consistent with the requirements of Section 121 of CERCLA and the NCP, to the extent practicable. The NCP uses nine criteria to select a remedy, which are categorized into three groups: Threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria are protection of public health and the environment and compliance with Applicable, or Relevant and Appropriate Requirements (ARARS) unless the ARARs are other waived. Threshold criteria must be met in order for any alternative remedy to be selected as a site remedy. In addition to considering the nine-criteria (including meeting the threshold criteria), a selected remedy must be cost-effective. A cost-effective remedy is determined and selected by evaluating information on an alternative against three of the five balancing criteria to determine overall effectiveness: long-term effectiveness and permanence; reduction of toxicity, or volume through treatment; and short-term effectiveness. A remedy is considered protective if its costs are proportional to its overall effectiveness. A remedy that is more expensive but not proportionately

more protective is subject to attack as being arbitrary and capricious or otherwise not in accordance with law.

Contaminated soils at the former Carrie Gosch School have been excavated and disposed of off-site. The former Carrie Gosch School has been cleaned up consistent with the terms of the 2012 Record of Decision and the federal district court-approved 2014 Consent Decree between EPA and certain private parties. EPA has removed all soils within the top 24” bgs that contained lead or arsenic above the cleanup levels and replaced the contaminated soil with clean soil. The excavated area was backfilled and sodded or reseeded.

EPA has investigated thoroughly conditions at the former Carrie Gosch School. During the RI, 20 samples were analyzed near the Carrie Gosch School. Also, during the pre-design investigation in 2015, 20 samples were analyzed and each of those 20 samples had 5 locations composited into one sample. Based on the sampling results, EPA discovered soils above action levels in one quadrant at a depth of 18” to 24” bgs. (See ROD, Section 2.8.) Approximately 3,600 cubic yards of soil from this area, which contained concentrations of lead or arsenic above the action levels, was excavated and disposed of off-site. The excavation was backfilled, contaminated soils were replaced with clean soil. The excavated area has been sodded or reseeded. EPA has concluded that no further investigation is required.

Neither the demolition of the West Calumet Housing Complex nor the soil excavation of nearby homes caused further contamination of the Carrie Gosch School yard. Data obtained and reviewed by EPA during the monitoring of the demolition did not show unacceptable levels of lead or arsenic migrating off-site and contaminating the Carrie Gosch school area. EPA and the parties doing work pursuant to the Consent Decree and various administrative orders conducted air-monitoring and reviewed data generated by others during the residential cleanups. For a description of the dust control measures employed during demolition, please see the Remedial Action Completion Report prepared by Amereco, Inc. dated July 24, 2019.

Institutional Controls are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. ICs are divided into four categories: proprietary controls, governmental controls, informational devices, and enforcement controls with enforcement and permit tools with institutional controls components. EPA has followed the institutional controls guidance and will prepare and implement specific institutional controls for the Site in the future. In response to public comments and concerns regarding the need to and cost of managing contaminated soil during redevelopment, EPA has modified the scope and costs of the Modified Alternative 4B (Excavation to a depth of 24” plus ICs) and Alternative 4C (Excavation to groundwater) to take into consideration the costs of managing soils during redevelopment.

EPA is currently conducting a Remedial Investigation and Feasibility Study (RI/FS). The focus of the RI/FS is on groundwater beneath the entire USS Lead Superfund Site. Groundwater monitoring wells were installed in December 2018 and sampled in December 2018, March 2019, June 2019 and August 2019. The RI/FS will provide detailed information about the extent of the

contamination of groundwater beneath the Site. While awaiting the results of the RI, it is worth noting the following: all residences within the USS Lead Superfund Site receive drinking water from the City of East Chicago, no one uses private wells to supply drinking water.

EPA continues to investigate concerns related to basement seepage of groundwater by evaluating arsenic dust concentrations in basement dust samples. At this time, EPA is not aware of any on-site residences where a site-related risk of seepage exists in basements and the resident is actively living in the basement.

The commenter's statement that properties that EPA has cleaned up are being re-contaminated by contact with contaminated groundwater is not accurate. EPA has no data that shows contaminated groundwater is contaminating soils within 12" or 24" of the ground surface.

Comment: Alternative 4B fails to eliminate the environmental and human health threats posed by all the known contaminants present with the USS Lead Superfund site by:

- a. Leaving vast quantities of toxic wastes, known sub-surface contamination and contaminated debris, and contaminated in place in the Calumet neighborhood of East Chicago, Indiana. The commenter references the Amereco Engineering Report, dated February 15, 2017 that states based on the findings of the subsurface investigation, exposure pathways were identified on-site. Specific hazards identified include subsurface soils, groundwater and soil vapors.
- b. Further spreading 4,000 truckloads of toxic contamination to another community for land disposal – what community will be the recipient of these toxic and contaminated wastes? – will this land disposal site be a future Superfund site?
- c. Squandering millions of Responsible Party and US Taxpayers dollars on an impermanent cleanup that fails to achieve a permanent solution using alternative treatment technologies to the maximum extent practicable with reductions in volumes, mobility and toxicity of toxic and hazardous wastes.
- d. Spending millions of dollars to throw away valuable and strategic resources including antimony, arsenic, cadmium, chromium, copper, gold, iron, lead, manganese, selenium, silver, tin, zinc, beryllium, dysprosium, erbium, europium, gallium, gadolinium, hafnium, neodymium, platinum, praseodymium and tellurium.

Response: Modified Alternative 4B (Excavation to 24" plus ICs) is protective of human health and the environment if the future use is residential and will result in the removal of approximately 270,000 tons of contaminated soils, approximately 130,000 tons of which will likely be classified as a hazardous waste. Alternative 4A (Excavation to 12" plus ICs) is protective of human health and the environment if the future use is commercial/industrial and will result in the removal of approximately 135,000 tons of contaminated soils. For a more complete discussion of the manner in which EPA evaluated the threshold criteria, please see the ROD Amendment.

Comment: The building code and utility installation will require digging deeper than two feet and will disturb the installed barrier and expose unremediated subsurface contamination.

Response: The Indiana Building Code requires foundations to be at least 36” bgs. Construction of residences and installation of utilities will require excavation at depths greater than 24” bgs. Modified Alternative 4B has been altered on the basis of public comments to require management of contaminated soils during residential development at depths below two feet to be included as part of the remedy set forth in the Amended ROD. In Appendix B, EPA calculated the costs associated with managing contaminated soil below two feet at a hypothetical residential redevelopment within modified Zone 1. If modified Zone 1 is developed for residential usage, the management of contaminated soils below 24” will be added onto the costs associated with EPA’s chosen remedy. See, Modified Alternative 4B.

Comment: Certain kinds of actions are inconsistent with any permanent cleanup required under SARA such as any form of land disposal or containment and any use of engineering controls or institutional controls. All landfills leak over time.

Response: EPA defines the criteria of long-term effectiveness and permanence as the ability of an alternative to maintain protection of human health and the environment over time. EPA’s chosen alternatives address the unacceptable risk currently posed by the presence of lead and arsenic contaminated soils by removing either 12” or 24” of contaminated soil and disposing of the contaminated soil in an approved landfill, treating and disposing of contaminated soil that fails the TCLP test, replacing the excavated soil with clean soil, installation of a visible barrier at 12” or 24”, and institutional controls. EPA also is requiring that contaminated soils be properly managed during any residential or commercial/industrial development. Licensed landfills are lined to prevent leachate from leaving the landfill cell and contaminating soils or groundwater beneath the landfill. Licensed landfills are also monitored to detect leaks. Operators are required to mitigate the impact of leaks, if any. EPA is required to follow the CERCLA Off-Site Rule (OSR) for any off-site disposal. See Section 121(d)(3) of CERCLA. The OSR requires that CERCLA wastes be placed only in a facility operating in compliance with RCRA or other applicable Federal or State requirements. Federal law prohibits the transfers of CERCLA wastes to a land disposal facility that is releasing contaminants into the environment. These principles are interpreted in the OSR set forth at 40 CFR 300.440. Furthermore, lead and arsenic are not highly mobile but rather adsorb to molecules of surrounding substances. See, the Remedial Investigation, Section 6.4, Expected Fate and Transport. Finally, lead and arsenic contaminated soils that fail the TCLP will be treated first to render immobile the lead and arsenic in the contaminated soils.

Comment: EPA is attempting to justify an impermanent and incomplete cleanup balanced on its quickness, lower costs and administrative convenience rather than its permanence and reduction of toxicity, volume and mobility. The proposed remedy violates the NCP as well as federal and state requirements under RCRA, CERCLA, SARA and internal EPA guidance.

Response: EPA is not attempting to justify an impermanent or incomplete cleanup. The proposed remedies are in accordance with the NCP as well as federal and state requirements under RCRA, CERCLA, SARA and internal EPA guidance. (See Section 121(a) of CERCLA.) EPA uses nine criteria to evaluate remedies. One criterion is the extent to which a remedy reduces toxicity, volume and mobility and long-term effectiveness and permeance; this is not the sole criteria. Quickness and administrative convenience are not criteria that EPA uses to evaluate a remedy. Cost is one of the 5 balancing criteria EPA uses to evaluate Alternatives. EPA has chosen remedies for residential or future commercial/industrial use that balance best the nine criteria. EPA has followed CERCLA and SARA, including the NCP, along with all ARARs.

Comment: The USS Lead ROD Amendment should not be exempt from the National Remedy Review Board due to the large increase in costs over time.

Response: It is appropriate that EPA exempted the USS Lead ROD Amendment from the National Remedy Review Board (NRRB). The NRRB is a peer review group that reviews proposed Superfund cleanup decisions that meet cost-based review criteria to make sure the decisions are consistent with Superfund law, regulations and guidance. The NRRB typically reviews remedial actions that cost more than \$25 million. A remedy decision may be deemed exempt from review by the NRRB. The ROD issued by EPA in 2012 was exempted from review by the NRRB. The NRRB exempted the USS Lead remedy selection process from review because the remedies for residential lead contamination are consistent across the country and typically involve excavation and off-site disposal of contaminated soils, rather than novel treatment technologies. The NRRB will not review this Amended ROD. Such a review is unnecessary because the Amended ROD has been reviewed by EPA at the highest levels. Former EPA Administrator Scott Pruitt placed the USS Lead site on his 10 sites targeted for immediate and intense attention. Current Administrator Wheeler has retained the USS Lead Site as a high priority. This list was created in direct response to the *Superfund Task Force Recommendations*, issued July 25, 2017. EPA Region V has briefed Administrator Wheeler on the Zone 1 Proposed Plan and the Region has been in frequent contact with EPA Headquarters on the Zone 1 remedy.

Comment: It is inconsistent with EPA guidance and prior Site documents to state that 12 inches of clean soil is not protective of human health under a residential use.

Response: The placement of 12" of clean soil over contaminated soil at depth is protective of human health under a commercial/industrial use scenario. EPA has concluded that 12" of soil is not sufficiently protective of human health within modified Zone 1 because of the concentrations of arsenic and lead at depths greater than 12" bgs. Under a residential use scenario, it is foreseeable that some of the residents will be children and that children will dig to depths of greater than 12" bgs. It is also foreseeable that adults may garden and excavate or otherwise come into contact with soils at a depth of greater than 12" bgs. Modified Alternative 4B, which is the chosen remedy for a residential use scenario and requires excavation to a depth of 24" bgs, is consistent with the remedies implemented in OU1, Zones 2 and 3 (excavation to a depth of 24" bgs). Alternative 4A, which is the chosen remedy for a commercial/industrial use scenario and

requires excavation to a depth of 12” bgs, is protective of human health. Please see, ROD Amendment, Appendix D, for a summary of remedies at lead-contaminated residential sites.

Comment: EPA’s determination that all soil in the top 24-inches of the West Calumet Housing Complex (WCHC), Goodman Park and the Utility Corridor should be removed is not supported by the data.

Response: Based on both the RI sampling and Pre-design sampling, EPA currently believes that virtually all soil within the top 12” and even the top 24” within modified Zone 1 contains lead or arsenic above the action levels of 400 ppm for lead and 26/30 ppm for arsenic. It may be most cost effective to forego costly remedial design work and simply excavate the top 12” (commercial/industrial scenario) or 24” (residential scenario) within modified Zone 1. However, if a person commits to implement the remedy set forth in the Amended ROD and elects to do additional sampling as part of remedial design work and identifies areas within modified Zone 1 that are 12” or 24” bgs but do not exceed the action levels for lead or arsenic, then the person may leave these soils in place if they concluded that it was cost-effective to do so.

Comment: Alternative 4B (Excavating to a depth of 24” plus ICs) does not protect public health or the environment.

Response: Public health and the environment will be safeguarded by the implementation of Modified Alternative 4B (residential use scenario) or Alternative 4A (commercial/industrial use scenario). The threats posed to human health by lead and arsenic contaminated soils in modified Zone 1 arise from the threat of ingesting, inhaling or having direct contact with contaminated soils. The remedies selected by EPA for modified Zone 1 – Modified Alternative 4B (Excavation to 24” plus ICs) or Alternative 4A (Excavation to 12” plus ICs) – reduces the threat to human health by excavating contaminated soils to a depth of 12” or 24”; backfilling the excavation with clean fill; and placing sod or growing grass on top of the fill. Contaminated soils at a depth of greater than 12” or 24” will not pose a risk to human health or the environment unless disturbed by human activity. Human activity will be restricted by ICs to prevent exposure at depth. Unless disturbed by human activity, no one will ingest, inhale or come into direct contact with contaminated soils left at depth.

Comment: Alternative 4B makes future home building virtually impossible.

Response: Modified Alternative 4B will facilitate future residential development. During future construction or utility repair work within Modified Zone 1, workers and other persons may come into direct contact with contaminated soils and be at risk of ingesting or inhaling soil particles contaminated with lead or arsenic. Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depth to prepare and implement a Soil Management Plan. The purpose of the Soil Management Plan is to identify best practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material. The cost of developing and implementing the Soil Management Plan is an element of the work required by Modified Alternative 4B. ICs for Modified Alternative 4B may include an Environmental Restrictive Covenant (ERC) deed restriction, which prohibits the

installation of drinking water wells or the disturbance of soils at a depth of greater than 24” below ground surface (bgs) unless in compliance with an approved Soil Management Plan. EPA’s selected remedy for residential redevelopment is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in Modified Alternative 4B, if implemented, should facilitate the successful residential redevelopment of modified Zone 1.

Following the close of the public comment period and review of comments received, EPA has reevaluated Modified Alternative 4B and Alternative 4C based on public comments concerning residential redevelopment and the management of soils below two feet and below groundwater. EPA calculated the costs to manage contaminated soils that will remain at depth after the remedy has been implemented (top 24” is clean soil). In Appendix B, EPA calculated costs and based upon a hypothetical residential development that included 184 homes²¹. The building code for the State of Indiana requires the use of 36-inch footers. For purposes of calculating costs, EPA assumed that all the soils excavated during redevelopment work would be contaminated and would be disposed of off-site in an approved landfill.

The following describe the assumptions used to calculate the costs to manage contaminated soil that will remain at depth after an excavation remedy has been implemented:

- The installation of footers for the 184 properties would be to a depth of 36”, 1,850 feet long and 1-foot wide.
- Utility service lines would be required, and they would be to a depth of 36”, 36” wide and 60 feet long for each of the 184 properties.
- Gas and electric mains would need to be installed and those would be 48” below ground surface.
- A new water main would be required and would be 72” below ground surface.

In Appendix B, EPA has calculated detailed costs for institutional controls to manage contaminated soils through redevelopment for Modified Alternative 4B and Alternative 4C. Costs associated to manage soils for redevelopment is not necessary for Alternative 4D because Alternative 4D requires excavation of all contaminated soils. The costs associated with Modified Alternative 4B went from \$26.5 million to \$28.80 million with the addition of costs to manage contaminated soils during residential redevelopment. This cost increase adds approximately 7% to the total cost of the remedy. For Alternative 4C, EPA has estimated that the original remedy cost is approximately \$40.22 million; costs of managing soils during redevelopment would add approximately \$43,436 to the total cost of the remedy, an amount less than a 1% of the original remedy cost. The estimated cost of Modified Alternative 4B, even including the cost of managing soils during redevelopment, is estimated to be more than \$11,420,000 less than the cost of Alternative 4C.

EPA has estimated the cost of excavating and disposing of off-site all soils within Modified Zone 1 to a depth of 36” bgs in response to certain public comments that have been received. The costs

²¹ At the former West Calumet Housing Complex, 92 homes were present on one-half of the site and this figure was doubled to obtain 184 homes.

would be about \$34,680,000. Excavation of all soils to a depth of 36” bgs would allow a person to install footers anywhere within modified Zone 1. Excavation to a depth of 36” bgs would be approximately \$5,880,000 more expensive than excavation to a depth of 24” bgs with accompanying ICs that would require designed excavations for the installation of footers once a developer has prepared a final development plan for modified Zone 1. Digging to a depth of 36” bgs rather than to a depth of 24” bgs does not differ significantly in terms of long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; or short-term effectiveness. It is possible that in excavating to a depth of 36” bgs, a person might encounter groundwater, which a person would not expect to encounter if digging to only 24” bgs. Encountering groundwater would render digging to a depth of 36” bgs more difficult to implement. Excavation to either 36” bgs or 24” bgs when coupled with ICs would ensure that both approaches complied with ARARs. EPA has concluded that excavation to a depth of 24” bgs is protective of human health and the environment for residential use, complies with ARARs, and is a cost-effective remedial action. The extra cost associated with digging uniformly to a depth of 36” bgs would not result in a proportional increase in the protectiveness of the remedy.

In August 2003, EPA issued the *Superfund Lead-Contaminated Residential Sites Handbook* (OSWER 9285.7-50). The purpose of the handbook was to “promote a nationally consistent decision-making process for assessing and managing risks associated with lead-contaminated residential sites across the country.” See, page 1. In Section 6.3 Interpreting Sampling Results, EPA observed, “The goal should be to remove all contaminated soil or provide a 12” clean soil barrier.” See, page 39. The remedy set forth in the ROD Amendment will provide a 24” clean soil barrier.

In response to public comments, EPA has revised Alternative 4B to include costs associated with the management of soils below 24” if residential development occurs. By capturing these costs and including them in the cost of Modified Alternative 4B, EPA has facilitated the residential redevelopment of portions of modified Zone 1 without burdening the City of East Chicago, Indiana or the East Chicago Housing Authority.

Comment: EPA has not selected the most protective cleanup plan and EPA should adopt the “most protective remedy.”

Response: EPA has selected Modified Alternative 4B (Excavation to 24” with ICs) if the end use remains residential and Alternative 4A if the end use becomes commercial/industrial. Modified Alternative 4B and Alternative 4A are both protective of human health and the environment and consistent with the remedy selection provisions of CERCLA and the NCP. CERCLA authorizes EPA to take response actions to reduce threats posed to human health and the environment. Section 121(b) provides, “The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.” Section 121(d)(1) provides, “Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human

health and the environment.” The selected remedies, Modified Alternative 4B and Alternative 4A, meet these standards. For a complete discussion of how and why EPA selected Modified Alternative 4B (24” excavation plus ICs) and Alternative 4A, please see the ROD Amendment.

Comment: There is little difference among the remedies along the dimensions of cost and implementability.

Response: There are significant differences among the remedies along the dimensions of cost and implementability. The remedies included among the evaluated alternatives differ in terms of both cost and implementability. Modified Alternative 4B (Excavate to 24” plus ICs) is estimated to cost \$28,800,000. Alternative 4D (Excavate to native sand) is estimated to cost \$48,530,000, more than \$19,730,000 more than Modified Alternative 4B. Modified Alternative 4B can be implemented in an estimated 7 months. Alternative 4D can be implemented in an estimated 14 months, twice as long as Modified Alternative 4B. The reason it would take longer to implement Alternative 4D is because Alternative 4D is more difficult to implement. Digging to native sand requires digging through soils saturated with groundwater. EPA expects that sheet piling will be required to stabilize the deeper excavations and allow for groundwater control, including treatment of groundwater before discharge to the local sewer system. These additional measures make Alternative 4D much more difficult to implement.

Comment: EPA has chosen Alternative 4B principally based on the balancing factor of cost.

Response: EPA has not chosen Modified Alternative 4B (residential) and Alternative 4A (commercial/industrial) based principally on the balancing factor of cost. As set forth more fully in the Amended ROD, EPA uses nine criteria to evaluate the different remedial alternatives individually and against each other in order to select a remedy. See also, 40 C.F.R. Section 300.430(e)(9)(iii). EPA has concluded that Modified Alternative 4B (Excavation to 24” plus ICs) and Alternative 4A are the remedies that balance best the nine criteria. Cost is only one of the nine criteria. EPA did not select Modified Alternative 4B simply because it costs approximately \$20 million less than Alternative 4D (Excavation to native sand plus ICs). EPA did, however, consider whether the expenditure of an additional approximately \$19,730,000 would result in a remedy that was more protective of human health than Modified Alternative 4B (Excavation to 24” plus ICs). As set forth above, EPA concluded that while considerably more expensive Alternative 4D would not be significantly more protective than Modified Alternative 4B. Modified Alternative 4B and Alternative 4D reduce the threat to human health by greatly reducing the likelihood that a person will ingest, inhale or come into direct contact with contaminated soil.

In selecting a remedy, EPA must not act arbitrarily or capriciously. If EPA selects a remedy that is arbitrary and capricious or otherwise not in accordance with law, a person who is liable for response costs may recover its reasonable costs of response to the extent that it can demonstrate, on the administrative record, that the EPA’s decision in selecting the response action ordered was arbitrary and capricious or was otherwise not in accordance with law. EPA is required by law to balance not only the desires of the impacted community but also must ensure that it can demonstrate, on the administrative record, that the EPA’s decision in selecting the response

action is not arbitrary and capricious or otherwise not in accordance with law. See, CERCLA Section 106(b)(2)(D). A remedy that is more expensive but not proportionately more protective is subject to attack as being arbitrary and capricious or otherwise not in accordance with law.

Comment: The remedy set forth in Modified Alternative 4B (Excavation to 24” plus ICs) is not appropriate for the following reasons: (a) the presence of lead and arsenic at depths below 24” in concentrations above the action levels, (b) the absence of residential housing at the time of the cleanup, and (c) plans to build new residential structures after remediation.

Response: The remedies set forth in Modified Alternative 4B (Excavation to 24” plus ICs) and Alternative 4A (Excavation to 12” plus ICs) are appropriate notwithstanding (a) the presence of lead and arsenic at depths below 24” in concentrations above the action levels, (b) the absence of residential housing at the time of cleanup, and (c) plans to build new residential structures after remediation. CERCLA authorizes EPA to take response actions to reduce threats posed to human health and the environment. Section 121(b) provides, “The President shall select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.” Section 121(d)(1) provides, “Remedial actions selected under this section or otherwise required or agreed to by the President under this chapter shall attain a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment.” The selected remedies, Modified Alternative 4B and Alternative 4A, meet these standards.

Comment: The impact of more extreme weather on the fragile ecosystem under Zone 1 threatens to overwhelm the 24” barrier and expose contaminated soil and mobilize contaminants.

Response: Extreme weather events are unlikely to overwhelm the 24” barrier and expose contaminated soil or mobilize contaminants. The 24” barrier will include top soil and be covered in grass. The properties within Modified Zone 1 are level. There is not a dramatic slope to cause erosion of the soil cover. If the cap were to erode over time, EPA would identify such erosion in the course of the periodic, statutorily mandated reviews of the remedy. If the cap has eroded and the erosion poses a threat to human health and the environment, steps will be taken to mitigate the risk. Because contaminants remain in place, EPA will review the effectiveness of the remedy every five years. If the cap needs to be repaired or replaced, it will be repaired or replaced. Mobilization of contaminants is also unlikely. Arsenic and lead are known to adsorb to soils. Neither arsenic nor lead readily partitions away from soil once it has adsorbed to a soil molecule. In the Remedial Investigation EPA concluded, “lead will adsorb to soil particles and remain fairly immobile. See, RI, Section 6.4.1. EPA also concluded, “Arsenic will tend to be bound to soil and clay particles at the USS Lead Site and will be only slightly more mobile than lead.” See, RI, Section 6.4.2.

Community Acceptance of the Selected Remedy

Comment: EPA’s preferred remedy, Alternative 4D, lacks community acceptance.

Response: To the extent there is a lack of community acceptance, the lack of community acceptance appears to be based upon (1) a misunderstanding of the risk posed by contaminated soils at depth and (2) a concern that the cost of addressing contaminated soils during redevelopment will be borne by the community. In response to this concern, EPA has revised Alternative 4B to ensure that the costs of addressing contaminated soils during residential redevelopment will not be borne by the community. EPA is hopeful that this response to public comments will help the public understand that Modified Alternative 4B (Excavation to 24” plus ICs) is protective of human health and enable the community to embrace this remedy if the end use remains residential.

Community acceptance and State acceptance are classified as modifying criteria. See, 40 C.F.R. 300.430(f)(i)(c). Regarding acceptance of the remedy by the State of Indiana, IDEM has provided EPA with a letter stating that it concurs in EPA’s selection of Alternative 4A (Excavation to 12” plus ICs) and Modified Alternative 4B (Excavation to 24” plus ICs). Comments received from residents and the Mayor of East Chicago in January 2019²², Indiana express a preference for Alternative 4D (Excavation to native sand). The preference for Alternative 4D appears to be based on two factors: (1) the perception that the removal of contaminated soils to native sand was more protective of human health than was removal of contaminated soils to a depth of 24”; and (2) the belief that removal of contaminated soils to native sand would facilitate redevelopment of the property within modified Zone 1.

EPA has found that Alternative 4A, Modified Alternative 4B (Excavation to 24”) and Alternative 4D (Excavation to native sand) are each protective of human health and the environment. EPA has modified Alternative 4B since the issuance of the proposed plan in order to better facilitate redevelopment.

Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depth to prepare a Soil Management Plan. The purpose of the Soil Management Plan is to identify best practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material. The cost of developing and implementing the Soil Management Plan is an element of the work required by the Amended Record of Decision. The cost of developing and implementing the Soil Management Plan will not be borne by utilities or developers. ICs may include an ERC that prohibits the installation of drinking water wells or the disturbance of soils at a depth of greater than 24” below ground surface (bgs) unless in compliance with an approved Soil Management Plan. Because the cost of developing and implementing the Soil Management Plan will not be borne by the community, EPA is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in Modified Alternative 4B (Excavation to 24” plus ICs), once implemented,

²² Statements in the December 16, 2019, letter from the City confirming the City had executed a Letter of Intent (November 15, 2019) for commercial/industrial redevelopment of Zone 1 and rejecting residential redevelopment of Zone 1 show the City has modified its position on future land use in Zone 1. It is unclear to EPA whether the City has also modified its view on the preferred remedy.

should facilitate the successful residential redevelopment of modified Zone 1 if residential use remains the intended future use.

Comment: EPA is not achieving a permanent solution to threats from toxic contamination since it is leaving out entire nearby communities that have been shown to be impacted by toxic contamination.

Response: EPA is achieving a permanent solution to threats posed by contaminated soils within Modified Zone 1. The Amended ROD, which is the subject of this matter, addresses only soil contamination within Modified Zone 1. The boundaries of the USS Lead Superfund Site were established by the administrative record that supported the listing of the Site on the NPL in 2009. Whether other communities should be investigated and, as necessary, remediated, is beyond the scope of this proceeding.

Future Land Use

Comment: A ROD Amendment is premature until more details are known about a potential redevelopment.

Response: EPA is not issuing the ROD Amendment prematurely even though precise information about potential redevelopment is unknown. Modified Zone 1 will be redeveloped either for residential or commercial/industrial purposes. The ROD Amendment accounts for both possibilities by selecting as the currently preferred remedy Modified Alternative 4B (residential end use). If the parcels that comprise Modified Zone 1 are sold by the City and ECHA to an entity with plans for commercial/industrial development, and the City rezones Modified Zone 1 from residential to commercial/industrial, then the selected remedy will be Alternative 4A (commercial/industrial end use).

EPA cannot know when more details will be known about potential redevelopment. Faced with this uncertainty, EPA has two choices: wait for an indefinite period of time until more details are known or act now based upon the understanding that any future redevelopment will fall into one of two broad categories. EPA has elected to act now. By acting now, EPA provides certainty to the public, local officials, liable parties and potential developers about the nature and cost of the remedy. Providing this certainty facilitates redevelopment while also safeguarding human health and the environment.

Comment: If EPA selects Alternative 4B, residential construction in Zone 1 will be dangerous, expensive, and ultimately unlikely.

Response: Residential development will be facilitated by the implementation of Modified Alternative 4B. Modified Alternative 4B (Excavation to 24" plus ICs) will make residential construction in modified Zone 1 safe and cost-neutral. EPA has Modified Alternative 4B since the issuance of the proposed plan in order to better facilitate redevelopment. Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depth to prepare a Soil Management Plan. The purpose of the Soil Management Plan is to identify best

practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material. The cost of developing and implementing the Soil Management Plan is an element of the work required by the Amended Record of Decision. The cost of developing and implementing the Soil Management Plan will not be borne by utilities or developers. ICs may include an ERC that prohibits the installation of drinking water wells or the disturbance of soils at a depth of greater than 24” below ground surface (bgs) unless in compliance with an approved Soil Management Plan. Because the cost of developing and implementing the Soil Management Plan is not borne by the community, EPA is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in Modified Alternative 4B, once implemented, should facilitate the successful residential redevelopment of modified Zone 1 if residential use remains the intended future use.

Comment: Alternative 4B would virtually preclude future residential development in Zone 1.

Response: Residential development within modified Zone 1 will be facilitated by implementation of Modified Alternative 4B. Based on public comments and the concern for costs associated with residential redevelopment, Modified Alternative 4B has added as an element of the remedy and into the cost of the remedy soil management for soils below two feet during the construction of a residential development. EPA has estimated these costs at \$2,018,710. Future residential redevelopment is facilitated by adding these costs into the site remedy and making liable parties responsible for those costs.

Comment: If EPA selects a remedy other than Alternative 4D (Excavation to native sand), future remediation may happen lot by lot as the site is developed and when there may be residents living next door.

Response: EPA has selected Alternative 4A (commercial/industrial) and Modified Alternative 4B (residential). Whether remediated to commercial/industrial or residential standards, all of Modified Zone 1 will be remediated at one time over the course of several months. Residual contamination at depth may be remediated as it is encountered following the initial, cleanup. The scenario of houses being built one at a time while person live next door to construction sites where contaminated soils may be encountered while digging foundations or utility line trenches seems increasingly unlikely in light of the City’s letter of December 16, 2019, confirming execution of a Letter of Intent for a commercial/industrial end use and advising that residential development for Modified Zone 1 is not under further consideration. In Zones 2 and 3, EPA has remediated homes safely while the residents and neighbors remain in place. Dust can be controlled effectively during excavation of contaminated soils. If the end use is residential, it is more likely that the approximately 50-acre site that comprises modified Zone 1 will be developed comprehensively as a planned unit development. Planned unit developments are typically constructed by performing subsurface work before structures are built or persons move into and reside within the development.

Comment: Future residents may not have the knowledge of the contamination or the wherewithal to modify their activities to avoid the contamination.

Response: Both Alternative 4A and Modified Alternative 4B will require an ERC that notifies the public and future land owners that contaminated soils remain at depth. Future residents are likely to have knowledge of the contamination within modified Zone 1 because the relocation of over 1,000 residents and the demolition of the West Calumet Housing Complex have become part of the collective history of residents of East Chicago, Indiana. Future residents who are not aware of the history and engage in activities within modified Zone 1 at a depth greater than 12” (commercial/industrial end use) or 24” (residential end use) bgs will encounter a warning barrier that separates remediated from unremediated soils. Additionally, future residents will be reminded of the Site’s history because EPA will be evaluating the site remedy every five years through the Five-Year Review process and publishing Five Year Review reports.

Comment: EPA imagines a world in which development is complete and residents rarely dig below two feet when considering the benefits of excavation to a depth of 24 inches.

Response: EPA has not engaged in any acts of imagination but rather has looked hard at the actual conditions that exist and are likely to exist within Modified Zone 1. EPA has considered that if developed for residential purposes, persons may interact with soils at depths greater than 24” bgs while gardening or doing construction in and around their homes. The ROD Amendment requires a visual barrier between remediated and unremediated soils to alert persons to potential risks. EPA has Modified Alternative 4B since the issuance of the proposed plan in order to better facilitate redevelopment since redevelopment will require excavation at depths greater than 24” bgs. Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depth to prepare a Soil Management Plan. The purpose of the Soil Management Plan is to identify best practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material. The cost of developing and implementing the Soil Management Plan is an element of the work required by the Amended Record of Decision. The cost of developing and implementing the Soil Management Plan will not be borne by utilities or developers. EPA intends to require potentially liable parties to implement or pay for the amended remedy, including developing and implementing the Soil Management Plan. ICs may include a deed restriction, which prohibits the installation of drinking water wells or the disturbance of soils at a depth of greater than 24” below ground surface (bgs) unless in compliance with an approved Soil Management Plan. Because the cost of developing and implementing the Soil Management Plan is not borne by the community, EPA is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in the Amended ROD (Excavation to 24” plus ICs), once implemented, should facilitate the successful residential redevelopment of modified Zone 1.

The chosen remedies for Zone 1 – Alternative 4a and Modified Alternative 4B - are consistent with other lead sites and follows EPA’s lead handbook. EPA has added the costs associated with soil management for residential development to its chosen remedy to take into consideration the residential redevelopment. The visible barrier and institutional controls will notify residents of soil contaminated with lead and arsenic along with continued maintenance/inspections the remedy will remain protective over the long term.

Comment: Several commenters associated with a company that redevelops contaminated properties requested that the site be remediated to commercial/industrial land use. The redeveloper has submitted a proposal for a mix of light industrial logistics center, distribution, storage, office and training facilities for Zone 1.

Response: When EPA issued the Proposed Plan in November 2018, it had been made aware by a letter from the City in September 2018, that the end use of Zone 1 might be commercial/industrial. Consequently, EPA crafted a remedy that would be flexible enough to accommodate either residential or commercial/industrial redevelopment. EPA alerted the public to this possibility during the public meeting on November 29, 2018. In January 2019, the Lake County Indiana Economic Alliance advised EPA that it was talking with person about redevelopment of Modified Zone 1 for commercial purposes. Correspondence dated June 19, 2019 indicated that Mayor Anthony Copeland had been made aware of these proposals. On November 21, 2019, LCEA provided EPA with a LOI from IDA to the Mayor of the City of East Chicago, Indiana. The LOI outlined the business terms of IDA's proposal to buy most of Modified Zone 1 from the City and ECHA. The LOI was signed by Mayor Copeland. Because the future land use of Modified Zone 1 remains in flux, EPA has issued a ROD Amendment that selects Modified Alternative 4B if the end use remains residential and allows for the transition to Alternative 4A if the end use becomes commercial/industrial.

Carrie Gosch School

Comment: The Zone 1 area should not be modified by removing the Carrie Gosch School that is still being used by adults and children. The ROD Amendment should expand the USS Lead Superfund site to include nearby communities.

Response: Consistent with the terms of the ROD executed in 2012 and the 2014 Consent Decree, the soil cleanup of the former Carrie Gosch School began in July 2019 and was completed in August 2019. The ROD Amendment cannot be expanded to include nearby communities since EPA currently only has the authority to address contamination within the boundaries of the USS Lead site.

Comment: EPA does not have enough information about the extent of contamination near the Carrie Gosch School to proceed with remediation.

Response: As of August 2019, contaminated soils at the former Carrie Gosch School have been excavated and disposed of off-site. The former Carrie Gosch School has been cleaned up consistently with the terms of the 2012 Record of Decision and the federal district court-approved 2014 Consent Decree between EPA and certain private parties. EPA had sufficient information about the extent of contamination near the Carrie Gosch School. During the RI, 20 samples were collected near the Carrie Gosch School. Also, during the pre-design investigation in 2015, 20 samples were analyzed and each of those 20 samples had 5 locations composited into one sample. Based on the sampling results, EPA discovered one quadrant in the southeast corner of the schoolyard that had soils above the remedial action levels at a depth of 18" to 24" bgs.

The settling defendants excavated approximately 3,600 cubic yards of contaminated soil and disposed of these soils off-site. EPA oversaw cleanup in Zones 2 and 3 and monitored the demolition of structures just south of the schoolyard in Zone 1. EPA saw nothing and has seen no data to suggest that the schoolyard was contaminated during the cleanup of Zones 2 and 3 or the demolition work in Zone 1.

Comment: EPA should conduct further sampling in the Carrie Gosch area because fugitive dust emissions from either the demolition of the West Calumet Housing Complex or soil excavation of nearby homes may have caused further contamination of the Carrie Gosch area.

Response: Neither the demolition of the West Calumet Housing Complex nor the soil excavation of nearby homes caused further contamination of the Carrie Gosch School yard. EPA conducted air monitoring during the demolition work. Data obtained during the monitoring of the demolition did not show unacceptable levels of lead or arsenic in the air that would contaminate the Carrie Gosch School area. EPA also conducted air monitoring during the residential cleanups. EPA did not observe unacceptable levels of lead or arsenic that might have contaminated the Carrie Gosch area. EPA has fully characterized the Carrie Gosch area and no further sampling is required. The cleanup of the area in the schoolyard with concentrations of lead or arsenic above remedial action levels was completed in August 2019. Contaminated soils at the former Carrie Gosch School have been excavated and disposed of off-site. The former Carrie Gosch School has been cleaned up consistently with the terms of the 2012 Record of Decision and the federal district court-approved 2014 Consent Decree between EPA and certain private parties. See also, the Remedial Action Completion Report prepared by Amereco, Inc. and dated July 24, 2019.

Comment: EPA needs to do more to investigate conditions at the Carrie Gosch School.

Response: EPA has investigated thoroughly conditions at the former Carrie Gosch School. During the RI, 20 samples were analyzed near the Carrie Gosch school. Also, during the pre-design investigation in 2015, 20 samples were analyzed and each of those 20 samples had 5 locations composited into one sample. Based on the sampling results, EPA identified one quadrant at 18 to 24 inches below ground surface that exceeded the cleanup criteria. The settling defendants excavated approximately 3,600 cubic yards of contaminated soil and this soil was disposed of off-site. No further investigation is required.

Groundwater beneath the former Carrie Gosch School is being investigated as part of the RI/FS for Operable Unit 2.

Groundwater

Comment: EPA must consider groundwater in the proposed ROD Amendment because it is part of the environment.

Response: EPA has divided the USS Lead Superfund Site into two operable units (OUs). OU1 encompasses soil contamination within the residential areas located north and northeast of the

former USS Lead facility now known as Zones 1, 2 and 3. OU2 consists of soil contamination within a portion of the former USS Lead facility (the dunes and swales near the Grand Calumet River) and groundwater beneath both the USS Lead facility and the residential areas (Zones 1, 2 and 3).

EPA divided the Site into OU1 and OU2 so that it could address more quickly the risks to human health and the environment posed by soils in Zones 1, 2 and 3. EPA could define the horizontal and vertical extent of soil contamination in Zones 1, 2 and 3, and propose a remedy for Zones 1, 2 and 3, more quickly than it could complete an investigation of the groundwater. Unlike soils, which are relatively static, groundwater is more dynamic, subject to seasonal variation. Consequently, an investigation of groundwater takes longer than an investigation of soil. EPA did not want to delay the cleanup of soils in Zones 1, 2 and 3 while awaiting the completion of the groundwater investigation for OU2.

The proposed ROD Amendment addresses only soil contamination within Modified Zone 1. EPA has elected to focus its initial efforts on reducing quickly the greatest risk to residents and visitors to Modified Zone 1. The greatest risk is posed by ingestion of, inhalation of, or direct contact with contaminated soils. The ROD Amendment will allow EPA to move forward and address this risk by removing source material and constructing a 12” or 24” soil barrier between contaminated soils and residents. In the case of a commercial/industrial redevelopment, hardscapes including one or more buildings, driveways, and parking lots will also serve as barriers to exposure.

Concurrently, EPA is conducting a Remedial Investigation and Feasibility Study (RI/FS), which has as its focus groundwater beneath the entire USS Lead Superfund Site. Groundwater monitoring wells were installed in December 2018 and sampled in December 2018, March 2019, June 2019, and August 2019. The RI/FS will provide detailed information about the extent of contamination of groundwater beneath the Site. While awaiting the results of the RI, it is worth noting the following: all residences within the USS Lead Superfund Site receive drinking water from the City of East Chicago. The quality of the drinking water in East Chicago has been the subject of considerable scrutiny and a discussion of the quality of that water is beyond the scope of this Responsiveness Summary.

The commenter’s statement that properties that EPA has cleaned up are being contaminated by contact with contaminated groundwater is not accurate. EPA has no data that shows contaminated groundwater is contaminating soils within 12” or 24” of the ground surface.

Removal of the top 12” or 24” of soil from within modified Zone 1 will help remove source material. Data from the Amereco Phase II Investigation and preliminary groundwater data from the RI show that groundwater is only slightly contaminated with lead and arsenic. Delaying the soil cleanup to evaluate groundwater would have been imprudent. The groundwater study is underway within the surrounding area and may take several more years to complete. EPA concluded that it is more protective of human health and the environment to move forward with

the cleanup of contaminated soils within Modified Zone 1 and Zones 2 and 3 than to postpone cleanup until the groundwater investigation is complete.

Comment: It is in the best interests of the community and the environment for EPA to address groundwater contamination during this remediation.

Response: EPA has concluded that it is more protective of human health and the environment to move forward with the cleanup of approximately 200,000 cubic yards of contaminated soils (under Modified Alternative 4B) or 100,000 cubic yards of contaminated soils (under Modified Alternative 4A) within modified Zone 1 than to postpone cleanup until the groundwater investigation has been completed. EPA will continue to oversee the groundwater Remedial Investigation. EPA is developing detailed information about the condition of groundwater beneath the Site. This information needs to be gathered over time as groundwater fluctuates seasonally and over the course of years. Until EPA has a better understanding of conditions in the groundwater beneath the Site, it cannot determine whether the groundwater needs to be remediated or how best to remediate the groundwater. Once the groundwater investigation has been completed, EPA will issue a Proposed Plan for the groundwater. The Proposed Plan will be put out for public comment and the final groundwater remedy will be published after consideration of the public comments.

Comment: EPA should expedite the groundwater remediation at the Site to avoid both leaching of contamination into the groundwater and contamination spreading from the groundwater to the clean soil.

Response: On September 20, 2017, EPA executed an Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study of Operable Unit 2 (CERCLA Docket No. V-W-17-C-013). As part of the Remedial Investigation, contractors working on behalf of the potentially responsible parties installed groundwater monitoring wells in the residential neighborhoods in November and December 2018. Groundwater monitoring wells in the residential neighborhood and at the former industrial facility were sampled in December 2018, March 2019, June 2019, and August 2019. Data from the 2018 and 2019 sampling efforts will be compiled in a Remedial Investigation report submitted to EPA. Groundwater investigations require that data be gathered over time in order to understand seasonal variations in groundwater. The investigation has begun and is being conducted as quickly as possible consistent with the need to gather data over time.

Comment: Contamination will continue to leach into the groundwater if EPA selects an alternative other than Alternative 4D (Excavation to native sand).

Response: Contamination may or may not leach into groundwater because EPA has selected Modified Alternative 4B and Alternative 4A, both of which leave some contaminated soils in place at depths greater than 12” and 24”. Mobilization of contaminants is unlikely. Arsenic and lead are known to adsorb to soils. Neither arsenic nor lead readily partitions away from soil once it has adsorbed to a soil molecule. In the Remedial Investigation, EPA concluded, “lead will adsorb to soil particles and remain fairly immobile.” See, RI, Section 6.4.1. EPA also concluded, “Arsenic will tend to be bound to soil and clay particles at the USS Lead Site and will

be only slightly more mobile than lead.” See, RI, Section 6.4.2. The removal of approximately 200,000 tons from the top two feet or 100,00 tons of contaminated soil from the top 12” will also reduce the volume of a potential source of groundwater contamination.

Comment: The proposed remedy does not address the ongoing contamination of groundwater, the contamination buried at depth and some cases located within the Calumet Aquifers saturated zone – approximately 8 feet below the surface or address the removal of buried contamination debris found 11 feet below ground surface, leaking underground tanks and high levels of metals hot spots.

Response: The remedy set forth in Modified Alternative 4B is limited in scope and addresses only soil contamination within Modified Zone 1. With funds obtained from potentially liable parties, EPA is overseeing a Remedial Investigation and Feasibility Study, which will identify the horizontal and vertical extent of contamination within the aquifer beneath the entire Site. The investigation will determine whether there are residual “source areas” and identify the impact of such “source areas” on the quality of water within the aquifer. EPA will evaluate remedies and propose a remedy to address any groundwater contamination beneath the Site in a future remedy decision document.

Adequacy of the Investigation

Comment: EPA only has taken shallow samples and has not confirmed the true extent of contamination beneath the site. The assumption that native sand has been reached and is assumed clean is naïve given the surrounding area and considering the known solid waste disposal practices in the area, especially at the former DuPont site.

Response: The disposal practices that occurred at the DuPont site have no relationship to modified Zone 1 as presumably DuPont lacked access to the Anaconda facility and did not dispose of wastes at the former Anaconda facility within what is now referred to as modified Zone 1. Conditions at the former DuPont facility have been investigated under EPA’s authority under the Resource Conservation and Recovery Act (RCRA). During the Remedial Investigation/Pre-design Investigation, EPA collected samples to a depth of 30 inches below ground surface. EPA sampling data shows that native sand is not contaminated. EPA also evaluated soils deeper than 30 inches that were part of the Amereco Phase II Site Assessment. The Amereco sampling and analysis for arsenic showed only 5 out of the 20 samples collected and analyzed exceeded the 26-ppm arsenic soil cleanup standard. One sample that exceeded the standard for arsenic was at 24” bgs and will be removed with Modified Alternative 4B. Four samples that exceeded the standard for arsenic were at 4 feet bgs. With respect to lead, the Amereco soil sampling showed 6 out of 20 samples exceeded the 400-ppm lead cleanup standard. Five of these samples were at 4 feet bgs. The other sample was at 2 feet bgs and will be removed with Modified Alternative 4B. EPA’s evaluation of sampling results at depth show limited areas that exceed the cleanup criteria and those areas would be controlled through the use of institutional controls.

Comment: EPA relies too heavily on X-ray Fluorescence (XRF) testing to determine the extent of contamination near the Carrie Gosch School.

Response: EPA relies appropriately on XRF testing to determine the extent of contamination adjacent to the Carrie Gosch School. An X-ray fluorescence instrument (XRF instrument) allows a person to use a handheld, field instrument to determine the concentration of lead and arsenic in a soil sample. An XRF instrument yields a quick and reasonably accurate reading. The most accurate analytical method is the method employed in a laboratory. Analyzing soil samples in a laboratory is, however, more costly and time-consuming than using an XRF instrument. At Superfund sites around the country, EPA routinely uses the results of laboratory analysis to calibrate XRF instruments and relies on the results of both field and laboratory analysis to create remedial design documents. The Administrative Record contains a document, dated August 29, 2018, titled *FIELDS Analysis of the USS Lead XRF and Lab results for Lead and Arsenic*. This document describes how EPA calculated the triggering level. First, the action levels at the USS Lead Site are 400 mg/kg lead and 26 mg/kg arsenic. However, an XRF instrument determines metal concentrations in a soil matrix while a laboratory measures metals concentration in an extracted solution. EPA compared samples that had both XRF and laboratory results. Using statistical analysis, EPA determined that samples screened by XRF below 325 mg/kg lead and 26 mg/kg arsenic were sufficient to give it a 95% confidence level that the sample would not yield a value above the remediation-levels of contamination. Therefore, for samples with XRF values only, EPA set the triggering level at 325 mg/kg lead and 26 mg/kg arsenic. If an XRF value was 325 ppm or greater, it was assumed that this would be greater than a 400-ppm lead concentration if analyzed in a laboratory and the soil in the area sampled would require cleanup. The comment that EPA should have used a 235-ppm lead XRF reading as an action level rather than a 325-ppm XRF reading as action level in all instances is misleading. The 235-ppm value may have been appropriate for the specific XRF sampling instrument examined in the referenced study. It is incorrect to assume all XRF sampling instruments would measure lead or arsenic exactly the same or have the same calibration factor. Each XRF sampling device needs to be calibrated separately to obtain an accurate measurement. In connection with the sampling in Modified Zone 1, EPA was fortunate to have both laboratory and XRF data for the same sample locations, which allowed EPA to complete a statistical analysis that demonstrated the accuracy of the XRF results.

Comment: In 1989, an agreed order between the Indiana Department of Environmental Management (IDEM) and USS Lead was signed that required USS Lead to identify the full extent of contamination from the USS Lead Superfund site. The agreed order included a sampling and analysis plan for all contaminated areas to determine the extent, area and depth of contamination and a cleanup plan that addresses what remedial action will be performed to ensure the removal of all contamination. Neither EPA nor IDEM have completed a full investigation. The removal of all contamination is similar to Alternative 4D and would be the most protective of the cleanup alternatives.

Response: Between 2012 and 2019, EPA collected from within Modified Zone 1 more than 1,000 soil samples. While a private party implementing the Amended ROD might want to

collect additional soil samples to refine its remedial design, EPA believes it has conducted a “full investigation” of the extent of soil contamination within Modified Zone 1. In selecting Modified Alternative 4B, EPA is bound by the language of CERCLA and the requirements of the NCP, 40 C.F.R. Part 300. The language of an order between IDEM and USS Lead did not inform EPA’s decision-making process. For the reasons set forth in the ROD Amendment, EPA selected Modified Alternative 4B (Excavation to 24” plus ICs) rather than Alternative 4D (Excavation to native sand plus ICs). EPA has selected Alternative 4A if the end use of Modified Zone 1 is commercial/industrial.

Comment: EPA should have considered in the remedy selection process the information gained in Amereco’s 2017 Phase II Environmental Site Assessment.

Response: EPA has considered the information contained in the 2017 Phase II Environmental Site Assessment Report from Amereco. The soil sampling results from the 38 soil borings advanced by Amereco did not show anything unusual or of concern; the data was consistent with data previously developed by EPA. The Amereco sampling and analysis for arsenic showed that only 5 out of 20 samples collected and analyzed exceeded the 26-ppm arsenic soil cleanup standard. One sample that exceeded the standard for arsenic was at 2 feet (which will be removed with Modified Alternative 4B) and 4 samples that exceeded the standard for arsenic were at 4 feet bgs. With respect to lead, the Amereco soil sampling showed 6 out of 20 samples exceeded the 400-ppm lead cleanup standard. Five of the samples that exceeded 400-ppm lead were at 4 feet bgs and the other was at 2 feet bgs (which will be removed with Modified Alternative 4B). The commercial/industrial remedial action level for arsenic is the same as the residential level: 26 ppm. The commercial/industrial remedial action level for lead is 800 ppm rather than the residential level of 400 ppm. The Amereco sampling and analysis showed ???

Comment: EPA lacks support for its conclusion that “[D]igging deeper is not meaningfully more protective of potential users of the property and so does not justify the additional . . . \$22 million in estimated costs.”

Response: The conclusion that “[D]igging deeper is not meaningfully more protective of potential users of the property” is supported by common sense and consideration of the source of the threats to human health. The principal threats to human health are the risk of inhalation of, ingestion of, or direct contact with lead or arsenic contaminated soils. Removing the upper 24” of soil and creating a 24” inch barrier of clean soil and grass virtually eliminates the risk to residents of inhalation, ingestion or direct contact with contaminated soils. A 36” or 48” inch barrier is only marginally more effective than a 24” barrier. In all but the most unusual circumstances, persons do not have direct contact with contaminated soils at a depth of greater than 24” bgs. Modified Alternative 4B requires a person who intends to come into contact with contaminated soils at depth to do so in compliance with protective procedures outlines in an approved Soil Management Plan. Alternative 4A is protective in the commercial/industrial context. The remedial action level for arsenic is the same for both residential and commercial/industrial scenarios: 26 ppm. The remedial action level of lead in a commercial/industrial context is 800 ppm. The ROD Amendment will require excavation to a

depth of 12” bgs in a commercial/industrial context. The shallower excavation and higher remedial action level are warranted by several considerations. First, persons who occupy a commercial/industrial property spend less time at such properties than do persons who live in a residential home. Second, commercial/industrial developments typically involve greater use of hardscapes (fewer grassy areas or lawns), which prevent direct contact. Finally, fewer children will play or dig in and around a commercial/industrial development and adults will not be engaged in activities like construction or gardening, which might put them in direct contact with contaminated soils.

Comment: EPA needs to comprehensively investigate and map the full extent, breadth and depth of contamination within the USS lead site and determine if the current removal and remedial actions are effective over the long-term in protecting human health and the environment and meet the requirements of Superfund to achieve a permanent remedy.

Response: EPA has comprehensively investigated the extent, breadth and depth of contamination within the USS Lead Site. Please see the RI/FS and remedial design documents for Zones 1, 2 and 3. CERCLA requires EPA to select appropriate remedial actions, which EPA has determined to be necessary and which provide a degree of cleanup and control of further releases that, at a minimum, assure protection of human health and the environment. See CERCLA Section 121. CERCLA Section 121(c) requires EPA to evaluate Superfund sites with remedies that have left waste in place every five years after construction begins to ensure the remedy remains protective of human health and the environment. The USS Lead site will undergo periodic Five-Year Reviews.

Comment: EPA and IDEM have not adequately tested the USS Lead Superfund site and adjacent areas for dioxin and dioxin-like compounds.

Response: Dioxins and furans are the abbreviated names for a family of toxic substances that all share a similar chemical structure. Most dioxins and furans are not man-made or produced intentionally but are created when other chemicals or products are made or incinerated. Dioxins and furans can enter your body through breathing contaminated air, drinking contaminated water or eating contaminated food. The removal of soil from the top 12” or 24” will prevent any direct contact threat posed by the presence of dioxins or furans, if any. During performance of the Remedial Investigation, EPA analysis of soil samples did not detect chlorinated compounds, which would serve as indicators for dioxins and furans. Consequently, EPA did not include dioxin or dioxin-like compounds as chemicals of concern.

Comment: The ROD Amendment is deficient and fails to evaluate whether a public health emergency exists due to high levels of multiple contaminants. EPA also did not evaluate exposures and if they justify the voluntary evacuation of residents living on top of the Superfund site and any such actions should provide full compensation.

Response: The ROD Amendment is not deficient and properly evaluates the risks posed by lead and arsenic contaminated soils within Modified Zone 1. CERCLA authorizes EPA to take

actions to address hazardous substances that might pose a risk to human health and the environment. The response actions already taken in Zone 2 and Zone 3 have removed contaminated soils and mitigated the risks posed to human health. Relocation is an extreme remedy and has rarely been used by EPA. Conditions within OU1, Zones 1, 2 and 3 can be addressed by removing contaminated soils and did not and currently do not warrant evacuation. The City of East Chicago, Indiana and the East Chicago Housing Authority elected to relocate residents despite assurances from EPA that the selected response actions in Zone 1 could be undertaken safely with residents in place.

Comment: EPA erred in not considering the information contained in the 2017 Amereco Phase II Environmental Site Assessment and the 2018 Agency for Toxic Substances and Disease Registry report.

Response: EPA has considered the information contained in the 2017 Phase II Environmental Site Assessment Report from Amereco. The soil sampling results from the 38 soil borings advanced by Amereco did not show anything unusual or of concern; the data was consistent with data previously developed by EPA.

The Amereco sampling and analysis for arsenic showed only 5 out of the 20 samples collected and analyzed exceeded the 26-ppm arsenic soil cleanup standard. One sample that exceeded the standard for arsenic was at 24” bgs and will be removed with Modified Alternative 4B. Four samples that exceeded the standard for arsenic were at 4 feet bgs. With respect to lead, the Amereco soil sampling showed 6 out of 20 samples exceeded the 400-ppm lead cleanup standard. Five of these samples were at 4 feet bgs. The other sample was at 2 feet bgs and will be removed with Modified Alternative 4B.

EPA has also considered the ATSDR report, *Historical Blood Lead Levels in East Chicago, Indiana Neighborhoods Impacted by Lead Smelters.*” The purpose of the ATSDR report was to evaluate historical lead exposure from the industrial facilities that contributed to the soil contamination in the Calumet neighborhoods (Zones 1, 2 and 3). ATSDR summarized blood lead levels in children in the Calumet neighborhoods from 2005-2015. Among other conclusions, ATSDR concluded: (1) the blood lead levels for children less than 6 years of age living in the Calumet neighborhoods continued to decline between 2005-2015; and (2) the percentage of children less than 6 years of age living in the Calumet neighborhoods with elevated blood lead levels was greater than the percentage of children less than 6 years of age living in other areas of East Chicago. Implementation of the remedy in Zone 2 and Zone 3 has removed hundreds of thousands of tons of contaminated soil from the neighborhood and replaced these contaminated surficial soils with clean fill. This remedial work has reduced inhalation of, ingestion of, and direct contact with contaminated soils. Implementation of the remedy described in the Amended ROD – Alternative 4A or Modified Alternative 4B - will also reduce the likelihood that children will ingest, inhale or come into direct contact with contaminated soils within modified Zone 1.

Appropriate Cleanup Standard

Comment: Given the proximity of Modified Zone 1 to nearby parks, schools, churches, businesses and residences, any selected cleanup remedy must require cleanup to residential standards or better.

Response: The remedy set forth in the Amended ROD will clean up the entirety of Modified Zone 1 to residential standards based on the anticipated residential use of the property. If the future use of Modified Zone 1 becomes commercial/industrial and the titles of those parcels are transferred to a new owner who intends to develop the property for commercial use, those areas will be subject to commercial/industrial remedial action levels. Those areas that are not designated for commercial/industrial redevelopment will continue to be subject to the residential remedial action levels of 400 ppm lead and 26 ppm arsenic, and excavation to 24” bgs will be required.

Comment: EPA should remediate the site to residential standards and if Modified Zone 1 is designated commercial/industrial, then EPA should apply residential remediation standards to areas not covered by permanent structures. Also, since Modified Zone 1 is in close proximity to Zones 2 and 3, that it presents an unacceptable risk to the residents of those zones unless it is remediated to residential standards.

Response: EPA proposes to remediate Modified Zone 1 to residential standards – Modified Alternative 4B - if the future use is residential and to commercial/industrial standards – Alternative 4A - if the properties that comprise Modified Zone 1 are sold, and the City rezones the properties commercial/industrial. The risk posed by lead and arsenic in the soil is that a person may ingest, inhale or come into direct contact contaminated soil. It is not necessary to clean Zone 1 to residential standards (400 ppm lead, 26 ppm arsenic, to a depth of 24”) to reduce to an acceptable level the risk to residents in Zones 2 and 3. The remedies set forth in both Modified Alternative 4B and Alternative 4A will prevent persons in Zone 1 as well as persons in Zones 2 and 3 from ingesting, inhaling or coming into direct contact with lead or arsenic contaminated soil.

Comment: EPA should cleanup Zone 1 to residential standards through the implementation of Alternative 4D (Excavation to native sand). EPA’s cleanup plan should facilitate construction of affordable homes with community-focused development to revitalize and stabilize the Calumet neighborhood. Residents only agreed to the demolition of the WCHC because it understood that HUD and the Mayor of East Chicago were committed to residential future use. Only Alternative 4D is compatible with all the adjacent uses including housing to the east and north, a school to the north, the Grand Calumet River to the south and the Indiana Harbor Shipping Canal to the west. For Environmental Justice purposes, anything less than a full cleanup to native sand limits or excludes higher and better uses without institutional controls; the imposition of institutional

controls devalues the land and taking value from the residents of the Calumet community and future generations.

Response: The remedy selected by EPA requires cleanup of modified Zone 1 to residential standards if the future use remains residential but requires cleanup to commercial/industrial standards if the future use is commercial/industrial. CERLCA authorizes EPA to take response actions to reduce threats posed to human health and the environment. The threats posed to human health by lead and arsenic contaminated soils in modified Zone 1 arise from the threat of ingesting, inhaling or having direct contact with contaminated soils. The remedy selected by EPA for modified Zone 1 – Modified Alternative 4B (Excavation to a depth of 24” plus Institutional Controls (ICs)) – reduces the threat to human health by excavating contaminated soils to a depth of 24”; backfilling the excavation with clean fill; and placing sod or growing grass on top of the fill.

Contaminated soils at a depth of greater than 12” or 24” inches will not pose a risk to human health or the environment unless disturbed by human activity. Unless disturbed by human activity, no one will ingest, inhale or come into direct contact with contaminated soils left at depth. During future construction or utility repair work within modified Zone 1, workers and other persons may come into direct contact with contaminated soils and be at risk of ingesting or inhaling soil particles contaminated with lead or arsenic. Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depth to prepare a Soil Management Plan. The purpose of the Soil Management Plan is to identify best practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material.

The cost of developing and implementing the Soil Management Plan is an element of the work required by the Amended Record of Decision. EPA intends to require responsible parties to pay the cost of developing and implementing the Soil Management Plan so that these costs will not be borne by utilities or developers. ICs may include a deed restriction, which prohibits the installation of drinking water wells or the disturbance of soils at a depth of greater than 24” below ground surface (bgs) unless in compliance with an approved Soil Management Plan.

Because EPA intends to require responsible parties to pay the cost of developing and implementing the Soil Management Plan is not borne by the community, EPA’s selected remedy is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in the Amended ROD, once implemented, should facilitate the successful residential redevelopment of modified Zone 1. If, however, the future use is modified to commercial/industrial use, EPA will require a cleanup to commercial/industrial remedial action levels. These levels will be protective of human health and the environment and will support the return of Modified Zone 1 to productive use without imposing a cost on the community.

Comment: EPA used a suspect screening and cleanup level for lead based on the use of XRF technology. EPA should have used 235 ppm lead instead of 400 ppm due to a report titled Final

Report on X-Ray Fluorescence Field Study of Selected Properties in Vicinity of Former USS Lead refinery Facility (Michael Mikulka P. E. and Mirtha Capiro U.S. EPA) which showed that results as low as 235 ppm for lead using XRF technology could possibly be over the 400-ppm lead cleanup number.

Response: EPA did not use a suspect screening and cleanup level for lead. It was appropriate to use 400 ppm rather than 235 ppm for lead as the action level in residential areas. An X-ray fluorescence instrument (XRF instrument) allows a person to use a handheld, field instrument to determine the concentration of lead and arsenic in a soil sample. An XRF instrument yields a quick and reasonably accurate reading. The most accurate analytical method is the method employed in a laboratory. Analyzing soil samples in a laboratory is, however, more costly and time-consuming than using an XRF instrument.

At Superfund sites around the country, EPA routinely uses the results of laboratory analysis to calibrate XRF instruments and relies on the results of both field and laboratory analysis to create remedial design documents. The Administrative Record contains a document, dated August 29, 2018, titled *FIELDS Analysis of the USS Lead XRF and Lab results for Lead and Arsenic*. This document describes how EPA calculated the triggering level. First, the action levels at the USS Lead Site are 400 mg/kg lead and 26 mg/kg arsenic. However, an XRF instrument determines metal concentrations in a soil matrix while laboratory analysis measures metals concentrations in an extracted solution. EPA compared samples that had both XRF and laboratory results. Using statistical analysis, EPA determined that samples screened by XRF below 325 mg/kg lead and 26 mg/kg arsenic were sufficient to give it a 95% confidence level that the sample would not yield a value above the remediation-levels of contamination. Therefore, for samples with XRF values only, EPA set the triggering level at 325 mg/kg lead and 26 mg/kg arsenic. If an XRF value was 325 ppm or greater, it was assumed that this would be greater than a 400-ppm lead concentration based on a laboratory analysis and would require cleanup.

The comment that EPA should have used a 235-ppm lead XRF reading as an action level rather than a 325-ppm XRF reading as action level in all instances is misleading. The 235-ppm value may have been appropriate for the specific XRF sampling instrument examined in the referenced study. It is incorrect to assume all XRF sampling instruments would measure lead or arsenic exactly the same or have the same calibration factor. Each XRF sampling device needs to be calibrated separately to obtain an accurate measurement. In connection with the sampling in modified Zone 1, EPA was fortunate to have both laboratory and XRF data at the same location, which allowed EPA to complete a statistical analysis to confirm the accuracy of the XRF readings.

Comment: Based on the September 8, 2004 TechLaw Report titled Characterization of the Lead and Other metals in Soil in the vicinity of the USS Lead Site, 10 metals exceeded human health screening values.

Response: The Remedial Investigation began by collecting samples and analyzing those samples for a full suite of contaminants including metals, VOCs, semi-VOCs, PCBs and pesticides. Please see the Remedial Investigation, Section 3.0, Remedial Investigation Field Activities. Based on the results of the sampling within the RI/FS, it was determined that lead and arsenic were the main contaminants of concern. The chosen remedy will result in the removal of the top 24” of soil from modified Zone 1 (50.5 acres) if the future use remains residential and the top 12” of soil if the future use shifts to commercial/industrial. All metals contained within the top 24” or 12” of soil will be removed along with the lead and arsenic.

Metals contamination below either 12” or 24” will not pose an unacceptable risk to human health or the environment since a visible barrier will be present and institutional controls will be in place. These actions will greatly reduce the prospect for ingesting, inhaling or having direct contact with metals-contaminated soils. As part of the site remedy, inspections and maintenance of the soil cover and visible barrier will be necessary to ensure that over time the remedy remains protective of human health and the environment. For more information about how EPA identified lead and arsenic as the contaminants of concern, please see the Remedial Investigation, Section 5.0, Nature and Extent of Contamination.

Comment: Other metals and polynuclear aromatic hydrocarbons (PAHs), dioxin and furans that are produced from industrial processes that historically occupied the USS Lead superfund site should not be ruled out as contaminants of concern. EPA has concluded that PAH contamination in OU1 does not appear to be site related but indicative of a highly industrial area. The Amereco Phase II Report shows PAHs in soils above the IDEM Remediation Closure Guide, Residential Direct contact Screening Levels and Soil Migration to Groundwater Screening levels. Also lead and arsenic were identified in exceedance of IDEM’s Remediation Closure Guide for excavation worker direct contact screening levels in subsurface soils.

Response: The Remedial Investigation performed by EPA and completed in June 2012, assessed whether PAHs should be included, along with lead and arsenic, as a contaminant of concern (COC). Please see, the Remedial Investigation, Section 5.0, Nature and Extent of Contamination. After careful consideration, EPA determined that PAHs should not be considered a COC and that the only appropriate COCs were lead and arsenic. Consequently, the 2012 ROD identified lead and arsenic as the only COCs.

The information developed by Amereco and reported in 2017 does not persuade EPA that other contaminants should be identified as COCs. The commenter references the Amereco data. Of the 38 soil samples taken during the Amereco Phase II Environmental Assessment and analyzed for PAHs, only two samples slightly exceeded the residential soil direct contact screening numbers developed by IDEM for PAHs. One sample was obtained at 48” below ground surface and the other at 72” below ground surface. Neither the RI data nor the Amereco report indicates that PAHs above IDEM screening numbers are widespread within modified Zone 1. Consequently, there is no basis for including PAHs among the COCs. Nor should dioxin/furans

be added as COCs. Dioxin and furans are volatile organic compounds. Neither the RI data nor the Amereco data established the widespread presence of VOCs within modified Zone 1.

The Amereco sampling and analysis for arsenic showed only 5 out of the 20 samples collected and analyzed exceeded the 26-ppm arsenic soil cleanup standard. One sample that exceeded the standard for arsenic was at 24” bgs and will be removed if Modified Alternative 4B is implemented; it will be covered with 24” of soil if Alternative 4A is implemented. Four samples that exceeded the standard for arsenic were at 48” bgs. With respect to lead, the Amereco soil sampling showed 6 out of 20 samples exceeded the 400-ppm lead cleanup standard. Five of these samples were at 48” bgs. The other sample was at 24” bgs and will be removed if Modified Alternative 4B is implemented; it will be covered with 24” of soil and significantly restrict the exposure pathway if Alternative 4A is implemented.

Based on the RI data and Amereco soil sampling data, EPA is confident that by addressing the threats posed by lead and arsenic, the two identified COCs, it will also successfully address risks posed to human health or the environment potentially posed by PAHs or metals other than lead and arsenic. The implementation of either Alternative 4A or Modified Alternative 4B will address the inhalation, ingestion and direct contact threat posed by PAHs and dioxin/furans by removing the top 12” or 24” of contaminated soil, disposing of that soil off-site, placement of a visible barrier, and the management of soils at depth during residential redevelopment and institutional controls.

Comment: The ROD Amendment is deficient and fails to evaluate numerous environmental and human exposure pathways such as the intrusion of toxic vapors from subsurface contamination, contaminated surface water entering storm water and sewer systems, the contaminated groundwater migration pathway, the windblown contaminated soil and transportation spillage exposure pathway, the drinking water threat, the environmental and human food chain threat (fish, waterfowl, vegetable/fruit grown within or near the site with even a bald eagle nesting on-site, and the uptake of contaminants by plants/shrubs/trees/insects/wildlife.

Response: The ROD Amendment is not deficient and does not fail to consider other environmental and human exposure pathways. The Remedial Investigation performed by EPA includes Section 6.0, Contaminant Fate and Transport. In this section, EPA discusses the COCs and various factors that impact the fate and transport of contaminants. The Human Health Risk Assessment (HHRA) is also part of the Administrative Record. The HHRA identifies the COCs and exposure pathways that need to be addressed by the remedial action. EPA conducted the HHRA consistently with EPA’s Risk Assessment Guidance for Superfund (RAGS) and other supplemental guidance to evaluate human health risks. The HHRA identified possible receptors and potentially complete pathways of exposure.

Concerns about toxic vapors from subsurface contamination are unwarranted. Vapors are common when the COCs include volatile or semi-volatile organic compounds. Here, the COCs are metals, arsenic and lead, not VOCs. Once the remedy set forth in the Amended ROD – whether Alternative 4A or Modified Alternative 4B - is implemented, the risks posed by

contaminated surface water entering the storm water or combined sewer system will be eliminated because the top 12” or 24” of soil will have been removed and replaced by clean fill; surface water runoff from clean fill will pose no risk to human health or the environment. Risks associated with windblown contamination will also be eliminated once the remedy is implemented. The spillage exposure pathway apparently references the possibility of direct contact with contaminated soil spilled during transport. The Transportation and Safety Plans ensure that persons will not come into direct contact with any soils that might spill during transport. Trucks will also be covered while transporting contaminated soils to prevent windborne migration of contaminants.

Drinking water is not evaluated as a pathway because residents within the USS lead Superfund site receive water from the City of East Chicago (which comes from Lake Michigan). EPA has provided fact sheets concerning gardening and recommends raised gardening beds and washing fruits and vegetables prior to use. Fish, waterfowl and plant uptake would not be an issue after the remedy is implemented and no bald eagle nest is present within modified Zone 1.

Evaluation of Risk

Comment: ATSDR should develop a health surveillance program in coordination with the Indiana State Department of Health, the Indiana Family Social Service Administration, and the East Chicago Department of Health. It should also work with the National Center on Environmental Health and other partners to establish a USS Lead Site Registry to ensure that all impacted people can participate in health studies and screenings.

Response: EPA does not have the authority to compel action by ATSDR, the Indiana State Department of Health, the Indiana Family Social Service Administration, or the East Chicago Department of Health. These are independent governmental entities, separate and distinct from EPA. EPA has met with many of these entities and is willing to meet with them in the future to talk about how actions by EPA can support their respective missions

Comment: EPA should have evaluated the risk after demolition was completed since the barriers to exposure were removed and increased migration of contaminants due to more exposure of more land area after demolition

Response: The former footprint of the West Calumet Housing Complex is fenced to prevent access and has been planted with grass or covered with gravel. The fence and cover reduce the likelihood that a person will have direct contact with or ingest contaminated soils. The gravel and grass covers prevent the windborne migration of contaminated soil pending the removal of soil from within modified Zone 1 and reduce the likelihood that a person will inhale contaminated soil particles.

Comment: EPA has erroneously concluded that contamination below 24” causes no danger to human health.

Response: EPA has not concluded that contamination below 24” poses no danger to human health. Rather, EPA has concluded that contamination below 24” poses an acceptable risk. For systemic toxicants like lead and arsenic, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety. For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 1×10^{-4} to the minus 4 and 1×10^{-6} using information on the relationship between dose and response. See, 40 C.F.R. 300.430(e)(2)(i)(A)(1) and (2).

The chosen remedies remove either the top 12” or 24” of contaminated soil which will eliminate the direct contact threat. The placement of a visible barrier will deter persons from unknowingly disturbing soils below the visible barrier. The long-term inspection/maintenance and Five-Year Reviews will ensure that contamination below 24” does not present an unacceptable risk to human health and the environment.

Comment: Residents within the US Smelter and Lead refinery Superfund site in East Chicago are impacted by an ambient polluted environment that has an established cancer risk of 300 in 1,000,000 (3×10^{-4}) when EPA considers an acceptable cancer risk to be 1 in 1,000,000 (1×10^{-6}).

Response: The NCP requires EPA to set remediation goals that establish acceptable exposure levels that are protective of human health and the environment. Those goals shall be developed considering acceptable exposure levels for known or suspected carcinogens. For known or suspected carcinogens, EPA has determined that acceptable exposure levels are generally concentration levels that represent to an individual an excess upper bound lifetime cancer risk of between 1 in 10,000 (1×10^{-4}) and 1 in 1,000,000 (1×10^{-6}). See, 40 C.F.R. 300.430(e)(2)(i)(A)(2).

For soils within modified Zone 1, EPA has set action levels at concentrations of 400 ppm for lead (residential), 800 ppm for lead (commercial/industrial), and 26 ppm for arsenic (both residential and commercial/industrial). Areas where there is a likelihood of exposure in excess of those concentrations need to be remediated. The 400-ppm action level for lead in residential soil equates to a 5 percent chance of a child having a blood lead level of 10 ug/dL.²³ An arsenic action level of 26 ppm in residential soil equates to an excess lifetime cancer risk of 3.8×10^{-5} , which is within EPA’s acceptable risk range. To evaluate the arsenic non-cancer risk, a Hazard Quotient (HQ) less than 1 is acceptable and 26 ppm relates to 0.7 for a child and 0.08 for an adult. Therefore, the action levels of 400 ppm lead and 26 ppm arsenic are within EPA’s acceptable risk range.

²³ In 2012, the Centers for Disease Control and Prevention updated its recommendations on children’s blood lead levels. Prior to that, CDC used 10 micrograms per deciliter (ug/dL) as the “level of concern” to identify children who require case management. A reference level of 5 ug/dL is currently used to evaluate children who have been exposed to lead, based on the 97.5th percentile of the distribution of national blood lead levels in children (National Health and Nutrition Examination Survey). See, ATSDR Health Consultation (August 16, 2018).

Comment: The arsenic cleanup level of 26 ppm was modified from 14.1 ppm and was changed based on biased calculations. A Report from the USGS Waster Resources Investigations Report shows arsenic at 6.56 ppm within 500 kilometers from Chicago.

Response: CERCLA authorizes EPA to remediate hazardous substances, like lead and arsenic, where there has been releases of those substances from a facility. CERCLA does not authorize EPA to cleanup naturally occurring substances like arsenic unless EPA can show that the source of the arsenic, at least in part, was a specific facility's operations and emissions. Here, EPA contends that lead and arsenic were the by-products of operations at the USS Lead, DuPont and Anaconda facilities.

The challenge that confronted EPA as it prepared the Remedial Investigation was determining how much arsenic within the USS Lead Superfund Site OUI was caused by activities at the nearby industrial facilities and how much is naturally occurring. As discussed in the November 2012 ROD, the RAL for arsenic is based upon the upper tolerance limit of naturally-occurring concentrations of arsenic within OUI. Arsenic concentrations in soil samples collected within OUI are distributed around both the site-specific background concentration of 14.1 mg/kg and the Illinois metropolitan background concentration of 13.0 mg/kg. Because of the similarity between the bulk soil concentrations for arsenic within OUI and the naturally-occurring background concentrations, EPA made a risk-management decision to use the upper tolerance limit (UTL) to distinguish between arsenic soil concentrations that are distributed among the naturally-occurring values at OUI and those that may have been impacted by activities in and around the site.

The 95% UTL for arsenic in soil within OUI is 26 mg/kg, which corresponds to the upper bound of the naturally-occurring (i.e. background) concentrations. The 26 mg/kg RAL for arsenic will be applied to residential, recreational, and commercial/industrial properties. The approach of using the UTL as a RAL has been used at other CERCLA sites, including the Jacobsville Neighborhood Soil Contamination Site in Evansville, Indiana, and is discussed more fully in the RI Report for OUI of the USS Lead Site.

EPA notes that an arsenic soil concentration of 26 mg/kg also corresponds with a risk level of 1×10^{-4} for residential land use if one assumes that 25 percent of the produce consumed by residents of OUI is comprised of homegrown produce (grown within OUI).

Institutional Controls

Comment: EPA should revise the proposed ROD Amendment to provide (1) a full accounting for all costs associated with the ICs; and (2) evaluate whether the long-term cost of implementing ICs is cost effective as compared to the full cleanup in Alternative 4D, which does not require any ICs.

Response: EPA has revised Alternative 4B to provide (1) a full accounting for all costs associated with the ICs; and (2) evaluate whether the long-term cost of implementing ICs is cost effective compared to the full cleanup in Alternative 4D. Modified Alternative 4B is estimated to cost \$28,80,000 including an estimated cost of \$2,018,710 for ICs. Alternative 4D is

estimated to cost \$48,530,000, including an estimated cost for ICs of \$21,000. The difference in cost between these two remedies is approximately \$19,730,000 even when the full costs of ICs are considered.

Comment: EPA has not provided a sufficiently detailed description of the Institutional Controls, omitting descriptions of what steps the landowners or utilities will need to take to dig deeper than 24” and omitting the costs associated with implementing these ICs.

Response: Modified Alternative 4B includes the costs of implementing the ICs associated with the steps persons will need to take to dig deeper than 24” bgs. EPA has estimated that the cost of implementing these ICs is \$2,018,710. Please see ROD Amendment, Section XX. EPA has included these costs in the final cost estimate for Modified Alternative 4B and compared this revised cost estimate with the cost of implementing Alternative 4D, the only remedy under consideration that would not require ICs. As noted above, EPA has determined that it will cost almost \$20 million more to implement Alternative 4D rather than Modified Alternative 4B, but that implementation of Alternative 4D does not provide significantly more protection to human health and the environment.

Institutional Controls are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. ICs work by limiting land or resource use and by providing information that helps modify or guide human behavior at properties where hazardous substances prevent unlimited use and unrestricted exposure. Common examples of ICs include zoning, building or excavation permits, well drilling prohibitions, and easements and restrictive real covenants. ICs are divided into four categories: proprietary controls (e.g., easements, restrictive covenants); governmental controls (e.g., zoning, local ordinances); informational devices (e.g., notices filed in the land records, advisories); and enforcement controls with enforcement and permit tools with institutional controls components (e.g., consent decrees, administrative orders).

Both Alternative 4A and Modified Alternative 4B require persons to record an ERC. As set forth in the ROD Amendment, the terms of the ERC will depend upon which remedy is ultimately implemented. Either ERC will ensure that the remedy remains protective of human health and the environment.

Comment: EPA should “identify whether a particular stakeholder group may be harmed as a result of a proposed IC.”

Response: Typically, the stakeholder harmed by a proposed IC is the property owner, here the City and the ECHA. Some members of the public have argued that if the cost of the ICs is borne by the City and ECHA, the public at large will end up bearing the cost of the ICs in the form of higher costs for residential housing if the property is developed for residential purposes. Modified Alternative 4B makes clear that if the property is developed for residential purposes, the cost of implementing the ICs will not be borne by the City or ECHA.

Public comments on the Proposed Plan made clear that citizen stakeholders were concerned that Modified Alternative 4B (Excavate to 24” plus ICs) as described in the Proposed Plan would shift to the community and its taxpayers, the costs associated with excavations for footers, utilities, and a water main during residential redevelopment. In response to these concerns, EPA drafted Modified Alternative 4B. As modified, Alternative 4B makes the costs associated with excavation of contaminated soils at depth a part of the remedy and not a cost to be borne by or passed on to the City or ECHA.

Comment: EPA has not solicited input specifically about potential ICs.

Response: EPA has solicited input on the entire array of Alternatives many of which included ICs as a component of the remedy. The public has commented on the IC component of the Alternatives. EPA has considered and acted upon those comments by modifying Alternative 4B.

Comment: EPA would be mistaken if it assumed that fewer public comments on the ICs meant that there was community acceptance of the ICs.

Response: EPA has not made any assumption about community acceptance of ICs based on the number of comments about ICs. To the contrary, the only reasonable assumption based on the comments from the public is that the public favors Alternative 4D over Modified Alternative 4B in part because Alternative 4D does not require ICs since no contamination would be left in place. As noted, the cost of Alternative 4D is almost \$20 million more than Modified Alternative 4B, even when the cost of ICs is factored into the equation.

Comment: EPA did not describe with enough specificity the cost of implementing fully-protective ICs and did not indicate that it will need to evaluate the effectiveness of the ICs as part of the five-year review.

Response: Fully-protective ICs are ICs sufficient to ensure that the remedy as implemented protects human health and the environment over time. EPA has identified a variety of ICs. After completion of construction of the remedy, EPA will track compliance with the ICs portion of the remedy. In a document entitled, *Strategy to Ensure Institutional Control Implementation at Superfund Sites* (OSWER No. 9355.0-106)(September 2004), EPA described the IC Tracking System (ICTS). The ICTS is a tool that EPA uses to help ensure the long-term durability, reliability, and effectiveness of ICs throughout their life-cycle. EPA set the goal of conducting analysis either through an independent evaluation or a scheduled Five-Year Review to determine whether necessary ICs have been properly implemented. EPA typically funds and performs the Five-Year Review, including the review of ICs implementation, and then bills liable parties for the cost of the Five-Year Review. EPA expects to use this standard approach at the USS Lead Site.

Comment: Residents, community groups and the city are unable to assess fully the impact of EPA’s planned ICs and are thus unable to comment on their implementation without specific information about potential ICs.

Response: EPA provided sufficient information about prospective ICs in the Proposed Plan to enable residents, community groups and the City of East Chicago to assess the impact of the ICs

and comment on their implementation. After reviewing the description of the ICs in the Proposed Plan, community groups observed that the proposed ICs would require the property owners (ECHA and the City) to bear the cost of addressing soils remaining at depth. In response to public comments and concerns regarding the need to and cost of managing contaminated soil during redevelopment, EPA has modified the scope and costs of the Alternative 4B (Excavation to a depth of 24") and Alternative 4C (Excavation to groundwater) to require the development and implementation of a Soil Management Plan and to take into consideration the costs of managing soils during redevelopment.

The ICs, in the form of an ERC, will alert persons that contamination exists at depth and that excavation into contaminated soils must be done with care. This will protect workers by notifying them of the need to take precautions to prevent direct contact or inhalation of contaminated soils. This will also protect residents of Zones 2 and 3 by reducing the likelihood of inhalation of contaminated soils by alerting persons who may disturb contaminated soils at depth that they must take precautions when handling such soils.

Compliance with ARARs

Comment: EPA should undertake a proper analysis of all ARARs before finalizing its remediation plan.

Response: EPA has undertaken a proper analysis of all ARARs before finalizing its remediation plan. The acronym "ARARs" stands for applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws. EPA is instructed to consider ARARs when establishing remedial action objectives. See, 40 C.F.R. 300.430(e)(i)(A). EPA did evaluate all ARARs and the list of ARARs evaluated by EPA is included in Appendix C of the ROD Amendment. The commenter suggests that IDEM's remediation closure guide was not followed and Voluntary Remediation Act would be considered an ARAR. EPA coordinated with IDEM to identify the state law ARARs. ARARs include only state or federal laws or regulations. ARARs do not include guidance documents.

IDEM's Remediation Closure Guide (RCG) and the referenced screening levels are not ARARs; they are guidance and as such are not enforceable. Neither EPA nor IDEM consider the RCG or the screening levels contained in it as ARARs. The RCG and the screening levels are seen by EPA as fitting into the "To Be Considered" criteria found in the *EPA's CERCLA Compliance with Other Laws Manual*. Screening levels are just that, levels used to screen for the presence of contaminants. If a threshold level is met, it is an indication that further action needs to be taken. The potential actions in this case are the Alternatives that were evaluated and considered by both EPA and by IDEM.

Comment: EPA is violating the LDRs since mixed waste is declared no-longer hazardous and land disposal takes place without any proof of the long-term effectiveness in preventing migration of persistent toxic contaminants from the landfill. Toxic metals do not breakdown over time.

Response: EPA is not violating the Land Disposal Restrictions regulations (“LDR regulations”). Congress passed RCRA in 1976 to ensure hazardous waste is safely managed from generation to disposal. In 1984, Congress updated RCRA by prohibiting land disposal of certain hazardous wastes, and, as a result, EPA developed the LDR regulations. The LDR regulations require that protective treatment standards must be met before hazardous waste is land disposed. A waste is considered a “hazardous wastes” if the waste is either a listed or characteristic hazardous waste. EPA does not know nor is it likely to be able to determine whether Anaconda Copper, which ceased operations within modified Zone 1 in the late 1940s, or Eagle-Picher, a bankrupt company that ceased operations within modified Zone 1 in the early 1950s, disposed of within modified Zone 1 what would after 1984 be considered “listed hazardous wastes.”

Soils contaminated with lead and arsenic are not among the wastes listed on one of the four lists (the F, K, P and U lists) found in title 40 of the Code of Federal Regulations (CFR) in section 261. Some of the soils within modified Zone 1 contain concentrations of lead and arsenic that are sufficiently high that EPA considers these soils to be hazardous wastes because they have the characteristic of toxicity. EPA estimates that about 50% of the soil located within modified Zone 1 will fail the TCLP test and be classified as characteristic hazardous waste. If the soil is deemed hazardous, then treatment will be required prior to disposal in order to stabilize the waste and reduce the likelihood that the waste will contaminate groundwater in the vicinity of the disposal facility.

Comment: EPA’s Mixture rule makes it illegal to mix Listed Hazardous Wastes to avoid regulation under federal law and Listed Hazardous Wastes are known to have been present at USS Lead Superfund site.

Response: Mixing wastes for the purpose of diluting the wastes to meet treatment standards is prohibited by the LDR regulations. The LDR regulations consists of three elements: the disposal prohibition; the dilution prohibition; and the storage prohibition. The dilution prohibition states that waste must be properly treated and not simply diluted in concentration by adding large amounts of water, soil, or non-hazardous waste. Dilution does not reduce the toxicity of the hazardous constituents. The lead and arsenic contaminated soils within modified Zone 1 are not listed hazardous wastes as the soils are not among the waste streams specifically listed in 40 C.F.R. section 261. EPA has no knowledge of whether wastes, which following the enactment of RCRA in 1976 and the amendments to RCRA in 1984 might be considered listed hazardous wastes - were disposed of within modified Zone 1 by either Anaconda Copper or Eagle-Picher in the 1930s, 1940s or early 1950s.

EPA is not proposing that wastes be diluted. The Amended ROD will require that the soils be tested to determine whether they are characteristic hazardous wastes. If the soils are characteristic hazardous wastes, the soils will be treated prior to disposal. Contaminants within modified Zone 1 were disposed of before 1970, prior to the enactment of RCRA. EPA has limited knowledge of the sources of the lead and arsenic. Anaconda was involved in the processing of secondary lead. Certain waste streams from the secondary processing of lead

generate K listed wastes. EPA has no knowledge of whether Anaconda or Eagle-Picher disposed of what are now considered to be K listed wastes within modified Zone 1 prior to the cessation of operations.

Comment: EPA and IDEM have approved the use of mining and diluting other materials with the toxic and contaminated wastes in a treatment scheme that will also make it more difficult to recover these resources in the future. This is being done in order to ensure passage of the Toxicity Characteristic Leaching Procedure (TCLP) test for land disposal. Otherwise most of these toxic wastes are banned from land disposal under current federal and state standards.

Response: Neither EPA nor IDEM has approved diluting wastes to meet treatment standards. The TCLP test was developed to determine whether a material should be deemed a hazardous waste under the Resource Conservation and Recovery Act. The TCLP test involves placing material in a container, pouring a pure liquid through the material and then analyzing the content of the liquid that has leached through the material. The type and concentration of a contaminant in the leachate determines whether the material is classified for disposal purposes as “hazardous” or “non-hazardous” RCRA wastes.

Currently, EPA tests soil using the TCLP test to determine if the soil is a characteristic hazardous waste. If the soil contains enough lead or arsenic to be characterized as a hazardous waste, the soil will be treated and stabilized prior to disposal. If the contaminated materials are not a hazardous waste then they may be disposed at a non-hazardous, subtitle D, waste facility. In the Feasibility Study Addendum, EPA has assumed based on known concentrations that over 50% of the soil excavated will require treatment before disposal. Contrary to the assertion of the commenter, contaminated soils from the USS Lead site can be disposed of off-site in a landfill notwithstanding certain Land Disposal Restrictions (LDRs). A portion of the contaminated soils at USS Lead within Zone 1 are considered characteristic hazardous wastes and will require treatment before disposal. This method of analysis and treatment as necessary allows EPA to dispose of contaminated material consistently with the LDRs.

Wildlife Considerations

Comment: EPA should consider whether the documented presence of a bald eagle nest in nearby Operable Unit 2 of the USS Lead Site alters the conclusion that no ecological risk assessment is need for the proposed ROD Amendment.

Response: EPA will consider the impacts of a bald eagle nest in nearby Operable Unit 2 as part of the on-going remedial investigation of OU2. Operable Unit 2 includes dune and swale areas along the banks of the Grand Calumet River. These areas are known to be habit for wildlife. EPA expects to perform an ecological risk assessment in connection with the remedial investigation for Operable Unit 2. The properties that comprise modified Zone 1 are urban landscapes consisting of a former housing complex, an urban park and a utility right of way. EPA has no evidence of a bald eagle nest within modified Zone 1.

Comment: The ROD Amendment is falsely based on the assumption that no ecological habitat exists in Zone 1 when wildlife and waterfowl can be regularly observed nesting in the area and feeding upon contaminated land.

Response: The properties that comprise modified Zone 1 are urban landscapes consisting of a former housing complex, an urban park and a utility right of way. EPA has no evidence of a bald eagle nest within modified Zone 1. The remedy chosen for modified Zone 1 will mitigate the risks to ecological receptors since the top two feet of soil will be removed and replaced with clean soil.

EPA will consider the impacts of a bald eagle nest in nearby Operable Unit 2 as part of the ongoing remedial investigation of OU2. Operable Unit 2 includes dune and swale areas along the banks of the Grand Calumet River. These areas are known to be habit for wildlife. EPA expects to perform an ecological risk assessment in connection with the remedial investigation for Operable Unit 2.

Use of Alternative Treatment Technologies

Comment: EPA should prefer a permanent solution using alternative treatment technologies to the maximum extent practicable with reductions in volumes, mobility and toxicity of toxic and hazardous wastes instead of land disposal of toxic and contaminated remedial wastes. EPA should be using treatment technologies in a combined system to separate, reclaim and recycle, decontaminate, and restore soils and groundwater. EPA should be using cascading hydrocyclone system for the separation of metals from the soil. East Chicago is located upon the Calumet Sand aquifer which is made up of 75% quartz sand by weight and is chemically inert which allows the toxic contaminants to be separated by hydrocyclones. Bethlehem Steel Corp has patented a cascading hydrocyclone system for the separation of zinc and lead from blast furnace sludge.

Response: CERCLA directs EPA to “select a remedial action that is protective of human health and the environment, that is cost effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.” See, Section 121(b) of CERCLA, 42 U.S.C. 9621(b). EPA evaluated separation technology for metals. The results of the evaluation were set forth in a report titled *Soil Washing Remedial Alternative Screening Technical Memorandum for USS lead OUI Zone 1*, (May 2018). To separate metals from soil using soil washing, hydrocyclones would be used but hydrocyclones will not be effective without the use of a chemical separation process. The use of chemical separation is necessary because the top portion of modified Zone 1 is comprised of organic material and silty sand.

Physical separation - such as hydrocyclones - will not be effective since the lead and arsenic are adsorbed onto the soil. The addition of chemical separation with physical separation would increase the cost to treat the top two feet to over \$75 million dollars, with approximately the recovery of lead in an amount valued at \$2 million. The recovery is expensive – Modified Alternative 4B is estimated to cost approximately \$28,800,000 more than \$45 million less - and

the process would be difficult to implement; it would require large amounts of water that would need to be managed and treated for the separation technology. In addition, based on known sampling data, the native sand, which is part of the Calumet Aquifer, is not contaminated.

Comment: EPA should be evaluating a new metals separation and recovery technology from Metals U.S. The demolition of WCHC provides EPA an opportunity to recover valuable and strategic resources and can be sold to off-set the cleanup costs. This would also allow EPA to meet the requirements of the Superfund Amendments and Reauthorization Act (SARA), which stresses the importance of and requires preference of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites. EPA has not chosen to do that with this ROD Amendment.

Response: EPA has researched a purportedly new metals separation and recovery technology from Metals U.S. and did not find a single site where this technology has been used in full-scale to separate metals from soil. To bring experimental technology into a residential neighborhood to do metals separation would be difficult to implement and based on our soil washing analysis, the economics would likely not be favorable. The approach outlined in Modified Alternative 4B (Excavation to a depth of 24" plus ICs) has been shown to be effective at many Superfund sites contaminated with lead and arsenic. Excavation and off-site disposal are also consistent with the cleanup in Zone 2 and Zone 3, as well as with other sites across the country. EPA views excavation and off-site disposal at an appropriate disposal facility to be the best approach for modified Zone 1.

Comment: The preferred alternative fails to prefer permanent solutions and alternative treatment technologies to the maximum extent practicable with reductions in volumes, mobility and toxicity. The preferred alternative would increase the volume. The alternative fails to reduce the toxicity of the metals and metals will be disposed of in another community.

Response: EPA has chosen a permanent solution that is the best balance of the nine criteria and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The soil which fails the TCLP test will require treatment prior to disposal, likely through stabilization. EPA estimates that approximately 50% of the soil will require treatment before disposal. The commenter is correct that it is likely the volume will increase with the treatment, but the treatment method will meet the LDRs. Stabilization of soils is a common treatment method for soil contaminated with metals. The chosen remedy is also consistent with other lead and arsenic contaminated sites across the country and the Superfund Lead Contamination Handbook, which provides guidance on how to remediate sites contaminated with lead.

Enforcement Critique

While a critique of EPA's enforcement strategy is beyond the scope of this public comment period, which sought comments on the Proposed Remedy for Zone 1, EPA has elected to respond briefly to the comments that have critiqued its enforcement actions.

Comment: EPA has chosen not to pursue additional PRPs to fund the cleanup and EPA has the authority and ability to fund a permanent cleanup.

Response: EPA, in consultation with and with support from the Department of Justice, has pursued potentially responsible parties (PRPs). Funding obtained through settlements with PRPs and work obtained pursuant to orders issued to PRPs have facilitated the cleanup of 765 individual residences in Zone 2 and Zone 3, and the on-going investigation of groundwater beneath the entire Site. EPA and DOJ will engage with PRPs to secure funding for or the direct implementation of the remedy for Modified Zone 1 – whether Alternative 4A or Modified Alternative 4B - described in the Amended ROD.

Comment: The responsible parties should bear the costs of properly cleaning up the soil to native sands – not the housing developers, small contractors, future homeowners, utilities or the City of East Chicago.

Response: EPA intends to require potentially liable parties to implement or pay for the cost of remedial action, including the costs of developing and implementing the Soil Management Plan if Modified Zone 1 is developed for residential use. EPA has Modified Alternative 4B since the issuance of the proposed plan in order to better facilitate residential redevelopment. Modified Alternative 4B requires persons who perform work that may disturb contaminated soils at depths greater than 24" bgs to prepare a Soil Management Plan. The purpose of the Soil Management Plan is to identify best practices for protecting human health while performing activities at depth and to require the proper handling and disposal of contaminated material.

The cost of developing and implementing the Soil Management Plan is an element of the work required by the Amended Record of Decision. The cost of developing and implementing the Soil Management Plan will not be borne by utilities or residential developers. Institutional Controls (ICs) may include a deed restriction, which prohibits the installation of drinking water wells or the disturbance of soils at a depth of greater than 24" below ground surface (bgs) unless in compliance with an approved Soil Management Plan. Because the cost of developing and implementing the Soil Management Plan for residential end use is not borne by the community, EPA is not devaluing the land or taking anything of value from the Calumet residents. The cleanup described in the ROD Amendment should facilitate the successful residential redevelopment of modified Zone 1.

Alternative 4A will facilitate the successful commercial/industrial redevelopment. Successful commercial/industrial redevelopment does not require the extensive ICs developed for Modified

Alternative 4B. In the context of commercial/industrial redevelopment, the cost of addressing contaminated soils at depth will be allocated among the developer and potentially liable parties; the municipal authorities will not bear these costs. Furthermore, these costs will not be borne by future residents because there will be no residents under a commercial/industrial scenario.

Comment: Zone 2 should have been part of the 2014 Consent Decree and should not have been addressed through Unilateral Administrative Orders issued in 2018. The ROD Amendment should treat all of the residential areas of the USS Lead Superfund site equally and comprehensively as one Superfund site.

Response: A consent decree to perform remedial action work as required by the 2012 ROD is entered through agreement of the parties. At the time of the negotiations the parties were unable to reach agreement on who would be responsible for the cleanup of Zone 2. By using both administrative and judicial mechanisms, EPA and the Department of Justice secured funds to commence the cleanup of the USS Lead Site. EPA has completed the cleanup of all 285 homes in Zone 3 that required cleanup and expects to complete the cleanup of railroad properties in Zone 3 in 2020. EPA has completed the cleanup of 480 homes of the 508 homes in Zone 2 known to require cleanup under the ROD. EPA expects to complete the cleanup of all homes in Zone 2 as well as remaining railroad properties in Zone 2 in 2020.

The ROD Amendment will treat equally all residential areas and all commercial/industrial areas within the USS Lead Superfund site. The ROD for Operable Unit 1 (OU1) established the same remediation goals and objectives for the entire OU1, which includes Zones 1, 2, and 3. EPA divided OU1 into three zones, known as Zone 1, Zone 2 and Zone 3 for administrative convenience. Modified Zone 1 is the subject of this Amended ROD and consists of the former West Calumet Housing Complex (WCHC), Goodman Park, and an adjacent utility corridor. Zone 2 consists of a predominantly residential neighborhood that begins immediately east of WCHC and extends to Kennedy Avenue and Huish Drive. Zone 3 consists of a predominantly residential neighborhood east of Kennedy Avenue and Huish Drive.

In 2014, EPA concluded negotiations and entered a Consent Decree with certain private parties. Pursuant to the Consent Decree, the private parties agreed to fund work in Zone 1 and Zone 3. The Consent Decree was viewed by EPA as the quickest way possible to secure private funds for cleanup of OU1. In 2016 and with federal funds, EPA began sampling and remedial design work in Zone 2. In 2018, EPA issued a Unilateral Administrative Order to various private parties to fund remedial actions within Zone 2.

Through August 31, 2019, all 285 residences that require remediation and are located in Zone 3 have been remediated. In Zone 2, 480 residences of the 508 residences known to require remediation have been remediated. Remediation has not begun within modified Zone 1 due to changed circumstances caused by the demolition of the residential buildings and hardscape within the former WCHC.

EPA has treated the residential areas in Zone 1, Zone 2, and Zone 3 equally. The residential remedial action levels for lead (400 ppm) and arsenic (26 ppm) in Zones 1, 2 and 3 are identical. In all three zones, contaminated soils located in residential areas will be excavated to a depth of 24” bgs.²⁴ If the future use of Modified Zone 1 is commercial/industrial, the cleanup will be to a depth of 12” and the remedial action levels will be 800 ppm for lead and 26 ppm for arsenic.

²⁴ At certain properties in Zone 2 and Zone 3, the private parties elected to excavate below 24 inches in order to capture all lead and arsenic contamination and avoid the cost of recording ICs.

Appendix B
Costs of Modified Alternative 4B Including Costs of
Institutional Controls and a Comparison of Its Cost to the
Cost of Other Remedies



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

Date: December 4, 2019
To: File
From: Thomas Alcamo, Remedial Project Manager
Subject: Detailed Cost Analysis

Attached to this memorandum are detailed cost calculations for a series of Alternatives used in the Record of Decision (ROD) Amendment for the USS Lead Superfund site. The purpose of recalculating the costs for each of the Alternatives was to capture the costs to manage contaminated soils that will remain at depth following the initial remedial action and will be disturbed by future residential redevelopment. Alternatives that were evaluated after the receipt of public comments include:

- Alternative 4B – Excavation to Two Feet
- Alternative 4C – Excavation to Groundwater
- Alternative 4D – Excavation to Native Sand
- Alternative 4E – Excavation to 36 inches (for comparison purposes and for use in the Responsiveness Summary)

Several assumptions were used to calculate the costs associated with the management of contaminated soils at depths of greater than 24” in the course of residential redevelopment include the following:

- The construction of 184 single family homes (92 homes were present on one-half of the West Calumet Housing Complex).
- Footers for the 184 homes, as required by Indiana law, would be placed at a depth of 36 inches, and the footers would be 1-foot wide and be in total for each house 1,850 feet long.
- Utility service lines would be placed at a depth of 36 inches, and the excavation would be 36 inches wide and 60 feet long for each of the 184 properties.
- Gas and electric mains would be installed to a depth of 48 inches below ground surface.
- A new water main would be installed at a depth of 72 inches below ground surface.

The costs associated with managing contaminated soils during future residential redevelopment were added onto the costs for implementing the initial remedy. The costs associated with managing contaminated soils during future residential redevelopment are represented within the attached cost tables as the cost of institutional controls.

Alternative 4B – Excavation to Two Feet

- Capital Cost - \$150,000 (Prep) + \$22,797,351 (Phase 1) + \$53,000 (restoration + \$460,007 (Bond 2%) = \$23,460,358 + \$300,000 (Project Management) = \$23,760,358
- Costs for ICs - \$2,018,710 + \$40,374 (Bond 2%) = \$2,059,084
- O&M – 30 years \$360,206
- Contingency 10% - \$2,617,965

- **TOTAL = \$28,800,000**

Alternative 4C – Excavation to Groundwater/Native Sand

- Capital Cost - \$150,000 (Prep) + \$31,815,840 + \$53,000 (restoration) + \$640,376 = \$32,659,216 + \$450,000 (Project Management) = \$33,109,216
- Costs for ICs - \$43,436 + \$868 (2% bond) = \$44,304
- O&M – 30 years \$360,206
- Contingency 20% - \$6,702,746

- **TOTAL = \$40,220,000**

Alternative 4D – Excavation to Native Sand

- Capital Cost - \$250,000 (Site Prep) + \$36,952,895 (Implementation) + \$253,000 (Restoration) + \$749,118 (2% Bond) + 600,000 (Project Management) = \$38,805,013
- Costs for ICs - \$21,000
- O&M Costs - \$0
- Contingency 25% - \$9,706,503

- **TOTAL = \$48,530,000**

Alternative 4E – Excavation to 36 Inches

- Capital Cost - \$150,000 (Preparation) + \$29,853,358 (Phase 1) + \$55,000 (restoration) + \$601,167 (2% bond) = \$30,659,525 + \$450,000 (Project Management) = \$31,109,525
- Costs for ICs - \$56,737 + \$1134 (2% bond) = \$57,871
- O&M – 30 years \$360,206
- Contingency 10% - \$3,152,760

- **TOTAL = \$34,680,000**

ALTERNATIVE 4B1 - EXCAVATION FOR RESIDENTIAL REUSE TO 24 INCHES

CAPITAL COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Preparation					
1	Engineering Design/Agency Approvals/Access Agreements	1	Lump	\$ 150,000.00	\$ 150,000
Preparation Subtotal					\$ 150,000
Phase 1 - Implementation					
2	Construction Contractor Mobilization, Site Preparation and Submittals	1	Lump	\$ 250,000.00	\$ 250,000
3	Excavation and loading of 24 inches of impacted surface material	157,206	CY	\$ 8.50	\$ 1,336,248
4	Excavation of soil over utility lines	741	CY	\$ 56.00	\$ 41,496
5	Concrete size reduction - excavation of concrete foundations	5,000	CY	\$ 2.29	\$ 11,450
6	Hauling and disposal of hazardous material (51% of soil above 2 ft)	120,829	TON	\$ 95.00	\$ 11,478,774
7	Hauling and disposal of non-hazardous material (49% of soil above 2 ft)	128,591	TON	\$ 45.00	\$ 5,786,586
8	Installation of non-woven geotextile liner	244,420	SY	\$ 1.28	\$ 312,858
9	Backfill	162,947	CY	\$ 20.65	\$ 3,364,849
10	Seeding	244,420	SY	\$ 0.88	\$ 215,090
Phase 1 Subtotal					\$ 22,797,351
Phase 2 - Institutional Controls					
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 25,000.00	\$ 25,000
12	Excavation of Footers (3 feet deep, 1 foot wide, 1850 long) 184 properties	37,904	CY	\$ 17.00	\$ 644,368
13	Excavation of Service lines (3 feet deep, 3 feet wide, 60 feet long) 184 properties	3,680	CY	\$ 17.00	\$ 62,560
14	Excavation of soil for gas and electric main lines (48 inches below grade)	215	CY	\$ 17.00	\$ 3,647
15	Excavation of soil for new water main (72 inches below grade)	161	CY	\$ 17.00	\$ 2,735
16	Water Management	1	Lump	\$ 5,000.00	\$ 5,000
17	Hauling and disposal of hazardous material (30% of soil below 2 ft)	6,272	TON	\$ 95.00	\$ 595,840
18	Hauling and disposal of non-hazardous material (70% of soil below 2 feet)	14,635	TON	\$ 45.00	\$ 658,560
19	Prepare LUC Implementation Plan (mid-level staff with senior review)	100	hr	\$ 110.00	\$ 11,000
20	Meetings with agencies (senior staff and attorneys)	40	hr	\$ 250.00	\$ 10,000
Phase 2 Subtotal					\$ 2,018,710
Site Restoration					
21	Site Restoration and Cleanup	1	Lump	\$ 3,000.00	\$ 3,000
22	Demobilization	1	Lump	\$ 50,000.00	\$ 50,000
Site Restoration Subtotal					\$ 53,000
Construction Subtotal					\$ 25,019,061
23	Construction Contractor Bonds	2%			\$ 500,381
24	Project Management and Construction Oversight (7 months)				\$ 300,000.00
Construction subtotal plus Contractor Bonds, Project Management, and Oversight					\$ 25,819,442
CAPITAL COST SUBTOTAL					\$ 25,819,442
O&M COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Annual Maintenance					
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	50.5	AC	\$ 50.00	\$ 2,525
Maintenance Subtotal					\$ 2,525
Annual Inspections					
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	8.0	hr	\$ 200.00	\$ 1,600
3	Annual inspection report	1.0	ls	\$ 5,000.00	\$ 5,000
4	Project Management	4.0	hr	\$ 200.00	\$ 800
Inspections Subtotal					\$ 7,400
Annual Operation and Maintenance Subtotal					\$ 9,925
ALTERNATIVE 4B1 - RESIDENTIAL STANDARD					
Description	Subtotal				
Construction	\$ 25,819,442				
Operation and Maintenance (30-Year Present Value Analysis Costs)	\$ 360,206				
Contingency	10%	\$ 2,617,965			
Total (Rounded)	\$ 28,800,000				

Quantity and Cost Assumptions: Alternatives 4B1

Item Number	DESCRIPTION	ASSUMPTION
	CAPITAL COSTS	
	Preparation	
1	Engineering Design/Agency Approvals/Access Agreements	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
	Phase 1 Implementation	
2	Construction Contractor Mobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
3	Excavation and loading of 24 inches of impacted surface material	Quantity based on 50.5 acres excavated to 2 feet, minus volume hand dug and concrete debris. Cost based on RS Means CostWorks software.
4	Excavation of soil over utility lines	Quantity based on utility corridor excavated to 2 feet along east side of site. Cost based on RS Means CostWorks software.
5	Concrete size reduction - excavation of concrete foundations	Engineer estimate of concrete volume using limited subsurface sample results. Cost based on RS Means CostWorks software
6	Hauling and disposal of hazardous material (51% of soil above 2 ft)	Quantity based on analytical results for % of soil samples exceeding 2000 mg/kg lead in top 2 feet of soil. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal. See Table 1 for volume and percentage.
7	Hauling and disposal of non-hazardous material (49% of soil above 2 ft)	Quantity based on analytical results for % of soil samples below 2000 mg/kg lead in top 2 feet of soil. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois. See Table 1 for volume and percentage.
8	Installation of non-woven geotextile liner	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.
9	Backfill	Quantity based on 2 feet of fill over 50.5 acres. Cost based on RS Means CostWorks software.

10	Seeding	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.
	PHASE 2 – Institutional Controls	
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
12	Excavation of Footers (3 feet deep, 1 foot wide, 1850 long) 184 properties	Quantity based on footers excavated to 3 feet for footers that are 1 foot wide for 184 properties. Average perimeter of single home is 1850 feet. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 1 foot of contaminated soil. Cost based on RS Means CostWorks software.
13	Excavation of Service lines (3 feet deep, 3 feet wide, 60 feet long) 184 properties	Quantity based on excavation for 3 service lines (water, gas, and electric) to 184 properties. For each property, excavation for service lines is 3 feet wide, 3 feet deep, and 60 feet long. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 1 foot of contaminated soil. Cost based on RS Means CostWorks software.
14	Excavation of soil for gas and electric main lines (48 inches below grade)	Quantity based on excavation for gas and electric main in area where contaminated soils exist below 3 feet. Linear feet of lines within impacted area shown in Figure 1. Excavation volume is 2 feet wide, 4 feet deep, and 724 feet in length. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 2 foot of contaminated soil. Cost based on RS Means CostWorks software
15	Excavation of soil for new water main (72 inches below grade)	Quantity based on excavation for water main in area where contaminated soils exist below 3 feet. Linear feet of lines within impacted area shown in Figure 1. Excavation volume is 1 foot wide, 6 feet deep, and 724 feet in length. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 4 foot of contaminated soil. Cost based on RS Means CostWorks software
16	Water Management	Engineer estimate based on similar projects
17	Hauling and disposal of hazardous material (30% of soil below 2 ft)	Quantity based on 30% of volume of contaminated soil segregated in Items 12, 13, 14,15. Percentage is an engineer

		estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal.
18	Hauling and disposal of non-hazardous material (70% of soil below 2 feet)	Quantity based on 70% of volume of contaminated soil segregated in Items 12, 13, 14,15. Percentage is an engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois.
19	Prepare LUC Implementation Plan (mid-level staff with senior review)	Engineer estimate
20	Meetings with agencies (senior staff and attorneys)	Engineer estimate
	SITE RESTORATION	
21	Site Restoration and Cleanup	Engineer estimate for both Phases 1 and 2
22	Demobilization	Engineer estimate for both Phases 1 and 2
	CONSTRUCTION SUBTOTAL	
23	Construction Contractor Bonds	2% of construction subtotal
24	Project Management and Construction Oversight (7 months)	Engineer estimate based on scope and schedule
	O&M COSTS	
	Annual Maintenance	
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	Engineer estimate
	Annual Inspections	
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	Engineer estimate
3	Annual inspection report	Engineer estimate
4	Project Management	Engineer estimate
	Annual Operation and Maintenance Subtotal	
	ALTERNATIVE 4B1 SUMMARY	
	Construction	Sum of Preparation, Phase 1 and Phase 2, Site Restoration, Bonds, and Project Management
	Operation and Maintenance (30-year Present Value Cost Analysis)	Present value of 30 years of annual maintenance and inspections (\$9,925/year) discounted at 1.4%
	Contingency	Engineer estimate based on complexity and uncertainty
	Project Total	

ALTERNATIVE 4C1 - EXCAVATION TO GROUNDWATER

CAPITAL COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Preparation					
1	Engineering Design/Agency Approvals/Access Agreements	1	Lump	\$ 150,000.00	\$ 150,000
Preparation Subtotal					\$ 150,000
Phase 1 - Implaementation					
2	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 250,000.00	\$ 250,000
3	Excavation and loading of impacted material	226,926	CY	\$ 8.50	\$ 1,928,871
4	Excavation of soil over utility lines	1,482	CY	\$ 56.00	\$ 82,992
5	Concrete size reduction - excavation of concrete foundations	10,000	CY	\$ 2.29	\$ 22,900
6	Hauling and disposal of hazardous material (44% of soil above grounwater)	150,749	TON	\$ 95.00	\$ 14,321,182
7	Hauling and disposal of non-hazardous material (56% of soil above groundwater)	216,863	TON	\$ 45.00	\$ 9,758,822
8	Installation of non-woven geotextile liner	244,420	SY	\$ 1.28	\$ 312,858
9	Backfill	238,408	CY	\$ 20.65	\$ 4,923,125
10	Seeding	244,420	SY	\$ 0.88	\$ 215,090
Phase 1 Subtotal					\$ 31,815,840
Phase 2 -Institutional Controls					
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 5,000.00	\$ 5,000
12	Excavation of soil for new water line (72 inches below grade)	161	CY	\$ 17.00	\$ 2,735
13	Water Management	1	Lump	\$ 5,000.00	\$ 5,000
14	Hauling and disposal of hazardous material (30% of soil below groundwater)	49	TON	\$ 95.00	\$ 4,608
15	Hauling and disposal of non-hazardous material (70% of soil below groundwater)	113	TON	\$ 45.00	\$ 5,093
16	Prepare LUC Implementation Plan (mid-level staff with senior review)	100	hr	\$ 110.00	\$ 11,000
17	Meetings with agencies (senior staff and attorneys)	40	hr	\$ 250.00	\$ 10,000
Phase 2 Subtotal					\$ 43,436
Site Restoration					
18	Site Restoration and Cleanup	1	Lump	\$ 3,000.00	\$ 3,000
19	Demobilization	1	Lump	\$ 50,000.00	\$ 50,000
Site Restoration Subtotal					\$ 53,000
Construction Subtotal					\$ 32,062,276
20	Construction Contractor Bonds	2%			\$ 641,246
21	Project Management and Construction Oversight (9 Months)				\$ 450,000.00
Construction subtotal plus Contractor Bonds, Project Management, and Oversight					\$ 33,153,522
CAPITAL COST SUBTOTAL					\$ 33,153,522
O&M COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Annual Maintenance					
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	50.5	AC	\$ 50.00	\$ 2,525
Maintenance Subtotal					\$ 2,525
Annual Inspections					
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	8.0	hr	\$ 200.00	\$ 1,600
3	Annual inspection report	1.0	ls	\$ 5,000.00	\$ 5,000
4	Project Management	4.0	hr	\$ 200.00	\$ 800
Inspections Subtotal					\$ 7,400
Annual Operation and Maintenance Subtotal					\$ 9,925
ALTERNATIVE 4C1 - EXCAVATION TO GROUNDWATER					
Description	Subtotal				
Construction and Institutional Controls	\$ 33,153,522				
Operation and Maintenance (30-Year Present Value Analysis Costs)	\$ 360,206				
Contingency	20%	\$ 6,702,746			
Total (Rounded)	\$ 40,220,000				

Quantity and Cost Assumptions: Alternatives 4C1

Item Number	DESCRIPTION	ASSUMPTION
	CAPITAL COSTS	
	Preparation	
1	Engineering Design/Agency Approvals/Access Agreements	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
	Phase 1 Implementation	
2	Construction Contractor Mobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
3	Excavation and loading of up to 48 inches (groundwater depth) of impacted surface material	Quantity based on 50.5 acres excavated to up to 4 feet, minus volume hand dug and concrete debris. Cost based on RS Means CostWorks software.
4	Excavation of soil over utility lines	Quantity based on utility corridor excavated to up to 4 feet along east side of site. Cost based on RS Means CostWorks software.
5	Concrete size reduction - excavation of concrete foundations	Engineer estimate of concrete volume using limited subsurface sample results. Cost based on RS Means CostWorks software
6	Hauling and disposal of hazardous material (44% of soil above 4 ft)	Quantity in top 2 feet of soil based on analytical results for % of soil samples exceeding 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal. See Table 1 for volume and percentage.
7	Hauling and disposal of non-hazardous material (56% of soil above 4 ft)	Quantity in top 2 feet of soil based on analytical results for % of soil samples below 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois. See Table 1 for volume and percentage.
8	Installation of non-woven geotextile liner	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.

9	Backfill	Quantity based on fill over 50.5 acres. See Cut/Fill report for volume. Cost based on RS Means CostWorks software.
10	Seeding	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.
	PHASE 2 – Institutional Controls	
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
12	Excavation of soil for new water main (72 inches below grade)	Quantity based on excavation for water main in area where contaminated soils exist below 3 feet. Linear feet of lines within impacted area shown in Figure 1. Excavation volume is 1 foot wide, 6 feet deep, and 724 feet in length. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 4 feet of contaminated soil. Cost based on RS Means CostWorks software
13	Water Management	Engineer estimate based on similar projects
14	Hauling and disposal of hazardous material (30% of soil below 2 ft)	Quantity based on 30% of volume of contaminated soil segregated in Item 12. Percentage is an engineer estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal.
16	Hauling and disposal of non-hazardous material (70% of soil below 2 feet)	Quantity based on 70% of volume of contaminated soil segregated in Item 12. Percentage is an engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois.
16	Prepare LUC Implementation Plan (mid-level staff with senior review)	Engineer estimate
17	Meetings with agencies (senior staff and attorneys)	Engineer estimate
	SITE RESTORATION	
18	Site Restoration and Cleanup	Engineer estimate for both Phases 1 and 2
19	Demobilization	Engineer estimate for both Phases 1 and 2
	CONSTRUCTION SUBTOTAL	
20	Construction Contractor Bonds	2% of construction subtotal
21	Project Management and Construction Oversight (9 months)	Engineer estimate based on scope and schedule
	O&M COSTS	

	Annual Maintenance	
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	Engineer estimate
	Annual Inspections	
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	Engineer estimate
3	Annual inspection report	Engineer estimate
4	Project Management	Engineer estimate
	Annual Operation and Maintenance Subtotal	
	ALTERNATIVE 4B1 SUMMARY	
	Construction	Sum of Preparation, Phase 1 and Phase 2, Site Restoration, Bonds, and Project Management
	Operation and Maintenance (30-year Present Value Cost Analysis)	Present value of 30 years of annual maintenance and inspections (\$9,925/year) discounted at 1.4%
	Contingency	Engineer estimate based on complexity and uncertainty
	Project Total	

ALTERNATIVE 4D - EXCAVATION TO NATIVE SAND

CAPITAL COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Preparation					
1	Engineering Design/Agency Approvals/Access Agreements	1	Lump	\$ 250,000.00	\$ 250,000
Preparation Subtotal					\$ 250,000
Implementation					
2	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 500,000.00	\$ 500,000
3	Excavation and loading of impacted material	245,186	CY	\$ 8.50	\$ 2,084,081
4	Slope stability below water table	1	LS	\$ 1,500,000.00	\$ 1,500,000
5	Water management	60	Days	\$ 12,000.00	\$ 720,000
6	Excavation of soil over utility lines	2,164	CY	\$ 56.00	\$ 121,184
7	Concrete size reduction - excavation of concrete foundations	15,000	CY	\$ 2.29	\$ 34,350
8	Hauling and disposal of hazardous material (43% of Volume)	159,541	TON	\$ 95.00	\$ 15,156,371
9	Hauling and disposal of non-hazardous material (57% of Volume)	248,984	TON	\$ 45.00	\$ 11,204,291
10	Backfill	262,350	CY	\$ 20.65	\$ 5,417,528
11	Seeding	244,420	SY	\$ 0.88	\$ 215,090
Implementation Subtotal					\$ 36,952,895
Site Restoration					
12	Site Restoration and Cleanup	1	Lump	\$ 3,000.00	\$ 3,000
13	Demobilization	1	Lump	\$ 250,000.00	\$ 250,000
Site Restoration Subtotal					\$ 253,000
Construction Subtotal					\$ 37,455,895
14	Construction Contractor Bonds	2%			\$ 749,118
15	Project Management and Construction Oversight				\$ 600,000.00
Construction subtotal plus Contractor Bonds, Project Management, and Oversight					\$ 38,805,013
CAPITAL COST SUBTOTAL					\$ 38,805,013

INSTITUTIONAL CONTROLS COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Institutional Controls					
1	Prepare LUC Implementation Plan (mid-level staff with senior review)	100	hr	\$ 110.00	\$ 11,000
2	Meetings with agencies (senior staff and attorneys)	40	hr	\$ 250.00	\$ 10,000
Institutional Controls Subtotal					\$ 21,000

O&M COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Annual Maintenance					
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	0.0	LF	\$ 15.00	\$ -
Maintenance Subtotal					\$ -
Annual Inspections					
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	0.0	hr	\$ 200.00	\$ -
3	Annual inspection report	0.0	ls	\$ 5,000.00	\$ -
4	Project Management	0.0	hr	\$ 200.00	\$ -
Inspections Subtotal					\$ -
Annual Operation and Maintenance Subtotal					\$ -

ALTERNATIVE 4D- EXCAVATION TO NATIVE SAND		Subtotal
Description		
Construction		\$ 38,805,013
Institutional Controls		\$ 21,000
Operation and Maintenance (30-Year Present Value Analysis Costs)		\$ -

Contingency	25%	\$ 9,706,503
Total (Rounded)		\$ 48,530,000

Quantity and Cost Assumptions: Alternatives 4D

Item Number	DESCRIPTION	ASSUMPTION
	CAPITAL COSTS	
	Preparation	
1	Engineering Design/Agency Approvals/Access Agreements	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
	Implementation	
2	Construction Contractor Mobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
3	Excavation and loading of impacted surface material above native sand	Quantity based on 50.5 acres excavated to up to 11 feet, minus volume hand dug and concrete debris. Cost based on RS Means CostWorks software.
4	Slope stability below water table	Engineer estimate
5	Water Management	Engineer estimate based on similar projects
6	Excavation of soil over utility lines	Quantity based on utility corridor excavated above utilities to approximately 6 feet along east side of site. Cost based on RS Means CostWorks software.
7	Concrete size reduction - excavation of concrete foundations	Engineer estimate of concrete volume using limited subsurface sample results. Cost based on RS Means CostWorks software
8	Hauling and disposal of hazardous material (43% of soil above native sand)	Quantity in top 2 feet of soil based on analytical results for % of soil samples exceeding 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal. See Table 1 for volume and percentage.
9	Hauling and disposal of non-hazardous material (57% of soil above native sand)	Quantity in top 2 feet of soil based on analytical results for % of soil samples below 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois. See Table 1 for volume and percentage.

10	Backfill	Quantity based on fill over 50.5 acres. See Cut/Fill report for volume. Cost based on RS Means CostWorks software.
11	Seeding	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.
	SITE RESTORATION	
12	Site Restoration and Cleanup	Engineer estimate for both Phases 1 and 2
13	Demobilization	Engineer estimate for both Phases 1 and 2
	CONSTRUCTION SUBTOTAL	
14	Construction Contractor Bonds	2% of construction subtotal
15	Project Management and Construction Oversight (12 months)	Engineer estimate based on scope and schedule
	INSTITUTIONAL CONTROL COSTS	
1	Prepare LUC Implementation Plan (mid-level staff with senior review)	Engineer estimate
2	Meetings with agencies (senior staff and attorneys)	Engineer estimate
	O&M COSTS	
	Annual Maintenance	
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	Not required as all impacted soil removed
	Annual Inspections	
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	Not required as all impacted soil removed
3	Annual inspection report	Not required as all impacted soil removed
4	Project Management	Not required as all impacted soil removed
	Annual Operation and Maintenance Subtotal	
	ALTERNATIVE 4B1 SUMMARY	
	Construction	Sum of Preparation, Implementation, Site Restoration, Bonds, and Project Management
	Institutional Controls	Engineer estimate
	Operation and Maintenance (30-year Present Value Cost Analysis)	Not required as all impacted soil removed
	Contingency	Engineer estimate based on complexity and uncertainty
	Project Total	

ALTERNATIVE 4E - EXCAVATION FOR RESIDENTIAL REUSE TO 36 INCHES OR NATIVE SAND

CAPITAL COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Preparation					
1	Engineering Design/Agency Approvals/Access Agreements	1	Lump	\$ 150,000.00	\$ 150,000
Preparation Subtotal					\$ 150,000
Phase 1 - Implementation					
2	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 250,000.00	\$ 250,000
3	Excavation and loading of impacted material	213,664	CY	\$ 8.50	\$ 1,816,144
4	Excavation of soil over utility lines	1,112	CY	\$ 56.00	\$ 62,272
5	Concrete size reduction - excavation of concrete foundations	7,500	CY	\$ 2.29	\$ 17,175
6	Hauling and disposal of hazardous material (45% of soil above 3 feet)	144,974	TON	\$ 95.00	\$ 13,772,511
7	Hauling and disposal of non-hazardous material (55% of soil above 3 feet)	195,940	TON	\$ 45.00	\$ 8,817,309
8	Installation of non-woven geotextile liner	244,420	SY	\$ 1.28	\$ 312,858
9	Backfill	222,276	CY	\$ 20.65	\$ 4,589,999
10	Seeding	244,420	SY	\$ 0.88	\$ 215,090
Phase 1 Subtotal					\$ 29,853,358
Phase 2 - Institutional Controls					
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	1	Lump	\$ 5,000.00	\$ 5,000
12	Excavation of soil for gas and electric lines (48 inches below grade)	215	CY	\$ 17.00	\$ 3,647
13	Excavation of soil for new water line (72 inches below grade)	161	CY	\$ 17.00	\$ 2,735
14	Water Management	1	Lump	\$ 5,000.00	\$ 5,000
15	Hauling and disposal of hazardous material (30% of soil below 3 feet)	97	TON	\$ 95.00	\$ 9,194
16	Hauling and disposal of non-hazardous material (70% of soil below 3 feet)	226	TON	\$ 45.00	\$ 10,161
17	Prepare LUC Implementation Plan (mid-level staff with senior review)	100	hr	\$ 110.00	\$ 11,000
18	Meetings with agencies (senior staff and attorneys)	40	hr	\$ 250.00	\$ 10,000
Phase 2 Subtotal					\$ 56,737
Site Restoration					
19	Site Restoration and Cleanup	1	Lump	\$ 5,000.00	\$ 5,000
20	Demobilization	1	Lump	\$ 50,000.00	\$ 50,000
Site Restoration Subtotal					\$ 55,000
Construction Subtotal					\$ 30,115,095
21	Construction Contractor Bonds	2%			\$ 602,302
22	Project Management and Construction Oversight (9 Months)				\$ 450,000.00
Construction subtotal plus Contractor Bonds, Project Management, and Oversight					\$ 31,167,397
CAPITAL COST SUBTOTAL					\$ 31,167,397
O&M COSTS					
Item	Description	Quantity	Unit	Unit Price (Incl. O&P)	Total Cost
Annual Maintenance					
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	50.5	AC	\$ 50.00	\$ 2,525
Maintenance Subtotal					\$ 2,525
Annual Inspections					
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	8.0	hr	\$ 200.00	\$ 1,600
3	Annual inspection report	1.0	ls	\$ 5,000.00	\$ 5,000
4	Project Management	4.0	hr	\$ 200.00	\$ 800
Inspections Subtotal					\$ 7,400
Annual Operation and Maintenance Subtotal					\$ 9,925
ALTERNATIVE 4E - EXCAVATION FOR RESIDENTIAL REUSE TO 36 INCHES OR NATIVE SAND					
Description					Subtotal
Construction and Institutional Controls					\$ 31,167,397
Operation and Maintenance (30-Year Present Value Analysis Costs)					\$ 360,206
Contingency					\$ 3,152,760
Total (Rounded)					\$ 34,680,000

Quantity and Cost Assumptions: Alternatives 4E

Item Number	DESCRIPTION	ASSUMPTION
	CAPITAL COSTS	
	Preparation	
1	Engineering Design/Agency Approvals/Access Agreements	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
	Phase 1 Implementation	
2	Construction Contractor Mobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
3	Excavation and loading of up to 36 inches of impacted surface material	Quantity based on 50.5 acres excavated to up to 3 feet, minus volume hand dug and concrete debris. Cost based on RS Means CostWorks software.
4	Excavation of soil over utility lines	Quantity based on utility corridor excavated to up to 3 feet along east side of site. Cost based on RS Means CostWorks software.
5	Concrete size reduction - excavation of concrete foundations	Engineer estimate of concrete volume using limited subsurface sample results. Cost based on RS Means CostWorks software
6	Hauling and disposal of hazardous material (45% of soil above 3 ft)	Quantity in top 2 feet of soil based on analytical results for % of soil samples exceeding 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal. See Table 1 for volume and percentage.
7	Hauling and disposal of non-hazardous material (55% of soil above 3 ft)	Quantity in top 2 feet of soil based on analytical results for % of soil samples below 2000 mg/kg lead. Quantity below 2 feet based on engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois. See Table 1 for volume and percentage.
8	Installation of non-woven geotextile liner	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.

9	Backfill	Quantity based on fill over 50.5 acres. See Cut/Fill report for volume. Cost based on RS Means CostWorks software.
10	Seeding	Quantity based on material to cover 50.5 acres. Cost based on RS Means CostWorks software.
	PHASE 2 – Institutional Controls	
11	Construction Contractor Mobilization/Demobilization, Site Preparation and Submittals	Engineer estimate based on project complexity compared to similar scale projects completed in Region V and northwest Indiana
12	Excavation of soil for gas and electric main lines (48 inches below grade)	Quantity based on excavation for gas and electric main in area where contaminated soils exist below 3 feet. Linear feet of lines within impacted area shown in Figure 1. Excavation volume is 2 feet wide, 4 feet deep, and 724 feet in length. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 2 feet of contaminated soil. Cost based on RS Means CostWorks software
13	Excavation of soil for new water main (72 inches below grade)	Quantity based on excavation for water main in area where contaminated soils exist below 3 feet. Linear feet of lines within impacted area shown in Figure 1. Excavation volume is 1 foot wide, 6 feet deep, and 724 feet in length. Top 2 feet of clean soil installed in Phase 1 segregated from the bottom 4 feet of contaminated soil. Cost based on RS Means CostWorks software
14	Water Management	Engineer estimate based on similar projects
15	Hauling and disposal of hazardous material (30% of soil below 2 ft)	Quantity based on 30% of volume of contaminated soil segregated in Items 12 and 13. Percentage is an engineer estimate. Cost based on quote from Peoria Disposal Company for transportation, treatment and land disposal.
16	Hauling and disposal of non-hazardous material (70% of soil below 2 feet)	Quantity based on 70% of volume of contaminated soil segregated in Items 12 and 13. Percentage is an engineer estimate. Cost based on cost within last 3 years for transportation and land disposal of similar waste to landfills in Indiana and Illinois.
17	Prepare LUC Implementation Plan (mid-level staff with senior review)	Engineer estimate

18	Meetings with agencies (senior staff and attorneys)	Engineer estimate
	SITE RESTORATION	
19	Site Restoration and Cleanup	Engineer estimate for both Phases 1 and 2
20	Demobilization	Engineer estimate for both Phases 1 and 2
	CONSTRUCTION SUBTOTAL	
21	Construction Contractor Bonds	2% of construction subtotal
22	Project Management and Construction Oversight (9 months)	Engineer estimate based on scope and schedule
	O&M COSTS	
	Annual Maintenance	
1	Soil cap maintenance (mowing, clearing, repairing erosion damage)	Engineer estimate
	Annual Inspections	
2	Annual cap inspections (includes labor - 2 hours per site- and travel)	Engineer estimate
3	Annual inspection report	Engineer estimate
4	Project Management	Engineer estimate
	Annual Operation and Maintenance Subtotal	
	ALTERNATIVE 4B1 SUMMARY	
	Construction	Sum of Preparation, Phase 1 and Phase 2, Site Restoration, Bonds, and Project Management
	Operation and Maintenance (30-year Present Value Cost Analysis)	Present value of 30 years of annual maintenance and inspections (\$9,925/year) discounted at 1.4%
	Contingency	Engineer estimate based on complexity and uncertainty
	Project Total	

Table 1. Hazardous and Nonhazardous Soil Volumes and Percentages

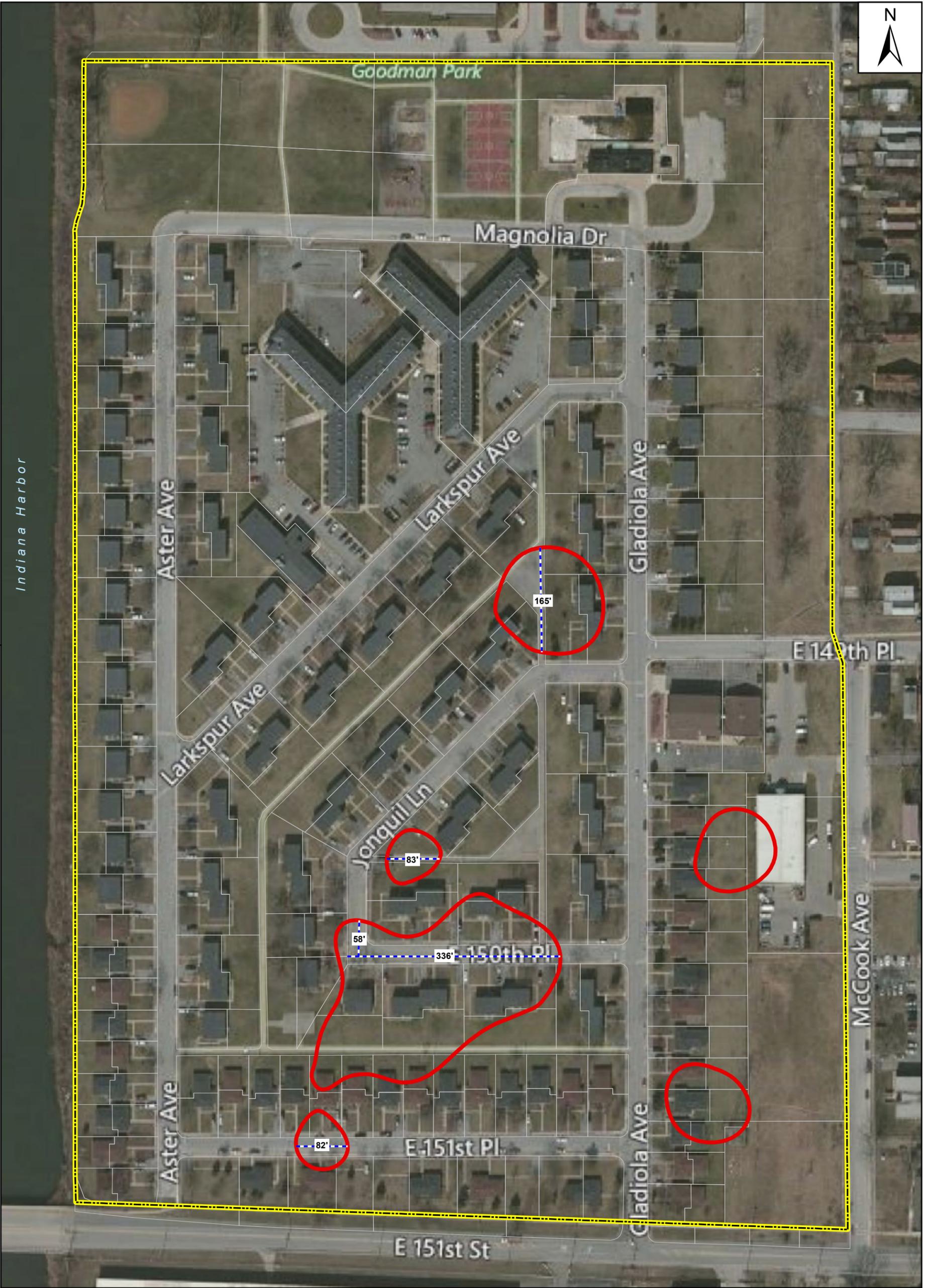
Remedial Option	Removal Interval	Total Volume (CY)	Hazardous Volume (CY)	Percent Hazardous	Non-hazardous Volume (CY)	Percent Non-hazardous
2 Feet (4B)	Top 2 Feet	162947	83103	0.51	79844	0.49
3 Feet (4E)	Top 2 Feet	162947	83103	0.51	79844	0.49
	From 2ft to 3 ft	59328	17798	0.3	41530	0.7
	Total	222275	100901	0.45	121374	0.55
GW (4C)	Top 2 Feet	162947	83103	0.51	79844	0.49
	From 2 ft to GW	75461	22638	0.3	52823	0.7
	Total	238408	105741	0.44	132667	0.56
Native Sand (4D)	Top 2 Feet	162947	83103	0.51	79844	0.49
	From 2 ft to Native	99403	29821	0.3	69582	0.7
	Total	262350	112924	0.43	149426	0.57

Assume Hazardous to Non-hazardous ratio in top 2 feet to .51 to .49. Ratio below 2 feet is .30 to .70
 GW: Groundwater

Cut/Fill Report

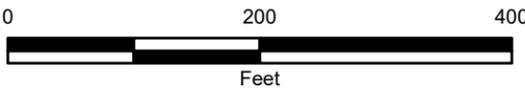
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By user: maggie.banh
Drawing: G:\G\1852\315 USS Lead\Volume Cal\2019-10\G:\G\1852\315 USS
 Lead\Volume Cal\2019-10\Soil Removal Areas100919.dwg

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Max Depth-4 feet	full	1.000	1.000	2201507.12	238407.89	0.00	238407.89<Cut>
Actual Max Depth-11 feet	full	1.000	1.000	2201507.12	262349.53	0.00	262349.53<Cut>
Max Depth-3 feet	full	1.000	1.000	2201507.12	222275.75	0.00	222275.75<Cut>



Legend

- - - Depp Utility Excavation (Total Length = 724 LF)
- Contaminated Area
- Zone 1 Site Boundary
- Parcels



USS LEAD
East Chicago, Indiana

Figure 1
Contaminated Areas
3 Feet Below Ground



File Path: G:\G182015\USS_Lead\mxd\2019-04\Fig-1-BelowGround3ft.mxd

Appendix C
List of ARARs

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
CLEAN AIR ACT (CAA) of 1974				
42 USC Section 7401-7671	The Act is intended to protect the quality of air and promote public health. Title I of the Act directed the U.S. Environmental Protection Agency (EPA) to publish national ambient air quality standards for "criteria pollutants." In addition, EPA has provided national emission standards for hazardous air pollutants under Title III of the Act. Hazardous air pollutants are also designated hazardous substances under CERCLA. The Clean Air Act amendments of 1990 greatly expanded the role of National Emission Standards for Hazardous Air Pollutants by designating 179 new hazardous air pollutants and directed EPA to attain maximum achievable control technology standards for emission sources. Such emission standards are potential ARARs if selected remedial technologies produce air emissions of regulated hazardous air pollutants.	Action-Specific	Applicable	The Act is considered an ARAR for remedies that involve creation of air emissions, such as excavation activities that might create dust. Also includes emissions rules that apply to equipment working on the project (based on date of manufacture and/or rebuild and/or overhaul).
FLOODPLAIN MANAGEMENT EXECUTIVE ORDER No. 11988				
40 CFR Part 6, Appendix A	Requires federal agencies to evaluate the potential adverse effects associated with direct and indirect development of a floodplain. Alternatives that involve modification/ construction within a floodplain may not be selected unless a determination is made that no practicable alternative exists. If no practicable alternative exists,	Location-Specific	Applicable	The Act is considered an ARAR as some properties within OU1 are adjacent to the Calumet Canal which feeds into the Grand Calumet River.

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
	potential harm must be minimized, and action taken to restore and preserve the natural and beneficial values of the floodplain.			
CLEAN WATER ACT (CWA) OF 1977				
Protection of Wetlands Executive Order 11990 [40 CFR Part 6, Appendix A]	Under this Order, federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands. If remediation is required within wetland areas and no practical alternative exists, potential harm must be minimized, and action taken to restore natural and beneficial values.	Location-Specific	Applicable	Applicability will be determined by location of wetlands, if any, along Grand Calumet River
Federal Water Pollution Control Act Section 401: Water Quality Certification	Establishes a permit program to regulate a discharge into the navigable waters of the U.S., including wetlands.	Chemical-Specific	Relevant and Appropriate	Depends on nature of remedial action chosen.
National Pollutant Discharge Elimination System 33 U.S.C. §§1251-1387 Clean Water Act NPDES Permit Program (40 CFR 122)	Regulates discharges of pollutants to navigable waters.	Action-Specific and may be Chemical-specific	Relevant and Appropriate	Depends on nature of remedial action chosen. Applies to disturbances of one acre or more of total land area and disturbances of less than one acre of land that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one or more acres of land.
FISH AND WILDLIFE COORDINATION ACT				
Fish and Wildlife Coordination Act; 16 U.S.C. §§661 et seq. 16 USC 742a	Actions that affect species/habitat require consultation with U.S. Department of Interior, U.S. Fish and Wildlife Service, and National Marine Fisheries Service, and/or state agencies, as appropriate, to	Location-Specific	Potentially Applicable	

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OUI
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
16 USC 2901 40 CFR 6.302 50 CFR 402	ensure that proposed actions do not jeopardize the continued existence of the species or adversely modify or destroy critical habitat. The effects of water-related projects on fish and wildlife resources must be considered. Action must be taken to prevent, mitigate, or compensate for project-related damages or losses to fish and wildlife resources. Consultation with the responsible agency is also strongly recommended for on-site actions. Under 40 CFR Part 300.38, these requirements apply to all response activities under the National Contingency Plan.			
RESOURCE CONSERVATION AND RECOVERY ACT OF 1976				
Off-Site Land Disposal Subtitle C [40 CFR 260-268]	Soil and/or sediment that is excavated for off-site disposal and constitutes a hazardous waste must be managed in accordance with the requirements of RCRA.	Action-Specific	Applicable	Relevant for management of soils that are characteristic hazardous wastes.
Land Disposal Restrictions [40 CFR 268.2]	The land disposal restrictions (LDR) provide a second measure of protection from threats posed by hazardous waste disposal by ensuring that hazardous waste cannot be placed on the land until the waste meets specific treatment standards to reduce the mobility or toxicity of its hazardous constituents. Hazardous waste destined for land disposal must meet the applicable Land Disposal Regulations of 40 CFR 268.	Action-Specific and Chemical-Specific	Relevant and Appropriate	Relevant for treatment of soils that are characteristic hazardous wastes.
Land Treatment [40 CFR 264.270 to	Establishes standards applicable for owners and operators of facilities that treat or dispose of hazardous waste in land treatment	Action-Specific	Relevant and Appropriate	Applicable if treatment of residue piles to render them non-hazardous occurs in a land treatment unit.

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
264.283 Subpart M]	units to ensure that hazardous constituents placed in or on the treatment zone are degraded, transformed, or immobilized within the treatment zone.			
Special Provisions for Cleanup [40 CFR 264.550 to 264.555 Subpart S]	Establishes standards for corrective action management units, temporary units, and staging piles.	Action-Specific	Applicable	Staging piles or temporary units may be needed for residue that may be a characteristic hazardous waste.
Miscellaneous Units [40 CFR 264.600 to 264.603 Subpart X]	Establishes design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the unit.	Action-Specific	Applicable/Relevant and Appropriate	ARAR if treatment or storage of the TCLP hazardous materials is in miscellaneous units.
Definition of a hazardous waste [40 CFR 261.3(d) and 329 IAC 3.1]	Applies to contaminated containment components, contaminated soils, and structures and equipment contaminated with waste.	Chemical-specific	Relevant and Appropriate	Substantive requirements are ARARs for identifying and managing characteristic hazardous waste.
Hazardous waste determination [40 CFR 262.11 and 329 IAC 3.1-6]	Requires that a proper hazardous waste determination must be made on all wastes generated from remedial actions.	Chemical-specific	Relevant and Appropriate	Substantive requirements are ARARs for identifying and managing characteristic hazardous waste.
Pre-Transportation Requirements [40 CFR 262.30, 262.31, 262.32, and 262.33 and 329	All hazardous waste must be properly packaged, with labels, markings, and placards, prior to transport.	Chemical-specific	Relevant and Appropriate	

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
IAC 3.1-7 and 329 IAC 3.1-8]				
Standards applicable to the generators of hazardous waste - The manifest [40 CFR 262, Subpart B and 329 IAC 3.1-7 and 329 IAC 3.1-8]	Hazardous waste stored onsite in containers for greater than 90 days shall be managed in accordance with 40 CFR 262, Subpart B (329 IAC 3.1-7 and 329 IAC 3.1-8).	Chemical-specific	Applicable	
Standards applicable to the generators of hazardous waste - The manifest [40 CFR 262, Subpart B and 329 IAC 3.1-7 and 329 IAC 3.1-8]	Hazardous waste must be manifested as such for transport to a permitted treatment, storage, or disposal facility (TSDF)	Chemical-specific	Relevant and Appropriate	
Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities - Waste piles [40 CFR 264, Subpart L]	Any excavated contaminated soils must not be placed back on the ground so as to create a waste pile. Covered rolloff containers may be used.	Chemical-specific	Relevant and Appropriate	
Use and management of containers	Hazardous waste stored onsite in containers for 90 days or less shall be managed in accordance with	Chemical-specific	Relevant and Appropriate	

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
[40 CFR 265, Subpart I and 329 IAC 3.1-10]	the standards of 40 CFR 265, Subpart I (329 IAC 3.1-10).			
SOLID WASTE DISPOSAL ACT				
Identification and Listing of Hazardous Waste (40 CFR 261) Subpart B	Sets criteria for identifying a hazardous waste.	Chemical-specific	Relevant and Appropriate	
Identification and Listing of Hazardous Waste (40 CFR 261) Subpart C	Identifies the characteristics of a hazardous waste.	Chemical-specific	Relevant and Appropriate	
Identification and Listing of Hazardous Waste (40 CFR 261) Subpart D, List of Hazardous Waste	Lists hazardous waste from sources	Action-specific and Chemical-specific	Relevant and Appropriate	
Standards for Hazardous Waste Generators (40 CFR 263)	General requirements for packaging, labeling, marking, and manifesting hazardous wastes for temporary storage and transportation off-site	Action-specific	Applicable	
Solid Wastes (40 CFR 264), Subpart D	Hazardous waste and debris may be placed in units known as containment buildings for the purpose of interim storage or treatment.	Action-specific	Applicable	
ENDANGERED SPECIES ACT				
Endangered Species Act [16	Requires that federal agencies ensure that any action authorized,	Location-Specific	Applicable	No endangered species are known to be present on the

APPENDIX C
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USS Lead Site, OUI
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
USC 1531]; 50 CFR 200	funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or adversely modify critical habitat.			site that would be affected by remedial actions.
NATURAL HISTORIC PRESERVATION ACT				
National Historic Preservation Act [16 USC 661 et seq.] 36 CFR Part 65	Establishes procedures to provide for preservation of scientific, historical, and archaeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program. If scientific, historical, or archaeological artifacts are discovered at the site, work in the area of the site affected by such discovery will be halted pending a completion of any data recovery and preservation activities required pursuant to the act and any implementing regulations.	Location- Specific	Applicable	No part of the USS Lead Residential Area is listed on the national register of historic places. Potentially applicable during remedial activities if scientific, historic, or archaeological artifacts are identified during implementation of the remedy.
DEPARTMENT OF TRANSPORTATION				
Requirements for the Transport of Hazardous Materials [40 CFR 172]	Transportation of hazardous materials on public roadways must comply with the requirements.	Action- Specific	Applicable	Depends on nature of remedial action chosen
OTHER FEDERAL GUIDELINES TO BE CONSIDERED				
Integrated Risk Information System (IRIS)	Risk reference doses (RfD) are estimates of daily exposure levels that are unlikely to cause adverse non-carcinogenic health effects over a lifetime. Cancer Slope Factors (CSF) are used to compute	Chemical- Specific	To Be Considered	Levels may be considered for use as cleanup goals.

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
	the incremental cancer risk from exposure to site contaminants and represent the most up-to-date information on cancer risk from EPA's Carcinogen Assessment Group.			
EPA Regional Screening Levels	EPA Regional Screening Levels (RSLs and associated guidance necessary to calculate them) are risk-based screening levels developed using risk assessment guidance from the USEPA Superfund program. These are risk-based concentrations derived from standardized equations combining exposure information assumptions with USEPA toxicity data. Screening levels are considered to be protective for humans over a lifetime; however, screening levels do not address non-human health endpoints, such as ecological impacts.	Chemical-Specific	To Be Considered	Levels may be considered for use as cleanup goals.
USEPA Areas of Contamination Policy	Allows wastes within an Area of Contamination to be consolidated and treated in-situ without triggering RCRA LDRs or minimum technology requirements.	Action-Specific	To be Considered	Applicable to onsite consolidation, treatment and covering/capping of soils and sediments.
Contained in Policy Guidance for RCRA	Deals with the management of remediation waste. This guidance document does not have the effect of law.	Action-Specific	To Be Considered	
Occupational Safety and Health Act [29 CFR 61]	The Act was passed in 1970 to ensure worker safety on the job. Worker safety at hazardous waste sites is addressed under 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response. General worker safety	Action-specific	Applicable	The Act is considered an ARAR for construction activities performed during the implementation of remedies. Depends on nature of remedial action chosen.

APPENDIX C
List of Applicable or Relevant and Appropriate Requirements
USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
	is covered elsewhere within the law.			
INDIANA ADMINISTRATIVE CODE				
Indiana Solid Waste Rules (IAC Title 329)	This law applies to remedies that involve off-site disposal of materials typically involved with excavations. Contaminated soils or wastes that are excavated for off-site disposal would be tested for hazardous waste characteristics and requirements of the Rules would be followed if hazardous waste is found.	Action - Specific	Relevant and Appropriate	Depends on nature of remedial action chosen.
Generator Responsibilities for Waste Information (329 IAC 10-7.2-1)	Requires all wastes undergo a waste determination, and if found to be nonhazardous, be disposed of in a permitted solid waste disposal facility.	Chemical-specific	Relevant and Appropriate	
Indiana Air Pollution Control Regulations (IAC Title 326)	This law applies to the regulation air emissions, for activities such as excavation, which has the potential to create dust and sets emissions limits for particulates.	Action-Specific	Relevant and Appropriate	Depends on nature of remedial action chosen.
Rule 4. Fugitive Dust Emission (326 IAC 6-4-1[4])	Rule 4 establishes that visible fugitive dust must not escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located.	Location/Action-specific	Relevant and Appropriate	
Motor vehicle fugitive dust sources (326 IAC 6-4-4)	No vehicle driven on any public right of way may allow its contents to escape and form fugitive dust.	Action-Specific	Relevant and Appropriate	
Ground Water Quality Standards	States that no person shall cause the groundwater in a drinking water supply well to have contaminant concentration that	Chemical-specific	Applicable	Groundwater is being considered under future actions at OU2.

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USS Lead Site, OU1
East Chicago, Indiana

Applicable/ Relevant and Appropriate Requirements	Description	Type of ARAR	Applicable/ Relevant and Appropriate	Comment
(327 IAC 2-11-2(e))	results in an exceedance of numeric criteria contained within the rule for drinking water class groundwater, creates a condition that is injurious to human health, creates an exceedance of specific indicator criteria levels contained within the rule, or renders the well unusable for normal domestic use.			
Storm Water Run-off Associated with Construction Activity (327 IAC 15-5)	Sets requirements for managing storm water during construction activities, including sediment and erosion control.	Action-Specific	Relevant and Appropriate	Will be required if remedial activities generate storm water runoff.
IDEM Remediation Closure Guide (RCG), March 2012, Updated July 2012	The RCG describes approaches to investigation and risk-based closure of contaminated or potentially contaminated sites. Its purpose is to provide for consistent application of Indiana Code (IC) 13-12-3-2 and IC 13-25-5-8.5, which form the statutory basis for risk-based cleanup in Indiana.	Chemical-specific	To Be Considered	The RCG is a non-rule policy document, which became effective in 2012. It is a revision of the Risk Integrated system of Closure (RISC) Technical Resource Guidance Document. The RCG contains contaminant-specific screening levels for different exposure scenarios and environmental media.

Appendix D
State Concurrence Letter



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We Protect Hoosiers and Our Environment.

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Eric J. Holcomb
Governor

Bruno L. Pigott
Commissioner

February 4, 2020

Mr. Doug Ballotti
Division Director
Superfund and Emergency Management
U.S. EPA, Region 5
77 West Jackson Boulevard
Mail Code SR-6J
Chicago, IL 60604-3590

Dear Mr. Ballotti:

Re: Record of Decision Amendment
Zone 1 of Operable Unit 1
USS Lead Superfund Site
East Chicago, IN

Staff of the Indiana Department of Environmental Management (IDEM) have reviewed the U.S. Environmental Protection Agency's (EPA's) draft Record of Decision (ROD) Amendment document for Zone 1 of Operable Unit 1 of the USS Lead Superfund site located in East Chicago, Indiana. IDEM is in full concurrence with the major components of the selected remedy outlined in the document (Modified Alternative 4B), which include:

- Excavation of contaminated soils that exceed the residential Remedial Action Levels (RALs) down to a depth of 24 inches;
- Backfilling of excavated areas with clean material to grade;
- Restoration of the disturbed areas with sod or seed;
- Disposal of contaminated soils at an off-site Subtitle D or Subtitle C landfill, as appropriate, with ex-situ treatment as necessary; and
- Implementation of Institutional Controls (ICs).

Further, in the event that the City of East Chicago and the East Chicago Housing Authority convey title of the parcels that comprise Zone 1 to a third party developer and the City of East Chicago changes the zoning designation of the area from residential use to commercial/industrial use, IDEM concurs with EPA's selection of Alternative 4A as the contingent remedy, which includes the following remedy components:

- Excavation of contaminated soils that exceed the commercial/industrial RALs down to a depth of 12 inches;
- Backfilling of excavated areas with clean material to grade;
- Restoration of the disturbed areas with sod or seed;



- Disposal of contaminated soils at an off-site Subtitle D or Subtitle C landfill, as appropriate, with ex-situ treatment as necessary; and
- Implementation of ICs.

Thank you for the opportunity for IDEM to review the draft ROD Amendment document. Please be assured that IDEM is committed to accomplish cleanup at all Indiana sites on the National Priorities List (NPL) and intends to fulfill all obligations required by law to achieve that goal. We look forward to continuing to work closely with EPA in the implementation of this important remedial action.

Sincerely,

A handwritten signature in black ink, appearing to read "Peggy Dorsey", with a large, sweeping flourish extending from the end of the signature.

Peggy Dorsey
Assistant Commissioner
Office of Land Quality

PD:DMP:dp

cc: Bruce Oertel, IDEM
Rex Osborn, IDEM
Tom Alcamo, EPA