

UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
REGION 5

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IN THE MATTER OF: )  
)  
)  
U.S. Smelter and Lead Refinery, Inc. Site )  
in East Chicago, Lake County, Indiana )  
)  
Atlantic Richfield Company, )  
The Chemours Company FC, LLC, )  
E. I. du Pont de Nemours and Company, )  
Mueller Industries, Inc., )  
United States Metals Refining Company, )  
and U.S.S. Lead Refinery, Inc., )  
)  
Respondents. )  
)  
Proceeding under Section 106(a) )  
of the Comprehensive Environmental )  
Response, Compensation, and Liability )  
Act, 42 U.S.C. § 9606(a). )  
)  

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CERCLA Docket No. V-W-18-C-001

**UNILATERAL ADMINISTRATIVE  
ORDER FOR REMEDIAL ACTION  
IN ZONE 2 OF OPERABLE UNIT 1  
OF THE U.S. SMELTER AND LEAD  
REFINERY, INC. SUPERFUND SITE**

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## **I. JURISDICTION AND GENERAL PROVISIONS**

1. This Administrative Order (“Z2 Soil UAO”) is issued under the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of the United States Environmental Protection Agency (EPA) by Executive Order No. 12580, 52 Fed. Reg. 2923 (Jan. 23, 1987), and further delegated to the Regional Administrators by EPA Delegation Nos. 14-14-A and 14-14-B. On May 11, 1994, this authority was further redelegated by the Regional Administrator of EPA Region 5 to the Superfund Division Director of Region 5 by EPA Regional Delegation No. 14-14-B.

2. This Z2 Soil UAO pertains to property located at U.S. Smelter and Lead Refinery Inc., Site in East Chicago, Lake County, Indiana (the “USS Lead Site” or the “Site”). This Z2 Soil UAO directs Respondents to perform the remedial action (RA) described in the Record of Decision (ROD), dated November 30, 2012, for Zone 2 of Operable Unit 1 of the Site.

3. EPA has notified the State of Indiana (the “State”) of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

## **II. PARTIES BOUND**

4. This Z2 Soil UAO applies to and is binding upon Respondents and their successors and assigns. Any change in ownership or control of the Site or change in corporate or partnership status of a Respondent, including, but not limited to, any transfer of assets or real or personal property, shall not alter Respondents’ responsibilities under this Z2 Soil UAO.

5. Respondents are jointly and severally liable for implementing all activities required by this Z2 Soil UAO. Compliance or noncompliance by any Respondent with any provision of this Z2 Soil UAO shall not excuse or justify noncompliance by any other Respondent. No Respondent shall interfere in any way with performance of the Z2 RA Work in accordance with this Z2 Soil UAO by any other Respondent. In the event of the insolvency or other failure of any Respondent to implement the requirements of this Z2 Soil UAO, the remaining Respondents shall complete all such requirements.

6. Respondents shall provide a copy of this Z2 Soil UAO to each contractor hired to perform the Z2 RA Work required by this Z2 Soil UAO and to each person representing any Respondents with respect to the Site or the Z2 RA Work, and shall condition all contracts entered into hereunder upon performance of the Z2 RA Work in conformity with the terms of this Z2 Soil UAO. Respondents or their contractors shall provide written notice of the Z2 Soil UAO to all subcontractors hired to perform any portion of the Z2 RA Work required by this Z2 Soil UAO. Respondents shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Z2 RA Work in accordance with the terms of this Z2 Soil UAO.

## **III. DEFINITIONS**

7. Unless otherwise expressly provided in this Z2 Soil UAO, terms used in this Z2 Soil UAO that are defined in CERCLA or in regulations promulgated under CERCLA shall have

the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Z2 Soil UAO or in its appendices, the following definitions shall apply solely for the purposes of this Z2 Soil UAO:

- a. “ARC” shall mean Atlantic Richfield Company.
- b. “CERCLA” shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601-9675.
- c. “Chemours” shall mean The Chemours Company FC, LLC
- d. “Construction Contractor” shall mean the principal contractor retained by the Supervising Contractor to implement the Z2 RA Construction under this Z2 Soil UAO.
- e. “Day” or “day” shall mean a calendar day. In computing any period of time under this Z2 Soil UAO, where the last day would fall on a Saturday, Sunday, or federal or State holiday, the period shall run until the close of business of the next working day.
- f. “DuPont” shall mean E. I. du Pont de Nemours and Company
- g. “Effective Date” shall mean the effective date of this Z2 Soil UAO as provided in Section VIII.
- h. “EPA” shall mean the United States Environmental Protection Agency and its successor departments, agencies, or instrumentalities.
- i. “EPA Hazardous Substance Superfund” shall mean the Hazardous Substance Superfund established by the Internal Revenue Code, 26 U.S.C. § 9507.
- j. “Final ESD” or “Final Explanation of Significant Differences” shall mean the final Explanation of Significant Differences that EPA issues to explain the significant increase in cost between the estimated cost of the remedy selected in the 2012 Record of Decision for Zones 2 and 3 of Operable Unit 1 of the Site and the December 2017 estimated cost of the remedy for those two Zones. The Final ESD will be issued after notice and public comment on the Proposed ESD.
- k. “Former USS Lead Facility” shall mean the approximately 79-acre parcel of land that forms a part of Operable Unit 2 and that, from approximately 1906 to 1985, housed operations including but not limited to lead refining and secondary lead smelting. The street address of the Former USS Lead Facility is 5300 Kennedy Ave., East Chicago, Indiana.
- l. “IDEM” shall mean the Indiana Department of Environmental Management and any successor departments or agencies of the State.
- m. “Institutional Controls” or “ICs” shall mean Proprietary Controls and state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices that: (a) limit land, water, or other resource use to minimize the potential for human exposure to Waste Material at or in connection with the Site; (b) limit land, water, or other

resource use to implement, ensure non-interference with, or ensure the protectiveness of the RA; and/or (c) provide information intended to modify or guide human behavior at or in connection with the Site.

n. “Interest” shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year. Rates are available online at <https://www.epa.gov/superfund/superfund-interest-rates>.

o. “Mueller” shall mean Mueller Industries, Inc.

p. “National Contingency Plan” or “NCP” shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

q. “Non-Respondent Owner” shall mean any person, other than a Respondent, that owns or controls any Affected Property. The phrase “Non-Respondent Owner’s Affected Property” means Affected Property owned or controlled by Non-Respondent Owner.

r. “OU1” or “Operable Unit 1” shall mean the surface and subsurface soil of the area located inside the red highlighted boundaries on Appendix B. OU1 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.

s. “OU2” or “Operable Unit 2” shall mean groundwater associated with the Site as well as the surface soil, subsurface soil, and sediments located inside the blue highlighted boundaries on Appendix B. The area within the blue highlighted boundaries on Appendix B consists of approximately 79 acres, is commonly known as 5300 Kennedy Avenue, and is generally bounded on the north by the Indiana Harbor Belt Railroad; on the east by Kennedy Avenue; on the south and west by the Grand Calumet River; and on the northwest by the Indiana Harbor Canal.

t. “Paragraph” or “¶” shall mean a portion of this Z2 Soil UAO identified by an Arabic numeral or an upper or lower case letter.

u. “Parties” shall mean EPA and Respondents.

v. “Performance Standards” shall mean the cleanup standards and other measures of achievement of the goals of the remedial action objectives, as set forth in the ROD.

w. “Personally Identifiable Information” or “PII” means “Personally Identifiable Information” as defined in 2 C.F.R. § 200.79 and EPA’s Privacy Policy, and generally includes information that can be used to distinguish, trace, or identify an individual’s identity, including personal information which is linked or linkable to an individual. Personally Identifiable Information includes but is not limited to names, addresses, GPS coordinates, telephone numbers, fax numbers, email addresses, social security numbers, or labels (including,

e.g., character strings linked with real estate depicted in maps or assigned to sampling data) or other personal information that can be linked to an individual. EPA's Privacy Policy is available at <https://www.epa.gov/privacy/epa-policy-21510-privacy-policy>.

x. "Proposed ESD" or "Proposed Explanation of Significant Differences" shall mean the EPA document, noticed on December 11, 2017, and made available for public comment, which explains the significant increase in cost between the estimated cost of the remedy selected in the 2012 Record of Decision for Zones 2 and 3 of Operable Unit 1 of the Site and the December 2017 estimated cost of the remedy for those two Zones. The Proposed ESD is attached as Appendix E.

y. "Proprietary Controls" shall mean easements or covenants running with the land that: (a) limit land, water, or other resource use and/or provide access rights; and (b) are created pursuant to common law or statutory law by an instrument that is recorded in the appropriate land records office.

z. "RCRA" shall mean the Resource Conservation and Recovery Act, also known as the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992.

aa. "Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to Operable Unit 1 at the Site signed on November 30, 2012, by the Director of the Superfund Division, EPA Region 5, or his/her delegate, and all attachments thereto. The ROD is attached as Appendix D.

bb. "Remedial Action" or "RA" shall mean the remedial action selected in the ROD.

cc. "Remedial Action Levels" or "RALs" shall mean, for residential properties, 400 milligrams per kilogram (mg/kg) for lead and 26 mg/kg for arsenic, and for commercial/industrial properties, 800 mg/kg for lead and 26 mg/kg for arsenic.

dd. "Remedial Design" or "RD" shall mean those activities already undertaken or to be undertaken by EPA to develop final plans and specifications for the RA.

ee. "Respondents" shall mean Atlantic Richfield Company, The Chemours Company FC, LLC, E. I. du Pont de Nemours and Company, Mueller Industries, Inc., United States Metals Refining Company, and U.S.S. Lead Refinery, Inc.

ff. "Section" shall mean a portion of this Z2 Soil UAO identified by a Roman numeral.

gg. "Site" or "USS Lead Site" shall mean the U.S. Smelter and Lead Refinery, Inc. Superfund Site in East Chicago, Lake County, Indiana, and depicted generally on the map included with Appendix B. The Site includes both OU1 and OU2.

hh. "Staging Area" shall mean a parcel of land, if any, utilized by Respondents to temporarily store and stage excavated soil and other Waste Materials prior to transportation to a disposal facility.

- ii. “State” shall mean the State of Indiana.
- jj. “Supervising Contractor” shall mean the principal contractor retained by Respondents to supervise and direct the implementation of the Z2 RA Work under this Z2 Soil UAO.
- kk. “Transfer” shall mean to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.
- ll. “United States” shall mean the United States of America and each department, agency, and instrumentality of the United States, including EPA.
- mm. “USMR” shall mean United States Metals Refining Company.
- nn. “USS Lead” shall mean U.S.S. Lead Refinery, Inc.
- oo. “Waste Material” shall mean: (a) any “hazardous substance” under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any “solid waste” under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), or under Indiana Code § 13-11-2-205; (d), any “hazardous material” under Indiana Code § 13-11-2-96(b); and (e) any “hazardous waste” under Indiana Code § 13-11-2-99(c).
- pp. “Z1” or “Zone 1” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 1.” Zone 1 is generally bordered: (1) on the north by the northern boundary of the Carrie Gosch Elementary School and a line extending eastward from that boundary to the eastern edge of a north/south utility right of way that runs parallel to McCook Avenue north of East 149<sup>th</sup> Place; (2) on the east by: (i) the eastern-most edge of a north/south utility right of way that runs parallel to McCook Avenue until East 149<sup>th</sup> Place, and (ii) McCook Avenue between East 149<sup>th</sup> Place and 151<sup>st</sup> Street; (3) on the south by East 151<sup>st</sup> Street; and (4) on the west by the Indiana Harbor Canal.
- qq. “Z2” or “Zone 2” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 2.” Zone 2 is generally bordered: (1) on the north by Chicago Avenue; (2) on the east, by the eastern edge of the railroad right of way that runs principally north and south and is labeled on Appendix C as “Elgin Joliet and Eastern Rlwy”; (3) on the south by East 151<sup>st</sup> Street; and (4) on the west by: (i) the Indiana Harbor Canal between Chicago Avenue and the northern boundary of the Carrie Gosch Elementary School; (ii) the eastern-most edge of a north/south utility right of way that runs parallel to McCook Avenue until East 149<sup>th</sup> Place, and (iii) McCook Avenue between East 149<sup>th</sup> Place and 151<sup>st</sup> Street.
- rr. “Z3” or “Zone 3” shall mean the surface and subsurface soil found in an area located inside the yellow highlighted boundaries on Appendix C and labeled as “Zone 3.” Zone 3 is generally bordered: (1) on the north by Chicago Avenue; (2) on the east by Parrish Avenue; (3) on the south by the northern edge of the railroad right of way located generally to

the south of East 149<sup>th</sup> Place and labeled on Appendix C as “Elgin Joliet and Eastern Rlwy”; and (4) on the west by the eastern edge of the railroad right of way that runs principally north and south and is labeled on Appendix C as “Elgin Joliet and Eastern Rlwy.” The triangular plot of land bounded by several railroad spurs in the southeastern portion of the area labeled Zone 3 on Appendix C is a part of Zone 3.

ss. “Z2 Affected Property” shall mean all real property in Zone 2, Operable Unit 1, of the Site and any other real property where EPA determines, at any time, that access, land, water, or other resource use restrictions, and/or Institutional Controls are needed to implement the Zone 2 Remedial Action.

tt. “Z2 Excluded Properties” shall mean the properties on the final list that EPA develops and provides to Respondents pursuant to Paragraph 4.8(a)(2) of the Z2 Soil SOW.

uu. “Z2 ICIAP” or Z2 Institutional Controls Implementation and Assurance Plan” shall mean the plan that Respondents prepare for EPA’s approval pursuant to ¶ 6.7(j) of the Z2 Soil SOW.

vv. “Z2 O&M” or “Z2 Operation and Maintenance” shall mean all activities related to the implementation and maintenance of Institutional Controls in Zone 2 to ensure the effectiveness of the Z2 Remedial Action in accordance with the ROD as specified in the Z2 Soil SOW or the EPA-approved Z2 O&M Plan.

ww. “Z2 RA” or “Z2 Remedial Action” shall mean the remedial action selected in the ROD as applied to Zone 2. The Z2 RA includes Z2 Remedial Action Construction and the implementation of Institutional Controls.

xx. “Z2 RA Construction” “Z2 Remedial Action Construction” shall mean the excavation and disposal of Waste Material from Z2 Affected Properties and the restoration of those properties, but shall not include implementation of Institutional Controls.

yy. “Z2 RA Data Management” or “Z2 Remedial Action Data Management” shall mean those activities undertaken by Respondents to develop, manage, and implement proper data management for the data generated in implementing this Z2 Soil UAO.

zz. “Z2 RA Response Costs” shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in monitoring and supervising Respondents’ performance of the Z2 RA Work to determine whether such performance is consistent with the requirements of this Z2 Soil UAO, including costs incurred in reviewing deliverables submitted pursuant to this Z2 Soil UAO, as well as costs incurred in overseeing implementation of this Z2 Soil UAO, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs and Department of Justice costs.

aaa. “Z2 RA Work” or “Zone 2 Remedial Action Work” shall mean all activities and obligations Respondents are required to perform under this Z2 Soil UAO, except those required by Section XVI (Record Retention). The Z2 RA Work encompasses all activities within the definition of “Z2 Remedial Action,” but, in addition, it includes the Z2 O&M.



bbb. “Z2 RD” or “Z2 Remedial Design” shall mean those activities already undertaken or to be undertaken by EPA to develop final plans and specifications for Z2 Remedial Action.

ccc. “Z2 Soil UAO” shall mean this Unilateral Administrative Order and all appendices attached hereto. In the event of conflict between this Z2 Soil UAO and any appendix, this Z2 Soil UAO shall control.

ddd. “Z2 Soil SOW” or “Zone 2 Soil Statement of Work” shall mean the document describing the activities Respondents must perform to implement the Z2 RA and the Z2 O&M. The Z2 Soil SOW is attached as Appendix A.

#### **IV. FINDINGS OF FACT**

8. EPA hereby makes the following findings of fact:

a. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List (NPL), set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on April 9, 2009, 74 Fed. Reg. 16,126–34.

b. The Site consists of two Operable Units: OU1 and OU2, both defined above. OU1 has been further divided into three zones: Zone 1 (Z1), Zone 2 (Z2), and Zone 3 (Z3), also defined above.

c. In response to a release or a substantial threat of a release of hazardous substances at or from OU1 of the Site, EPA commenced, in June 2009, a Remedial Investigation and Feasibility Study (RI/FS) of OU1 of the Site pursuant to 40 C.F.R. § 300.430.

d. EPA completed a Remedial Investigation (RI) Report and a Feasibility Study (FS) Report of OU1 in June 2012.

e. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS for OU1 and of the proposed plan for remedial action for OU1 on July 12, 2012, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Director of the Superfund Division, EPA Region 5, based the selection of the response action for OU1.

f. The decision by EPA on the remedial action to be implemented at OU1 of the Site is embodied in a final Record of Decision (ROD), executed on November 30, 2012, on which the State has given its concurrence. The ROD includes a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA, 42 U.S.C. § 9617(b). The remedy selected in that ROD included:

(1) Excavation of soil that contains lead or arsenic in concentrations that exceed the Remedial Action Levels (RALs) to a maximum depth of 24 inches;

(2) Disposal of excavated soil at a CERCLA-approved disposal facility;

(3) If contaminated soil is identified at a depth greater than 24 inches below ground surface (bgs), placement of a visual barrier over that contaminated soil before the yard is backfilled, and implementation of institutional controls to protect users of the property from exposure to contaminated soils that remain at depth; and

(4) Restoration of the excavated yards.

g. By Consent Decree entered on October 28, 2014, EPA and certain parties reached an agreement regarding remedial design and remedial action (RD/RA) in Zones 1 and 3 of OU1 of the Site. RD/RA work under the 2014 Consent Decree commenced in November 2014. In the summer of 2016, EPA suspended RD/RA work in Zone 1 because of actions of other governmental bodies leading to the permanent relocation of residents there. EPA is undertaking an Addendum to the FS as it applies to all of Zone 1, except for the property in Zone 1 that includes the former Carrie Gosch Elementary School. EPA continues RD/RA work in Zone 3 pursuant to the 2014 Consent Decree.

h. In July 2016, outside of the 2014 Consent Decree, EPA began conducting extensive soil sampling within Zone 2 as part of the Remedial Design process for OU1. As of December 4, 2017, EPA has sampled 528 out of approximately 590 properties in Zone 2. Approximately 446 of the sampled properties had contamination that equals or exceeds 400 mg/kg for lead and/or 26 mg/kg for arsenic in the top 24 inches of soil.

i. In the fall of 2016, outside of the 2014 Consent Decree, EPA remediated the soil of 17 properties in Zone 2.

j. On March 16, 2017, EPA and certain parties entered into an Administrative Settlement Agreement and Order on Consent (“Z2&3 ASAOC”) regarding, *inter alia*, exterior removal actions at properties in Zone 2 which had: (1) concentrations in surface soil (0 to 6 inches bgs) at or above 1200 mg/kg for lead or at or above 68 mg/kg for arsenic; and/or (2) concentrations in surface soil at or above 400 mg/kg for lead where EPA had reason to believe sensitive populations (pregnant women and/or children six and under) lived; and/or (3) concentrations in soil at or above 24 inches bgs at or above 400 mg/kg for lead where one or more children six and under had blood lead levels equal to or greater than 10 micrograms/deciliter. Exterior soil contamination at properties addressed under the Z2&3 ASAOC was remediated in a manner consistent with the ROD. As of December 1, 2017, exterior soil contamination at 109 Zone 2 properties has been addressed under the Z2&3 ASAOC.

k. A limited number of properties in Zones 2 and 3 that were remediated in 2016 and 2017 had lead and/or arsenic contamination below 24 inches bgs. However, no Institutional Controls will be required at any of these properties because all contamination that had existed below 24 inches bgs was removed.

l. On December 11, 2017, EPA noticed a Proposed Explanation of Significant Differences, with the State’s concurrence. That ESD documents only the increased

cost of implementing the ROD in Zones 2 and 3 of OU1 as compared to the original estimate provided in the Feasibility Study. The Proposed ESD has been published for public comment.

m. Lead is a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14). The Agency for Toxic Substances and Disease Registry (ATSDR) has determined that exposure to lead presents human health risks. Lead exposure via inhalation and/or ingestion can have detrimental effects on almost every organ and system in the human body. Exposure may occur from direct ingestion of soil in yards, soil tracked indoors (house dust), and inhalation of fugitive dust. Lead can cause a variety of health problems to people who are exposed to it. Potential human receptors include residents, with a particular concern for children six years of age and under, and pregnant or nursing women. Children are at greatest risk from the toxic effects of lead. Initially, lead travels in the blood to the soft tissues (heart, liver, kidney, brain, etc.). Then, it gradually redistributes to the bones and teeth where it tends to remain. Children exposed to high levels of lead have exhibited nerve damage, liver damage, colic, anemia, brain damage, and death. The most serious effects associated with markedly elevated blood lead levels include neurotoxic effects such as irreversible brain damage.

n. Arsenic is a hazardous substance, as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14). ATSDR has determined that exposure to arsenic presents human health risks. Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of “pins and needles” in hands and feet. Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small “corns” or “warts” on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling. Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen (ATSDR, Chemical Abstract Services [CAS] # 7440-38-2], August 2007).

o. EPA has already implemented and will continue to implement—outside the coverage of this Z2 Soil UAO—the activities (including sampling) necessary for designing the excavation activities in the yards in Zone 2.

## **V. CONCLUSIONS OF LAW AND DETERMINATIONS**

9. Based on the Findings of Fact set forth above, and the administrative record, EPA has determined that:

a. The U.S. Smelter and Lead Refinery, Inc. Superfund Site is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. The Former USS Lead Facility is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). The Former USS Lead Facility is a part of the Site.

c. The property and former manufacturing plants located at 5215 Kennedy Avenue in East Chicago, Indiana, previously owned and/or operated by Respondent E. I. du Pont

de Nemours and Company (“Former DuPont Facility”) and currently owned and/or operated by Respondent The Chemours Company FC, LLC, is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

d. The property and former manufacturing plants previously located in Zone 1 of OU1 of the Site (“Former Anaconda Facility”) and previously owned and/or operated by predecessors of Respondent Atlantic Richfield Company is a “facility” as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9). The Former Anaconda Facility is a part of the Site.

e. Each Respondent is a “person” as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

f. Each Respondent is a liable party under one or more provisions of Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

(1) From 1920 to the present, Respondent U.S.S. Lead Refinery, Inc. (“USS Lead”) has been an “owner” and/or “operator”—as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Sections 107(a)(1) and (a)(2) of CERCLA, 42 U.S.C. §§ 9607(a)(1), (a)(2)—of the Former USS Lead Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances.

(2) Respondent Mueller Industries, Inc. (“Mueller”) is liable as a successor to two companies: (i) United States Smelting Refining and Mining Company, which later changed its name to UV Industries, Inc. (“UV/USSRAM”); and (ii) Sharon Steel Corporation (“Sharon Steel”).

- i. UV/USSRAM was one or more of the following:
  - a. From 1919 to 1920, a person who, at the time of disposal of hazardous substances, “owned” and/or “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former USS Lead Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances.
  - b. For some or all of the time between 1920 and 1979, a person who “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. §§ 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former USS Lead Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances.
  - c. A parent company who, for some or all of the time between 1920 and 1979, is indirectly liable, under a

corporate veil piercing theory, for the acts of its subsidiary, USS Lead (which is liable as described in Paragraph 9.f(1) above).

- d. For some or all of the time between 1920 and 1979, a person who arranged with USS Lead for the disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances at the Former USS Lead Facility, within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).
- ii. Sharon Steel, for some or all of the time between 1979 and 1985, was a person who “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. §§ 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former USS Lead Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances.

(3) Respondent Atlantic Richfield Company is liable as a successor to: (i) one or more persons, including Anaconda Lead Products Company, International Lead Refining Company, and International Smelting and Refining Company, who, at the time of disposal of hazardous substances, “owned” and/or “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former Anaconda Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances; and/or (ii) one or more persons, including Anaconda Lead Products Company, International Lead Refining Company, and International Smelting and Refining Company, who arranged with USS Lead for the disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances at the Former USS Lead Facility, within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).

(4) Respondent E. I. du Pont de Nemours and Company is a person who: (i) at the time of disposal of hazardous substances, “owned” and/or “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former DuPont Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances to the Site; and/or (ii) arranged with USS Lead for the disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances at the Former USS Lead Facility, within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).

(5) Respondent The Chemours Chemical Company FC, LLC, is liable as a successor to E. I. du Pont de Nemours and Company (which is liable as described in Paragraph 9.f(4) above).

(6) Respondent United States Metals Refining Company is a person who at the time of disposal of hazardous substances, “owned” and/or “operated”—within the meaning of Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2)—the Former USS Lead Facility at which hazardous substances were disposed of and from which there were releases of hazardous substances.

g. The lead and arsenic contamination found in Zone 2, as identified in the Findings of Fact above, includes “hazardous substances” as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and also includes “pollutants or contaminants” that may present an imminent and substantial danger to public health or welfare under Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1).

h. The conditions described in Paragraph 8.h of the Findings of Fact above constitute an actual or threatened “release” of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

i. The conditions described in Paragraph 8.h of the Findings of Fact above may constitute an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of a hazardous substance from the facility within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

j. Solely for purposes of Section 113(j) of CERCLA, 42 U.S.C. § 9613(j), the remedy set forth in the ROD and the Z2 RA Work to be performed by Respondents shall constitute a response action taken or ordered by the President for which judicial review shall be limited to the administrative record.

k. The actions required by this Z2 Soil UAO are necessary to protect the public health, welfare, or the environment.

## **VI. Z2 REMEDIAL ACTION WORK ORDER**

10. Based on the Findings of Fact and Conclusions of Law and Determinations set forth above, and the administrative record, Respondents are hereby ordered to comply with this Z2 Soil UAO and any modifications to this Z2 Soil UAO, including, but not limited to, all appendices and all documents incorporated by reference into this Z2 Soil UAO. Consistent with the work schedule set forth ¶ 7.2 of the Z2 Soil SOW, in no event shall Respondents mobilize for Z2 RA Construction or commence Z2 RA Construction until after issuance of the Final ESD.

## **VII. OPPORTUNITY TO CONFER**

11. No later than 5 days after the Z2 Soil UAO is signed by the Regional Administrator or his/her delegatee, Respondents may, in writing, (a) request a conference with EPA to discuss this Z2 Soil UAO, including its applicability, the factual findings and the

determinations upon which it is based, the appropriateness of any actions Respondents are ordered to take, or any other relevant and material issues or contentions that Respondents may have regarding this Z2 Soil UAO, or (b) notify EPA that they intend to submit written comments or a statement of position in lieu of requesting a conference.

12. If a conference is requested, Respondents may appear in person or by an attorney or other representative at the conference. Any such conference shall be held no later than 5 days after the conference is requested. Any written comments or statements of position on any matter pertinent to this Z2 Soil UAO must be submitted no later than 5 days after the conference or, if Respondents do not request a conference, within 15 days after this Z2 Soil UAO is signed. This conference is not an evidentiary hearing, does not constitute a proceeding to challenge this Z2 Soil UAO, and does not give Respondents a right to seek review of this Z2 Soil UAO. Any request for a conference or written comments or statements should be submitted to:

Steven Kaiser  
Office of Regional Counsel  
Region 5, US EPA  
77 West Jackson Blvd. (C-14J)  
Chicago, IL 60604-3590  
[kaiser.steven@epa.gov](mailto:kaiser.steven@epa.gov)  
(312) 353-3804

Leonardo Chingcuanco  
Office of Regional Counsel  
Region 5, US EPA  
77 West Jackson Blvd. (C-14J)  
Chicago, IL 60604-3590  
[chingcuanco.leonardo@epa.gov](mailto:chingcuanco.leonardo@epa.gov)  
(312) 886-7236

## **VIII. EFFECTIVE DATE**

13. This Z2 Soil UAO shall be effective 5 days after the Z2 Soil UAO is signed by the Regional Administrator or his/her delegatee unless a conference is requested or notice is given, in accordance with Section VII (Opportunity to Confer), that written materials will be submitted in lieu of a conference. If a conference is requested or such notice is submitted, this Z2 Soil UAO shall be effective on 10th day after the day of the conference, or if no conference is requested, on the 5th day after written materials, if any, are submitted, unless EPA determines that the Z2 Soil UAO should be modified based on the conference or written materials. In such event, EPA shall notify Respondents, within the applicable period, that EPA intends to modify the Z2 Soil UAO. The modified Z2 Soil UAO shall be effective 5 days after it is signed by the Regional Administrator or his/her delegatee.

## **IX. NOTICE OF INTENT TO COMPLY**

14. On or before the Effective Date, each Respondent shall notify EPA in writing of Respondent's irrevocable intent to comply with this Z2 Soil UAO. Such written notice shall be sent to EPA as provided in ¶ 12.

15. Each Respondent's written notice shall describe, using facts that exist on or prior to the Effective Date, any "sufficient cause" defenses asserted by such Respondent under Sections 106(b) and 107(c)(3) of CERCLA, 42 U.S.C. §§ 9606(a) and 9607(c)(3). The absence of a response by EPA to the notice required by this Section shall not be deemed to be acceptance of any Respondent's assertions. Failure of any Respondent to provide such notice of intent to comply within this time period shall, as of the Effective Date, be treated as a violation of this Z2 Soil UAO by such Respondent.

## **X. PERFORMANCE OF THE WORK**

16. **Compliance with Applicable Law.** Nothing in this Z2 Soil UAO limits Respondents' obligations to comply with the requirements of all applicable federal and state laws and regulations. Respondents must also comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the ROD and the Z2 Soil SOW.

17. **Permits.**

a. As provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Z2 RA Work conducted entirely on-site or at any other property which is within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Z2 RA Work. Where any portion of the Z2 RA Work that is not on-site requires a federal or state permit or approval, Respondents shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. This Z2 Soil UAO is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation

18. **Coordination and Supervision.**

a. **Project Coordinators and Remedial Project Managers.**

(1) Respondents' Project Coordinator and Alternate Project Coordinator must have sufficient technical expertise to coordinate the Z2 RA Work. Respondents' Project Coordinator and Alternate Project Coordinator may not be an attorney representing any Respondent in this matter and may not act as the Supervising Contractor. Respondents' Project Coordinator and Alternate Project Coordinator may assign other representatives, including other contractors, to assist in coordinating the Z2 RA Work.



(2) EPA has designated Timothy Drexler and Sarah Rolfes as EPA's Remedial Project Managers (RPMs). EPA may designate other representatives, which may include its employees, contractors and/or consultants, to oversee the Z2 RA Work. EPA's RPM will have the same authority as a remedial project manager and/or an on-scene coordinator, as described in the NCP. This includes the authority to halt the Z2 RA Work and/or to conduct or direct any necessary response action when he or she determines that conditions at the Site constitute an emergency or may present an immediate threat to public health or welfare or the environment due to a release or threatened release of Waste Material.

(3) Respondents' Project Coordinator(s) shall communicate with EPA's RPMs regularly.

b. **Supervising Contractor.** Respondents' proposed Supervising Contractor must have sufficient technical expertise to supervise the Z2 RA Work and a quality assurance system that complies with ASQ/ANSI E4:2014, "Quality management systems for environmental information and technology programs - Requirements with guidance for use" (American Society for Quality, February 2014).

c. Procedures for Disapproval/Notice to Proceed.

(1) Respondents shall designate, and notify EPA, within 10 days after the Effective Date, of the names, titles, contact information, and qualifications of the Respondents' proposed Project Coordinator, Alternate Project Coordinator, and Supervising Contractor, whose qualifications shall be subject to EPA's review for verification based on objective assessment criteria (e.g., experience, capacity, technical expertise) and that they do not have a conflict of interest with respect to the project.

(2) EPA shall issue notices of disapproval and/or authorizations to proceed regarding the proposed Project Coordinator, Alternate Project Coordinator, and Supervising Contractor, as applicable. If EPA issues a notice of disapproval, Respondents shall, within 15 days, submit to EPA a list of supplemental proposed Project and Alternate Project Coordinators and/or Supervising Contractors, as applicable, including a description of the qualifications of each. EPA shall issue a notice of disapproval or authorization to proceed regarding each supplemental proposed coordinator/alternate coordinator and/or contractor. Respondents may select any coordinator/contractor covered by an authorization to proceed and shall, within 7 days, notify EPA of Respondents' selection.

(3) Respondents may change their Project Coordinator and/or Supervising Contractor, as applicable, by following the procedures of ¶¶18.c(1) and 18.c(2).

19. **Performance of Z2 RA Work in Accordance with Z2 Soil SOW.** Respondents shall: (a) perform the Z2 Remedial Action; (b) perform the Z2 O&M; and (c) support, if and as

necessary, EPA's periodic review efforts; all in accordance with the Z2 Soil SOW and all EPA-approved, conditionally-approved, or modified deliverables as required by the Z2 Soil SOW. All deliverables required to be submitted for approval under the Z2 Soil UAO or Z2 Soil SOW shall be subject to approval by EPA in accordance with ¶ 6.6 (Approval of Deliverables) of the Z2 Soil SOW.

20. **Emergencies and Releases.** Respondents shall comply with the emergency and release response and reporting requirements under ¶ 4.6 (Emergency Response and Reporting) of the Z2 Soil SOW.

21. **Community Involvement.** Respondents shall conduct community involvement activities under EPA's oversight as provided for in, and in accordance with, Section 2 (Community Involvement) of the Z2 Soil SOW. Such activities include, but are not limited to, designation of a Community Involvement Coordinator.

22. **Modification.**

a. EPA may, by written notice from the EPA RPM to Respondents, modify, or direct Respondents to modify, the Z2 Soil SOW and/or any deliverable developed under the Z2 Soil SOW, if such modification is necessary to achieve or maintain the Performance Standards or to carry out and maintain the effectiveness of the Z2 Remedial Action, and such modification is consistent with the Scope of the Remedy set forth in ¶ 1.3 of the Z2 Soil SOW. Any other requirements of this Z2 Soil UAO may be modified in writing by signature of the Superfund Division Director for Region 5 if such modification is consistent with the ROD.

b. Respondents may submit written requests to modify the Z2 Soil SOW and/or any deliverable developed under the Z2 Soil SOW. If EPA approves the request in writing, the modification shall be effective upon the date of such approval or as otherwise specified in the approval. Respondents shall modify the Z2 Soil SOW and/or related deliverables in accordance with EPA's approval.

c. No informal advice, guidance, suggestion, or comment by the EPA RPM or other EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondents shall relieve Respondents of their obligation to obtain any formal approval required by this Z2 Soil UAO, or to comply with all requirements of this Z2 Soil UAO, unless it is formally modified.

d. Nothing in this Z2 Soil UAO, the attached Z2 Soil SOW, any deliverable required under the Z2 Soil SOW, or any approval by EPA constitutes a warranty or representation of any kind by EPA that compliance with the work requirements set forth in the Z2 Soil SOW or related deliverable will achieve the Performance Standards.

## XI. PROPERTY REQUIREMENTS

23. **Agreements Regarding Access.**

a. EPA to Provide Respondents with Previously-Executed Access Agreements. With respect to Zone 2 Affected Properties that require remediation but still have

not been remediated, by no later than 10 days after the Effective Date, EPA shall either provide Respondents with a copy of each previously-executed access agreement or shall provide Respondents with access to a secure, non-public website where these access agreements can be found. An unexecuted, blank copy of the access agreement that EPA has used in Zone 2 is attached as Appendix F.

b. Respondents' Use of Previously-Executed Access Agreements. With respect to the previously-executed access agreements, Respondents are hereby deemed "authorized representatives" of EPA for purposes of this Z2 Soil UAO. If a previously-executed access agreement includes access for both sampling and "removal" activities, Respondents are authorized to access the subject Z2 Affected Property and undertake the activities required by this Z2 Soil UAO. If a previously-executed access agreement does not include access for "removal" activities or if a property owner does not continue to consent to or grant access notwithstanding his/her previous execution of an access agreement, Respondents shall use best efforts to secure from the property owner an access agreement substantially in the form attached as Exhibit F. Because completion of the Z2 RA Construction under this Z2 Soil UAO shall take more than one construction season, Respondents shall continue to use "best efforts," as defined in Paragraph 25.b, to secure access during each year up to and including three months prior to the expected final demobilization of Z2 RA Construction, unless EPA informs Respondents that, with respect to a particular property(ies), EPA will take independent action to obtain access. Respondents shall provide a copy of any newly-executed access agreements to EPA.

c. Respondents' use of an access agreement that is substantially in the form attached as Appendix F shall be deemed sufficient to enable the Respondents, their contractors, EPA, and its contractors to undertake, as applicable, the following activities:

- (1) Performing the Z2 RA Work;
- (2) Monitoring the Z2 RA Work;
- (3) Verifying any data or information submitted to EPA;
- (4) Conducting investigations regarding contamination at or near the Z2 Affected Property;
- (5) Obtaining samples;
- (6) Assessing the need for, planning, or implementing additional response actions at or near the Z2 Affected Property;
- (7) Assessing implementation of quality assurance and quality control practices as defined in the approved construction quality assurance quality control plan as provided in the Z2 Soil SOW;
- (8) Implementing the Z2 RA Work pursuant to the conditions set forth in ¶ 39 (Z2 RA Work Takeover);
- (9) Assessing Respondents' compliance with the Z2 Soil UAO;

(10) Determining whether the Z2 Affected Property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted under the Z2 Soil UAO; and

(11) Implementing, monitoring, maintaining, reporting on, and enforcing any land, water, or other resource use restrictions and any Institutional Controls regarding the Z2 Affected Property.

If Respondents do not use an access agreement substantially in the form attached in Appendix F, Respondents shall ensure that its access agreement enables access for the activities identified in this Paragraph 23.c.

24. **Proprietary and Institutional Controls.** Pursuant to the schedule set forth in Paragraph 7.2 of the Z2 Soil SOW, if contamination that requires Institutional Controls pursuant to the ROD remains at one or more Z2 Affected Properties, Respondents shall submit an Institutional Controls Implementation and Assurance Plan (ICIAP) for EPA approval. If an ICIAP is necessary, it shall include, but not be limited to, consideration of the following types of restrictions, as appropriate:

(1) Prohibitions on activities that could interfere with the Z2 Remedial Action;

(2) Prohibitions on the use of contaminated groundwater;

(3) Prohibitions on activities that could result in exposure to contaminants in subsurface soils and groundwater;

(4) Requirements ensuring that any new structures on the Z2 Affected Property will not be constructed in a manner that could interfere with the Z2 Remedial Action; and

(5) Requirements ensuring that any new structures on the Z2 Affected Property will be constructed in a manner that will minimize potential risk of inhalation of lead and arsenic contaminants.

The ICIAP shall include a schedule for implementation. Respondents shall implement the approved ICIAP consistent with the approved schedule.

25. **Proprietary Controls and Best Efforts.**

a. With respect to any Z2 Affected Property, Respondents shall use best efforts to secure the owner's cooperation in executing and recording, in accordance with the procedures of the ICIAP, Proprietary Controls that: (i) grant a right of access to conduct any activity regarding the Z2 Soil UAO, including those activities listed in ¶ 24; and (ii) grant the right to enforce the land, water, or other resource use restrictions set forth in the ICIAP, if necessary.

b. As used in this Paragraph: (1) “Prior Encumbrances” means any encumbrance that affects the title to the Z2 Affected Property, including but not limited to prior liens, claims, rights (such as easements) and mortgages; and (2) “best efforts” means the efforts that a reasonable person in the position of Respondents would use so as to achieve the goal in a timely manner, including the cost of employing professional assistance and the payment of reasonable sums of money to secure access and/or use restriction agreements, Proprietary Controls, releases, subordinations, modifications, or relocations of Prior Encumbrances that affect the title to the Z2 Affected Property, as applicable.

c. Notification to EPA regarding Best Efforts.

(1) For Access Agreements. By no later than October 31 of the year preceding the year that Respondents expect to complete the Z2 RA Construction for all Z2 Affected Properties for which access has been granted, Respondents shall notify EPA of the Z2 Affected Properties, if any, for which they still have not secured access. In the notice, Respondents shall include a description of the steps they have taken to comply with the requirement to use “best efforts” to secure access. If EPA deems it appropriate, it may assist Respondents, or take independent action, in obtaining such access. EPA reserves the right to pursue cost recovery regarding all costs incurred by the United States in providing such assistance or taking such action, including the cost of attorney time and the amount of monetary consideration or just compensation paid.

(2) Land, Water, or Other Resource Use Restrictions. By no later than 180 days after completion of the Z2 RA Construction, Respondents shall notify EPA of the Z2 Affected Properties, if any, where they have not been able to secure land, water, or other resource use restrictions set forth in the ICIAP. In the notice, Respondents shall include a description of the steps they have taken to comply with the requirement to use “best efforts” to secure these restrictions. If EPA deems it appropriate, it may assist Respondents, or take independent action, in obtaining such use restrictions, Proprietary Controls, releases, subordinations, modifications, or relocations of Prior Encumbrances that affect the title to the Z2 Affected Property, as applicable. EPA reserves the right to pursue cost recovery regarding all costs incurred by the United States in providing such assistance or taking such action, including the cost of attorney time and the amount of monetary consideration or just compensation paid.

26. In the event of any Transfer of any Z2 Affected Property, unless EPA otherwise consents in writing, Respondents shall continue to comply with their obligations under the Z2 Soil UAO, including their obligation to secure access and ensure compliance with any land, water, or other resource use restrictions regarding the Z2 Affected Property, and to implement, maintain, monitor, and report on Institutional Controls.

## **XII. INSURANCE**

27. Not later than 15 days before commencing any on-site Z2 RA Work, Respondents shall secure, and shall maintain until the first anniversary after the Certification of Z2 RA

Construction Completion pursuant to ¶ 4.8 of the Z2 Soil SOW, commercial general liability insurance with limits of liability of \$1 million per occurrence, and automobile insurance with limits of liability of \$1 million per accident, and umbrella liability insurance with limits of liability of \$5 million in excess of the required commercial general liability and automobile liability limits, naming the United States as an additional insured with respect to all liability arising out of the activities performed by or on behalf of Respondents pursuant to this Z2 Soil UAO. In addition, for the duration of the Z2 Soil UAO, Respondents shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing Z2 RA Work on behalf of Respondents in furtherance of this Z2 Soil UAO. Within the same time period, Respondents shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondents shall submit such certificate and copies of policies each year on the anniversary of the Effective Date. If Respondents demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Respondents need provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor. Respondents shall ensure that all submittals to EPA under this Paragraph identify the USS Lead Site in East Chicago, Indiana, and the EPA docket number for this action.

### **XIII. DELAY IN PERFORMANCE**

28. Respondents shall notify EPA of any delay or anticipated delay in performing any requirement of this Z2 Soil UAO. Such notification shall be made by telephone and email to the EPA RPM within 48 hours after Respondents first knew or should have known that a delay might occur. Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within seven days after notifying EPA by telephone and email, Respondents shall provide to EPA written notification fully describing the nature of the delay, the anticipated duration of the delay, any justification for the delay, all actions taken or to be taken to prevent or minimize the delay or the effect of the delay, a schedule for implementation of any measures to be taken to mitigate the effect of the delay, and any reason why Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Z2 Soil UAO. Increased costs or expenses associated with implementation of the activities called for in this Z2 Soil UAO is not a justification for any delay in performance.

29. Any delay in performance of this Z2 Soil UAO that, in EPA's judgment, is not properly justified by Respondents under the terms of ¶ 28 shall be considered a violation of this Z2 Soil UAO. EPA will notify Respondents of any such violation, or of any change to the deadline for deliverables. Any delay in performance of this Z2 Soil UAO shall not affect Respondents' obligations to fully perform all obligations under the terms and conditions of this Z2 Soil UAO.

### **XIV. PAYMENT OF Z2 RA RESPONSE COSTS**

#### **30. Z2 RA Response Cost Payments**

a. On a periodic basis, EPA will send Respondents a bill requiring payment of all Z2 RA Response Costs incurred by the United States regarding this Z2 Soil UAO that includes an Itemized Cost Summary. Respondents shall, within 30 days, make full payment of the amount billed, in accordance with ¶ 30.b.

b. Respondents shall make payment by Fedwire EFT, referencing the Site/Spill ID number. The Fedwire EFT payment must be sent as follows:

Federal Reserve Bank of New York  
ABA = 021030004  
Account = 68010727  
SWIFT address = FRNYUS33  
33 Liberty Street  
New York NY 10045  
Field Tag 4200 of the Fedwire message should read  
“D 68010727 Environmental Protection Agency”

c. At the time of payment, Respondents shall send notice that payment has been made to the EPA representatives identified in ¶ 12 and to the EPA Cincinnati Finance Office by mail or by email at:

EPA Cincinnati Finance Center  
26 W. Martin Luther King Drive  
Cincinnati, Ohio 45268  
cinwd\_acctsreceivable@epa.gov

Such notice shall reference Site/Spill ID Number 05-3J and the EPA docket number for this matter.

31. **Interest.** In the event that the payments for Z2 RA Response Costs are not made within 30 days after Respondents’ receipt of a written demand requiring payment, Respondents shall pay Interest on the unpaid balance. The Interest on Z2 RA Response Costs shall begin to accrue on the date of the written demand and shall continue to accrue until the date of payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to EPA by virtue of Respondents’ failure to make timely payments under this Section. Respondents shall make all payments under this Paragraph in accordance with ¶ 30.b.

## **XV. ACCESS TO INFORMATION**

32. Respondents shall provide to EPA, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as “Records”) within Respondents’ possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Z2 Soil UAO, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information regarding the Z2 RA Work. Respondents shall also make available to EPA, for purposes of investigation, information gathering, or

testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Z2 RA Work.

**33. Privileged and Protected Claims.**

a. Respondents may assert that all or part of a Record requested by EPA is privileged or protected as provided under federal law, in lieu of providing the Record, provided Respondents comply with ¶ 33.b, and except as provided in ¶ 33.c.

b. If Respondents assert a claim of privilege or protection, they shall provide EPA with the following information regarding such Record: its title; its date; the name, title, affiliation (e.g., company or firm), and address of the author, of each addressee, and of each recipient; a description of the Record's contents; and the privilege or protection asserted. If a claim of privilege or protection applies only to a portion of a Record, Respondents shall provide the Record to EPA in redacted form to mask the privileged or protected portion only. Respondents shall retain all Records that they claim to be privileged or protected until EPA has had a reasonable opportunity to dispute the privilege or protection claim and any such dispute has been resolved in the Respondents' favor.

c. Respondents may make no claim of privilege or protection regarding: (1) any data regarding the Site, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological, or engineering data, or the portion of any other Record that evidences conditions at or around the Site; or (2) the portion of any Record that Respondents are required to create or generate pursuant to this Z2 Soil UAO.

**34. Business Confidential Claims.** Respondents may assert that all or part of a Record provided to EPA under this Section or Section XVI (Record Retention) is business confidential to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Respondents shall segregate and clearly identify all Records or parts thereof submitted under this Z2 Soil UAO for which Respondents assert business confidentiality claims. Records claimed as confidential business information will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies Records when they are submitted to EPA, or if EPA has notified Respondents that the Records are not confidential under the standards of CERCLA § 104(e)(7) or 40 C.F.R. Part 2, Subpart B, the public may be given access to such Records without further notice to Respondents.

**35. Personally Identifiable Information.**

a. In the course of implementing this Z2 Soil UAO, Respondents shall receive from EPA and shall generate themselves written and/or electronic materials that contain Personally Identifiable Information. Respondents shall keep PII confidential and not disclose it to other persons or entities except as required by law, court order or other lawful process that protects disclosure to the public of PII. Respondents shall take all necessary and appropriate measures to maintain the confidentiality of PII and to retain written or electronic materials in a secure manner.



b. Respondents may share PII with agents and contractors of theirs who are responsible for assisting in the implementation of this Z2 Soil UAO provided that any such person with whom such information is shared either: (i) is specifically made aware of, and, prior to receiving the information, agrees in writing with Respondents to comply with the substantive requirements of Paragraph 35.a as if he/she were a Respondent; or (ii) already has executed a confidentiality agreement with the Respondent that is broad enough to cover PII.

c. PII otherwise admissible, discoverable or subject to subpoena in any proceeding shall not be rendered inadmissible, non-discoverable or not subject to subpoena because of its coverage under this Z2 Soil UAO.

d. In the event that Respondents conclude in good faith that applicable law, a subpoena or other lawful process, or a court order, requires disclosure of PII to a third party, Respondents shall provide, as far as is practicable, advance written notice to EPA of the intent to disclose, including a description of the applicable law or a copy of the subpoena, process or order requiring disclosure. Respondents shall not disclose any Personally Identifiable Information sooner than one day following provision of such written notice, unless required by law or order of a court.

e. Each Respondent shall promptly report to EPA breaches of PII, unauthorized disclosures or releases, and/or system vulnerability (to the extent known). Any disclosure of PII in contravention of this Z2 Soil UAO shall not result in a waiver of the claim of confidentiality, except as provided by law.

## **XVI. RECORD RETENTION**

36. During the pendency of this Z2 Soil UAO and for a minimum of 10 years after EPA provides Notice of Z2 RA Work Completion under ¶ 4.11 of the Z2 Soil SOW, each Respondent shall preserve and retain all non-identical copies of Records (including Records in electronic form) now in its possession or control or that come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, provided, however, that Respondents who are potentially liable as owners or operators of the Site must retain, in addition, all Records that relate to the liability of any other person under CERCLA with respect to the Site. Each Respondent must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above, all non-identical copies of the last draft or final version of any Records (including Records in electronic form) now in its possession or control or that come into its possession or control that relate in any manner to the performance of the Z2 RA Work, provided, however, that each Respondent (and its contractor and agents) must retain, in addition, copies of all data generated during performance of the Z2 RA Work and not contained in the aforementioned Records to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

37. At the conclusion of this document retention period, Respondents shall notify EPA at least 90 days prior to the destruction of any such Records, and, upon request by EPA, and except as provided in ¶ 33, Respondents shall deliver any such Records to EPA.

38. Within 30 days after the Effective Date, each Respondent shall submit a written certification to EPA's RPM that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed, or otherwise disposed of any Records (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by the United States or the State and that it has fully complied with any and all EPA requests for information regarding the Site pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927, and state law. Any Respondent unable to so certify shall submit a modified certification that explains in detail why it is unable to certify in full with regard to all Records.

## **XVII. ENFORCEMENT/WORK TAKEOVER**

39. Any willful violation, or failure or refusal to comply with any provision of this Z2 Soil UAO may subject Respondents to civil penalties of up to \$53,907 per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1), and the Civil Monetary Penalty Inflation Adjustment Rule, 81 Fed. Reg. 43,091, 40 C.F.R Part 19.4. In the event of such willful violation, or failure or refusal to comply, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Z2 Soil UAO pursuant to Section 106 of CERCLA, 42 U.S.C § 9606. Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such failure to comply, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3).

## **XVIII. NOTICES AND SUBMISSIONS**

40. All approvals, consents, deliverables, modifications, notices, notifications, objections, proposals, reports, and requests specified in this Z2 Soil UAO must be in writing unless otherwise specified. Whenever, under this Z2 Soil UAO, notice is required to be given, or a report or other document is required to be sent, by one Party to another, it must be directed to the person(s) specified below at the address(es) specified below. Any Party may change the person and/or address applicable to it by providing notice of such change to all Parties. All notices under this Section are effective upon receipt, unless otherwise specified. Except as otherwise provided, notice to a Party by email (if that option is provided below) or by regular mail in accordance with this Section satisfies any notice requirement of the Z2 Soil UAO regarding such Party.

As to EPA:

Director, Superfund Division  
Region 5, US EPA  
77 W. Jackson Blvd. (SR-6J)  
Chicago, IL 60604-3590

Timothy Drexler  
EPA RPM  
Region 5, US EPA  
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As to the Regional Financial  
Management Officer:

Chief, Program Accounting and Analysis Section  
United States Environmental Protection Agency  
Region 5, MF-10J  
77 West Jackson Blvd.  
Chicago, IL 60604-3590

As to EPA Cincinnati Finance  
Center

EPA Cincinnati Finance Center  
26 W. Martin Luther King Dr.  
Cincinnati, OH 45268  
[cinwd\\_acctsreceivable@epa.gov](mailto:cinwd_acctsreceivable@epa.gov)

## **XIX. RESERVATIONS OF RIGHTS**

41. Nothing in this Z2 Soil UAO limits the rights and authorities of EPA and the United States:

- a. To take, direct, or order all actions necessary, including to seek a court order, to protect public health, welfare, or the environment or to respond to an actual or threatened release of Waste Material on, at, or from the Site;
- b. To select further response actions for the Site in accordance with CERCLA and the NCP, including but not limited to further response actions relating to soils in Zone 2 that currently are covered by impermeable barriers but become exposed due to the removal of existing impermeable barriers and further response actions at Z2 Excluded Properties;
- c. To seek legal or equitable relief to enforce the terms of this Z2 Soil UAO;
- d. To take other legal or equitable action as they deem appropriate and necessary, or to require Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law;
- e. To bring an action against Respondents under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any costs incurred by EPA or the United States regarding this Z2 Soil UAO or the Site and not paid by Respondents pursuant to this Z2 Soil UAO;
- f. Regarding access to, and to require land, water, or other resource use restrictions and/or Institutional Controls regarding the Site under CERCLA, RCRA, or other applicable statutes and regulations; or
- g. To obtain information and perform inspections in accordance with CERCLA, RCRA, and any other applicable statutes or regulations.

## **XX. OTHER CLAIMS**

42. By issuance of this Z2 Soil UAO, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA shall not be deemed a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Z2 Soil UAO.

43. Nothing in this Z2 Soil UAO constitutes a satisfaction of or release from any claim or cause of action against Respondents or any person not a party to this Z2 Soil UAO, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

44. Nothing in this Z2 Soil UAO shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or C.F.R. § 300.700(d).

45. No action or decision by EPA pursuant to this Z2 Soil UAO shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

## XXI. ADMINISTRATIVE RECORD

46. EPA has established an administrative record that contains the documents that form the basis for the issuance of this Z2 Soil UAO, including, but not limited to, the documents upon which EPA based the selection of the Remedial Action selected in the ROD. EPA will make the administrative record available for review at the EPA Region 5 Superfund Record Center located 77 W. Jackson Blvd., Chicago, IL 60604. A copy of the administrative record is also available for viewing at <https://www.epa.gov/uss-lead-superfund-site>.

## XXII. APPENDICES

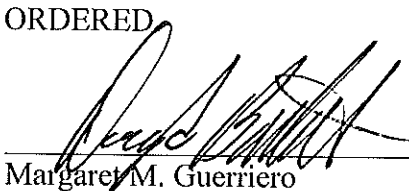
47. The following appendices are attached to and incorporated into this Z2 Soil UAO:
- a. Appendix A: Z2 Soil SOW
  - b. Appendix B: Map of USS Lead Site OU1 and OU2
  - c. Appendix C: Map of USS Lead Site OU1 – Zones 1, 2, and 3
  - d. Appendix D: Record of Decision
  - e. Appendix E: Proposed Explanation of Significant Differences
  - f. Appendix F: Copy of EPA's access agreement for soil sampling and clean-up

## XXIII. SEVERABILITY

48. If a court issues an order that invalidates any provision of this Z2 Soil UAO or finds that Respondents have sufficient cause not to comply with one or more provisions of this Z2 Soil UAO, Respondents shall remain bound to comply with all provisions of this Z2 Soil UAO not invalidated or determined to be subject to a sufficient cause defense by the court's order.

It is so ORDERED

BY:

  
Margaret M. Guerriero  
for Acting Division Director, Superfund Division  
Region 5  
U.S. Environmental Protection Agency

DATE:

12/14/2019

# **APPENDIX A**

**TO  
Z2 SOIL UAO**

**Z2 SOIL SOW**

**UNILATERAL ADMINISTRATIVE ORDER**

**STATEMENT OF WORK FOR  
REMEDIAL ACTION IN ZONE 2 OF  
OPERABLE UNIT 1 OF THE USS LEAD  
SUPERFUND SITE**

**City of East Chicago, Lake County, State of Indiana**

**EPA Region 5**

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## 1. INTRODUCTION

### 1.1 Background and Applicability of the Z2 Soil SOW

(a) Background.

(1) This Statement of Work forms a part of the Unilateral Administrative Order (Z2 Soil UAO) for the continued implementation of remedial action in Zone 2 of Operable Unit 1 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site (Site) in East Chicago, Indiana, consistent with the Record of Decision (ROD), which was signed by the Director of the Superfund Division of the U.S. Environmental Protection Agency, Region 5, on November 30, 2012. This document shall be referred to as the “Zone 2 Soil Statement of Work” or the “Z2 Soil SOW.”

(2) Operable Unit 1. EPA has divided the Site into two operable units: Operable Unit 1 (OU1) and Operable Unit 2 (OU2). OU1 consists generally of a residential neighborhood in East Chicago, Indiana, commonly known as the Calumet neighborhood. OU1 has been further divided into three zones: Zone 1 (Z1), Zone 2 (Z2), and Zone 3 (Z3). The definition and boundaries of OU1 and Zones 1, 2, and 3 are set forth in the Definitions Section of the Z2 Soil UAO.

(3) Operable Unit 2. OU2 consists a 79-acre parcel of land that formerly housed the lead refining and smelting operations of U.S. Smelter and Lead Refinery Inc. (Former USS Lead Facility), as well as the groundwater associated with both OU1 and the Former USS Lead Facility. The definition of OU2 is set forth in the Definitions Section of the Z2 Soil UAO.

(b) Contamination. Soils in yards throughout OU1 are contaminated with lead and arsenic above the Remedial Action Levels or “RALs.” The RALs at OU1 are 400 milligrams per kilogram (mg/kg) for lead at residential properties, schools, parks and unrestricted public right of ways; 800 mg/kg for lead at industrial/commercial properties; and 26 mg/kg for arsenic at both residential and industrial/commercial properties.

(c) Record of Decision. The ROD requires the excavation and off-Site disposal of soils in yards that contain lead or arsenic above RALs down to a maximum depth of twenty-four inches below ground surface (bgs). The ROD does not require the excavation of soils in yards that contain lead or arsenic in concentrations that exceed the RALs located more than twenty-four inches bgs. However, if soils in yards that contain lead or arsenic in concentrations that exceed the RALs are located more than twenty-four inches bgs, a visual barrier must be installed after any contaminated soils in the first twenty-four inches bgs are excavated, and Institutional Controls must be implemented.



- (d) The ROD addresses only OU1. It does not address groundwater associated with either OU1 or the Former USS Lead Facility or any other aspect of OU2.
- (e) The Z2 Soil UAO addresses continued implementation of the ROD in properties located only within Zone 2.
- (f) This Z2 Soil SOW addresses Z2 Remedial Design and Z2 Remedial Action. EPA will implement all Z2 Remedial Design. Respondents will implement all Z2 Remedial Action except they will not be responsible for implementing Z2 Remedial Action at the “Z2 Excluded Properties,” as that term is defined in the Z2 Soil UAO and in Paragraph 4.8(a)(2) of this Z2 Soil SOW.
- (g) Respondents will implement their activities consistent with the ROD; the Z2 Soil UAO; all plans approved by EPA pursuant to the Z2 Soil UAO and this Z2 Soil SOW; any additional written direction provided by EPA; the *National Contingency Plan*; the *Superfund Lead-Contaminated Residential Sites Handbook*, August 2003 (“*Lead Handbook*”); and the documents and guidances identified in Section 9 of this Z2 Soil SOW. Nothing in this Paragraph shall preclude EPA from providing additional guidance under the Resource Conservation and Recovery Act (RCRA) with respect to any RCRA-subject facility used during the implementation of the Z2 Remedial Action.

## **1.2 Structure of the Z2 Soil SOW**

- Section 2 (Community Involvement) sets forth EPA’s and Respondents’ responsibilities for community involvement.
- Section 3 (Remedial Design) sets forth activities related to EPA’s development of design documents for the Z2 RA.
- Section 4 (Remedial Action) sets forth requirements regarding the continued implementation of the Z2 RA, including primary deliverables related to completion of the Z2 RA for all Z2 properties except the Z2 Excluded Properties.
- Section 5 (Reporting) sets forth Respondents’ reporting obligations.
- Section 6 (Deliverables) describes the content of the supporting deliverables and the general requirements regarding Respondents’ submission of, and EPA’s review of, approval of, comment on, and/or modification of, the deliverables.
- Section 7 (Schedules) sets forth the schedule for submitting the primary deliverables, specifies the supporting deliverables that must accompany each primary deliverable, and sets forth the schedule of milestones regarding the continued implementation of the Z2 RA.
- Section 8 (State Participation) addresses providing documents to the State.
- Section 9 (References) provides a list of references, including URLs.

## **1.3 The Scope of the Remedy includes the actions described in the ROD at Section 1.4, Section 2.8, Alternative 4A of Section 2.9.2, and Section 2.12.**

- 1.4 The terms used in this Z2 Soil SOW that are defined in CERCLA, in regulations promulgated under CERCLA, or in the Z2 Soil UAO, have the meanings assigned to them in CERCLA, in such regulations, or in the Z2 Soil UAO, except that the term “Paragraph” or “¶” means a paragraph of the Z2 Soil SOW, and the term “Section” means a section of the Z2 Soil SOW, unless otherwise stated.

## 2. COMMUNITY INVOLVEMENT

### 2.1 Community Involvement Responsibilities

- (a) EPA has the lead responsibility for developing and implementing community involvement activities at the Site. Previously, EPA developed a Community Involvement Plan (CIP) for the Site. Pursuant to 40 C.F.R. § 300.435(c), EPA shall review the existing CIP and determine whether it should be revised to describe further public involvement activities during the Z2 RA Work that are not already addressed or provided for in the existing CIP, including, if applicable, any Technical Assistance Grant (TAG), and/or any use of the Technical Assistance Services for Communities (TASC) contract.
- (b) If requested by EPA, Respondents shall participate in community involvement activities, including participation in (1) the preparation of information regarding the Z2 RA Work for dissemination to the public, and (2) public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site. Respondents’ support of EPA’s community involvement activities may include providing initial submissions and updates of deliverables to (1) any Community Advisory Groups, (2) any Technical Assistance Grant recipients and their advisors, and (3) other entities to provide them with a reasonable opportunity for review and comment. EPA may describe in its CIP Respondents’ responsibilities for community involvement activities. All community involvement activities conducted by Respondents at EPA’s request are subject to EPA’s oversight.
- (c) **Respondents’ CI Coordinator.** Within 30 days of the Effective Date, Respondents shall designate and notify EPA of Respondents’ Community Involvement Coordinator (Respondents’ CI Coordinator). Respondents may hire a contractor for this purpose. Respondents’ notice must include the name, title, and qualifications of the Respondents’ CI Coordinator. Respondents’ CI Coordinator is responsible for providing support regarding EPA’s community involvement activities, including coordinating with EPA’s CI Coordinator regarding responses to the public’s inquiries about the Site.

## 3. REMEDIAL DESIGN

- 3.1 **Design Planning and Soil Sampling.** EPA already has developed a work plan that includes design planning for properties in Zone 2. In addition, EPA has conducted and will continue to conduct field activities and soil sampling, also known as “Pre-Design Investigation” (PDI). EPA will continue to undertake PDI to address data gaps.

**3.2 Zone 2 Remedial Design.** EPA will perform Z2 Remedial Design and has already started the process.

- (a) For the yards of each property in Zone 2 that have not yet been remediated and that contain lead or arsenic in concentrations above the RALs at locations from the surface down to 24 inches bgs, EPA will develop a design document for the property which will consist of a diagram for that individual property.
  - (1) The individual property diagram will identify the areas of excavation and the depth of the excavation areas. Areas on the diagram that are not identified for excavation (such as sidewalks, impermeable driveways, and buildings) are not required to be excavated.
  - (2) The diagram will identify whether the Waste Material to be excavated is non-hazardous (identified as “Type-1 Waste”) or hazardous (identified as “Type-2 Waste”).
  - (3) The diagram will identify whether Waste Material is located at depths below 24 inches bgs. These areas will be colored in orange. At their election, Respondents may either: (i) install a visible barrier immediately over contamination remaining below 24 inch bgs and use best efforts to secure institutional controls; or (ii) excavate all Waste Materials above native sand that are contaminated with lead or arsenic above the RALs.
- (b) For the yards of each property in Zone 2 that do not contain lead or arsenic in concentrations above the RALs at locations from the surface to twenty-four inches bgs, no design document will be created nor will the Respondents be required to excavate or remove Waste Material from such property.
- (c) To the extent of EPA’s knowledge, each property diagram will identify features that may require removal such as underground lighting systems, invisible fences, or watering systems.

**3.3** EPA will invite Respondents to discuss any Remedial Design issues as necessary.

#### **4. REMEDIAL ACTION**

**4.1 Z2 Remedial Action Work Plan.** Respondents shall submit a Z2 RA Work Plan (Z2 RAWP) for EPA approval that includes:

- (a) A proposed Z2 RA Construction Schedule in Gantt chart format;
- (b) The deliverables identified in ¶ 6.7, except for (i) the Z2 O&M Plan which must be submitted for EPA approval pursuant to the Z2 RA Schedule at ¶ 7.2 and (ii) the Z2 ICIAP, which may be unnecessary if no contamination is left that requires Institutional Controls; if the Z2 ICIAP is necessary, it shall be submitted for EPA approval pursuant to the Z2 RA Schedule at ¶ 7.2; and

- (c) Plans for satisfying the substantive requirements of permits for on-site activity (Respondents are not required to actually obtain the applicable permits—such as storm water permits—for on-site activity but must satisfy the substantive requirements of any such permits); and
- (d) Plans for obtaining permits and satisfying those permits requirements for off-site activity, if any such off-site activity occurs; and
- (e) A list of key contractor personnel who will provide support during the Z2 RA; and
- (f) A schedule of deliverables to be provided during the Z2 RA.

**4.2 Z2 Remedial Action.** Respondents shall conduct the Z2 RA in accordance with the Z2 RAWP. When conducting the Z2 RA, Respondents shall, at a minimum:

- (a) Excavate soils consistent with the individual property diagrams that EPA prepares pursuant to Section 3.2(a) of this Z2 Soil SOW.
- (b) Consistent with each individual property diagram, install a visual barrier such as landscape fabric or orange construction fencing over soil containing lead or arsenic in concentrations above the RALs at depths greater than 24 inches bgs. Respondents are required to install a visual barrier only if soils above 24 inches bgs are excavated. In the alternative, at their option, Respondents may elect to excavate soil deeper than 24 inches bgs to avoid the need for a visual barrier and Institutional Controls at the property. If Respondents elect to excavate additional soils, Respondents shall revise any individual property diagram from which they deviate to show the actual excavation that was undertaken.
- (c) Deviate from the individual property diagrams that EPA prepares, as necessary.
  - (1) Deviations Requiring EPA Approval. Based on property conditions (e.g., underground utilities or features, the addition of a porch or garage), Respondents may need to deviate from an individual property diagram (e.g., by using offsets). If Respondents determine that it is necessary to deviate from an individual property diagram based on property conditions, Respondents shall confer with EPA and obtain EPA's assent. Based upon the extent of the deviation from the individual property diagram, EPA may require Respondents to: (i) submit sufficient information to document the need for the deviation; (ii) revise, prior to excavation, the individual property diagram to reflect the newly proposed excavation design; and/or (iii) undertake additional soil sampling. If EPA determines that additional soil sampling is necessary, Respondents' sampling must be consistent with sampling methods and analysis described in the *Remedial Investigation Report, Final*, June 2012, at Section 3.0 and the *Superfund Lead-*

*Contaminated Residential Sites Handbook*, OSWER 9285.7-50 (Aug. 2003), at Section 4.3.

- (2) Deviations Not Requiring EPA Approval. If an individual property diagram prepared by EPA does not include complete sampling data to a depth of twenty-four inches bgs either because of refusal during RD sampling or because a previously-existing impermeable barrier has been removed, Respondents shall undertake additional soil sampling to determine whether any unsampled soils in the yard, down to a depth of at least twenty-four inches bgs, contain lead or arsenic above the RALs. Respondents' sampling must be consistent with sampling methods and analysis described in the *Remedial Investigation Report, Final*, June 2012, at Section 3.0 and the *Superfund Lead-Contaminated Residential Sites Handbook*, OSWER 9285.7-50 (Aug. 2003) at Section 4.3.
- (i) Contaminated Soils 0–24 Inches Below Ground Surface. If Respondents find additional soils containing lead or arsenic above the RALs within twenty-four inches bgs that were not identified in the individual property design provided by EPA, Respondents shall excavate those soils.
- (ii) Unknown Contaminated Soils Below 24 Inches Below Ground Surface. If Respondents excavate additional soils down to twenty-four inches bgs that were not identified in the individual property design provided by EPA, Respondents shall also sample the next six inches of soil below twenty-four inches bgs to determine if they contain lead or arsenic above the RALs. If they do, Respondents shall either:
- (A) Install a visual barrier (e.g., landscape fabric, orange construction fencing) over the contaminated soil at twenty-four inches bgs; or
- (B) Excavate all soils above native sand that are contaminated with lead or arsenic above the RALs.
- (iii) Known Contaminated Soils Below 24 Inches Below Ground Surface. If an individual property diagram prepared by EPA shows soil containing lead or arsenic above the RALs below twenty-four inches bgs, but no soil containing lead or arsenic above the RALs between 18 and 24 inches bgs, Respondents shall either:
- (A) Excavate all soils above native sand that are contaminated with lead or arsenic above the RALs; or

- (B) Implement Institutional Controls to prevent exposure to soil below twenty-four inches bgs contaminated with lead and arsenic above the RALs.
- (3) Respondents shall revise any individual property diagram from which they deviate to show the actual excavation that was undertaken.
- (d) Backfill and restore each property in a manner consistent with the *Superfund Lead-Contaminated Residential Sites Handbook*, OSWER 9285.7-50 (Aug. 2003).
- (e) Transport and dispose of Waste Material consistent with ¶ 4.7 and the Z2 RA TST&D Plan. If Respondents temporarily store and stage Waste Material, Respondents must identify and segregate from one another hazardous waste and non-hazardous waste. If Respondents stage or stockpile contaminated soil at a Staging Area or at a transfer station, or if they arrange for the treatment of contaminated soil, Respondents shall take all necessary measures to prevent the soil from being redistributed to any area other than the container it is in or the location at the Staging Area or transfer or treatment station where the soil is being held.
- (f) Implement Institutional Controls to preserve the protectiveness of the Z2 RA and prevent exposure to soil below twenty-four inches bgs contaminated with lead and arsenic above the RALs, at properties with soils below twenty-four inches bgs which contain lead or arsenic above the RALs after implementation of the Z2 RA Construction.

**4.3 Independent Quality Assurance Team.** Respondents shall notify EPA of Respondents' designated Independent Quality Assurance Team (IQAT). The Supervising Contractor may perform this function or Respondents may hire a third party for this purpose. Respondents' notice must include the names, titles, contact information, and qualifications of the members of the IQAT. The IQAT will have the responsibility to determine whether Z2 RA Work is of expected quality and conforms to applicable plans and specifications. The IQAT will have the responsibilities as described in ¶ 2.1.3 of the *Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties*, EPA/540/G-90/001 (Apr. 1990).

#### **4.4 Meetings and Inspections**

- (a) **Preconstruction Conferences.** Respondents shall hold an initial preconstruction conference with EPA and others as directed or approved by EPA to discuss Respondents' initial meetings with homeowners regarding remedial designs. Respondents subsequently shall hold a second preconstruction conference with EPA and others as directed or approved by EPA and as described in the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995). Respondents

shall prepare minutes of each conference and shall distribute the minutes to all Parties.

- (b) **Periodic Meetings.** During the construction portion of the Z2 RA (Z2 RA Construction), Respondents shall meet regularly with EPA, and others as directed or determined by EPA, to discuss construction issues. Respondents shall distribute an agenda and list of attendees to all Parties prior to each meeting. Respondents shall prepare minutes of the meetings and shall distribute the minutes to all Parties.
- (c) **Inspections**
  - (1) EPA or its representative shall conduct periodic inspections of the Z2 RA Work. At EPA's request, the Supervising Contractor or other designee shall accompany EPA or its representative during inspections.
  - (2) Upon notification by EPA of any deficiencies in the Z2 RA Construction, Respondents shall take all necessary steps to correct the deficiencies and/or bring the Z2 RA Construction into compliance with the Z2 RD, any approved design changes, and/or the approved Z2 RAWP. If applicable, Respondents shall comply with any schedule provided by EPA in its notice of deficiency.

#### **4.5 EPA Support**

- (a) Respondents may refer any questions or comments from the public regarding the Site to the EPA RPM(s), the EPA CI Coordinator, or any other person designated by EPA.
- (b) Upon request by Respondents' Project Coordinator or Supervising Contractor, an EPA RPM will:
  - (1) Conduct pre-construction walkthroughs of individual properties with Respondents' employees and/or contractors;
  - (2) Conduct post-construction walkthroughs of individual properties with Respondents' employees and/or contractors; and
  - (3) Conduct additional walkthroughs of individual properties with Respondents' employees and/or contractors, as practicable.

#### **4.6 Emergency Response and Reporting**

- (a) **Emergency Response and Reporting.** If any event occurs during performance of the Z2 RA Work that causes or threatens to cause a release of Waste Material on, at, or from the Site and that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment,

Respondents shall: (1) immediately take all appropriate action to prevent, abate, or minimize such release or threat of release; (2) immediately notify the authorized EPA officer (as specified in ¶ 4.6(c)) orally; and (3) take such actions in consultation with the authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plan, the Emergency Response Plan, and any other deliverable approved by EPA under this Z2 Soil SOW.

- (b) **Release Reporting.** Upon the occurrence of any event during performance of the Z2 RA Work that Respondents are required to report pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004, Respondents shall immediately notify the authorized EPA officer orally.
- (c) The “authorized EPA officer” for purposes of immediate oral notifications and consultations under ¶ 4.6(a) and ¶ 4.6(b) are the EPA RPMs or the Emergency Response Section, Region 5, U.S. Environmental Protection Agency (if neither EPA RPM is available), which is at (312) 353-2318.
- (d) For any event covered by ¶ 4.6(a) and ¶ 4.6(b), Respondents shall: (1) within 14 days after the onset of such event, submit a report to EPA describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and (2) within 30 days after the conclusion of such event, submit a report to EPA describing all actions taken in response to such event.
- (e) The reporting requirements under ¶ 4.6 are in addition to the reporting required by CERCLA § 103 or EPCRA § 304.

#### **4.7 Off-Site Shipments**

- (a) Respondents may ship hazardous substances, pollutants, and contaminants from the Site to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondents will be deemed to be in compliance with CERCLA § 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if Respondents obtain a prior determination from EPA that the proposed receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).
- (b) Respondents may ship Waste Material from the Site to an out-of-state waste management facility only if, prior to any shipment, they provide notice to the appropriate state environmental official in the receiving facility’s state and to the EPA Project Coordinator. This notice requirement will not apply to any off-Site shipments when the total quantity of all such shipments does not exceed 10 cubic yards. The notice must include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. Respondents also shall notify the state environmental official



referenced above and the EPA Project Coordinator of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. Respondents shall provide the notice after the award of the contract for Z2 RA Construction and before the Waste Material is shipped.

- (c) Respondents may ship Investigation Derived Waste (IDW) from the Site to an off-Site facility only if they comply with Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), 40 C.F.R. § 300.440, EPA's *Guide to Management of Investigation Derived Waste*, OSWER 9345.3-03FS (Jan. 1992), and any IDW-specific requirements contained in the ROD. Wastes shipped off-Site to a laboratory for characterization, and RCRA hazardous wastes that meet the requirements for an exemption from RCRA under 40 CFR § 261.4(e) shipped off-site for treatability studies, are not subject to 40 C.F.R. § 300.440.

#### **4.8 Certification of Z2 RA Construction Completion**

- (a) Definitions

- (1) Performance Standards

- (i) Cleanup Standards. The cleanup standards for the Z2 Remedial Action are the RALs for lead and arsenic set forth in the ROD. For residential yards, the RAL for lead is 400 mg/kg. At schools, parks and unrestricted public right of ways, the RAL for lead is also 400 mg/kg. At industrial/commercial properties, the RAL for lead is 800 mg/kg. The RAL for arsenic is 26 mg/kg at both residential and commercial/industrial properties.
    - (ii) ARARs. EPA has identified the ARARs for the Z2 Remedial Action in Appendix B of the ROD, a copy of which is appended to the Z2 Soil UAO as Appendix D.

- (2) "Z2 Excluded Properties"

- (i) Prior to scheduling a Z2 RA Construction Completion Inspection pursuant to Paragraph 4.8(b) of this Z2 Soil SOW, Respondents must secure a final list of the Z2 Excluded Properties from EPA.
    - (ii) As set forth in Paragraphs 23.b and 25 of the Z2 Soil UAO, for those properties for which there is no access for sampling and/or excavation/restoration activities, Respondents shall use best efforts to secure such access during each year up to and including three months prior to the expected final demobilization of Z2 RA Construction (excluding the maintenance period), unless EPA informs Respondents that, with respect to a particular property(ies), EPA will take independent action to obtain access.

- (iii) By no later than October 31 of the year preceding the year that Respondents expect to complete the Z2 RA Construction for all Z2 properties for which access has been granted, Respondents shall provide EPA with a list of the Z2 properties, if any, for which they still have not secured access for sampling and/or remediation.
  - (iv) After Respondents have provided EPA with the list required in ¶ 4.8(a)(2)(iii), EPA may, if it deems it appropriate, assist Respondents, or take independent action, in obtaining access. To the extent that Respondents and/or EPA is/are successful in securing access, EPA will prepare RD drawings and provide them to Respondents no later than 30 days prior to Respondents' expected date of final demobilization, excluding the maintenance period.
  - (v) No later than six months prior to Respondents' expected date of final demobilization of Z2 RA Construction, Respondents shall notify EPA of their expected date of final demobilization and will regularly update that expected date in subsequent monthly Progress Reports submitted pursuant to ¶ 5.1.
  - (vi) By no later than 30 days after the notification in ¶ 4.8(a)(2)(v), EPA will develop a preliminary list of all Z2 unsampled and/or unremediated properties and will provide it to the Respondents. Thereafter, EPA and Respondents, will informally discuss the list. By no later than 30 days prior to Respondents' expected date of final demobilization, excluding the maintenance period, EPA will provide Respondents with a final list of the properties within Z2 that are unsampled and/or unremediated. The properties on this list shall constitute the "Z2 Excluded Properties."
  - (vii) At such time as EPA provides Respondents with the final list of Z2 Excluded Properties (which will be no later than 30 days prior to demobilization of Z2 RA Construction, excluding the maintenance period), Respondents' obligations to perform Z2 Remedial Action and Z2 O&M at the Z2 Excluded Properties shall cease under the Z2 Soil UAO and this Z2 Soil SOW. After Respondents complete any remaining Z2 RA Construction at any non-Z2 Excluded Properties (if any), Respondents may schedule a Z2 RA Construction Completion Inspection.
- (b) **Z2 RA Construction Completion Inspection.** The Z2 RA Construction is "Complete" for purposes of this ¶ 4.8 when it has been fully performed and the Performance Standards have been achieved, except at the Z2 Excluded Properties. Respondents shall schedule an inspection for the purpose of obtaining EPA's

Certification of Z2 RA Construction Completion. The inspection must be attended by Respondents and EPA and/or their representatives.

- (c) **Z2 RA Construction Report.** Following the inspection, Respondents shall submit a Z2 RA Construction Report to EPA requesting EPA's Certification of Z2 RA Construction Completion. The report must: (1) include certifications by a registered professional engineer and by Respondents' Project Coordinator that the Z2 RA Construction is complete; (2) include as-built drawings in a package which is signed and stamped by a registered professional engineer; (3) include copies of all restoration plans generated in connection with ¶ 4.2(d); (4) be prepared in accordance with Chapter 2 of EPA's *Close Out Procedures for NPL Sites* guidance (May 2011); (5) contain post-excavation diagrams to demonstrate that Performance Standards have been achieved; and (6) be certified in accordance with ¶ 6.5 (Certification).
- (d) **EPA Notice of Deficiencies.** If EPA concludes that the Z2 RA Construction is not Complete, EPA shall so notify Respondents. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require Respondents to submit a schedule for EPA approval. Respondents shall perform all activities described in the notice in accordance with the schedule.
- (e) If EPA concludes, based on the initial or any subsequent Z2 RA Construction Report requesting Certification of Z2 RA Construction Completion, that the Z2 RA Construction is Complete, EPA shall so certify to the Respondents. This certification will constitute the Certification of Z2 RA Construction Completion for purposes of the Z2 Soil UAO. Issuance of the Certification of Z2 RA Construction Completion will not affect Respondents' remaining obligations under the Z2 Soil UAO.

**4.9 Periodic Review Support Plan.** To the extent that contamination is left that requires Institutional Controls and to the extent that EPA notifies Respondents that Respondents' submissions under the approved Z2 O&M Plan do not provide EPA with sufficient information to undertake its statutorily-mandated five-year reviews, Respondents shall submit a periodic review support plan (PRSP) for EPA approval. The PRSP addresses the studies and investigations that Respondents shall conduct to support EPA's reviews of whether the Z2 RA is protective of human health and the environment in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c) (also known as "Five-year Reviews"). Respondents shall develop the plan in accordance with *Comprehensive Five-year Review Guidance*, OSWER 9355.7-03B-P (June 2001), and any other relevant five-year review guidances.

#### **4.10 Notice of Z2 RA Completion**

- (a) **“Z2 RA” Distinguished from “Z2 RA Construction.”** “Z2 RA” fully encompasses “Z2 RA Construction” but it also includes Institutional Control activities.
- (b) **If Institutional Controls are not Required at any Z2 Affected Property.**
- (1) If Respondents leave no contamination in place that requires Institutional Controls, then, at the same time that Respondents seek certification from EPA of Z2 RA Construction Completion, they may also seek notification from EPA of Z2 RA Completion.
  - (2) Respondents shall not be required to prepare a Z2 RA Completion Report if no Institutional Controls are necessary because the Z2 RA Construction Completion Report shall be sufficient.
  - (3) If EPA concludes that the Z2 RA is complete, EPA shall so notify Respondents.
  - (4) If EPA concludes that the Z2 RA is not complete, the procedures identified in ¶ 4.10(c)(3)–(c)(4) shall apply.
- (c) **If Institutional Controls are Required at One or More Z2 Affected Properties.**
- (1) **Z2 RA Completion Meeting.** If Institutional Controls are required at one or more Z2 Affected Property, then upon completion of the implementation of the ICIAP, Respondents shall schedule a meeting with EPA for the purpose of obtaining EPA’s Notice of Z2 RA Completion. The meeting must be attended by Respondents and EPA and/or their representatives.
  - (2) **Z2 RA Completion Report.** Following the meeting, Respondents shall submit a report to EPA requesting EPA’s Notice of Z2 RA Completion. The report must: (1) include certifications by Respondents’ Project Coordinator that all requirements of Section XI (Property Requirements) of the Z2 Soil UAO and all activities under the Z2 ICIAP are complete; and (2) be certified in accordance with ¶ 6.5 (Certification).
  - (3) If EPA concludes that the Z2 RA is not complete, EPA shall so notify Respondents. EPA’s notice must include a description of the activities that Respondents must perform to complete the Z2 RA. EPA’s notice must include specifications and a schedule for such activities or must require Respondents to submit specifications and a schedule for EPA approval. Respondents shall perform all activities described in the notice or in the EPA-approved specifications and schedule.

- (4) If EPA concludes, based on the initial or any subsequent Z2 RA Completion Report, that the Z2 RA is complete, EPA shall so notify Respondents.
- (d) Issuance of the Notice of Z2 RA Completion under either ¶ 4.10(b)(2) or (c)(4) does not affect the following continuing obligations: (i) activities under the Periodic Review Support Plan, if this Plan is required; (ii) activities under the Z2 O&M Plan; (iii) obligations under Sections XVI (Record Retention) and XV (Access to Information) of the Z2 Soil UAO; and (iv) payment of Response Costs under Section XIV (Payment of Response Costs) of the Z2 Soil UAO.

#### **4.11 Notice of Z2 RA Work Completion**

- (a) **“Z2 RA Work” Distinguished from “Z2 RA.”** “Z2 RA Work” fully encompasses “Z2 RA” but also includes Z2 O&M. Z2 O&M involves inspecting or reviewing records of properties, if any, where Institutional Controls are required. *See* Paragraph 6.7(j) below. By definition in the Z2 Soil UAO, “Z2 RA Work” also includes all other activities required by the Z2 Soil UAO except for record retention. Those other activities are addressed in Paragraph 4.11(d) below.
- (b) **If Institutional Controls are not Required at any Z2 Affected Property.**
  - (1) If Respondents leave no contamination in place that requires Institutional Controls, then Respondents shall not be required to undertake any Z2 O&M under the Z2 Soil UAO. Therefore, at the same time that Respondents seek certification from EPA of Z2 RA Construction Completion and notification from EPA of Z2 RA Completion, Respondents may also seek notification of Z2 RA Work Completion.
  - (2) Respondents shall not be required to prepare a Z2 RA Work Completion Report if no Institutional Controls are necessary because the Z2 RA Construction Completion Report shall be sufficient.
  - (3) If EPA concludes that the Z2 RA Work is complete, EPA shall so notify Respondents.
  - (4) If EPA concludes that the Z2 RA Work is not complete, the procedures identified in ¶ 4.11(c)(3)–(c)(4) shall apply.
- (c) **If Institutional Controls are Required at One or More Z2 Affected Properties.**
  - (1) **Z2 RA Work Completion Meeting.** If Institutional Controls are required at one or more Z2 Affected Property, then upon completion of the implementation of the Z2 O&M Plan, Respondents shall schedule a meeting with EPA for the purpose of obtaining EPA’s Notice of Z2 RA

Work Completion. The meeting must be attended by Respondents and EPA and/or their representatives.

- (2) **Z2 RA Work Completion Report.** Following the meeting, Respondents shall submit a report to EPA requesting EPA's Notice of Z2 RA Work Completion. The report must: (1) include certifications by Respondents' Project Coordinator that the Z2 RA Work, including all Z2 O&M activities, is complete; and (2) be certified in accordance with ¶ 6.5 (Certification).
  - (3) If EPA concludes that the Z2 RA Work is not complete, EPA shall so notify Respondents. EPA's notice must include a description of the activities that Respondents must perform to complete the Z2 RA Work. EPA's notice must include specifications and a schedule for such activities or must require Respondents to submit specifications and a schedule for EPA approval. Respondents shall perform all activities described in the notice or in the EPA-approved specifications and schedule.
  - (4) If EPA concludes, based on the initial or any subsequent Z2 RA Work Completion Report, that the Z2 RA Work is complete, EPA shall so notify Respondents.
- (d) Issuance of the Notice of Z2 RA Work Completion does not affect the following continuing obligations: (1) activities under the Periodic Review Support Plan, if this Plan is required; (2) obligations under Section XVI (Record Retention), and XV (Access to Information) of the Z2 Soil UAO; and (3) payment of Response Costs under Section XIV (Payment of Response Costs) of the Z2 Soil UAO.

## 5. REPORTING

**5.1 Progress Reports.** Commencing in the month following the approval of the Z2 RAWP, Respondents shall submit progress reports to EPA on a monthly basis, or as otherwise requested by EPA. The reports must cover all activities that took place during the prior reporting period pursuant to the Z2 Soil UAO, including:

- (a) The actions that have been taken toward achieving compliance with the Z2 Soil UAO;
- (b) A summary of all results of sampling, tests, and all other data received or generated by Respondents;
- (c) A description of all deliverables that Respondents submitted to EPA;
- (d) A description of all activities relating to Z2 RA Construction that are scheduled for the next six weeks;

- (e) An updated Z2 RA Construction Schedule (if that schedule has been modified), together with information regarding percentage of completion, delays encountered or anticipated that may affect the future schedule for implementation of the Z2 RA Work, and a description of efforts made to mitigate those delays or anticipated delays; and
- (f) A description of any modifications to the work plans or other schedules that Respondents have proposed or that have been approved by EPA.

**5.2 Notice of Progress Report Schedule Changes.** If the schedule for any activity described in the Progress Reports, including activities required to be described under ¶ 5.1(d), changes, Respondents shall notify EPA of such change at least 7 days before performance of the activity.

## **6. DELIVERABLES**

**6.1 Applicability.** Respondents shall submit deliverables for EPA approval or for EPA comment as specified in this Z2 Soil SOW. If neither is specified, the deliverable does not require EPA's approval or comment. Paragraphs 6.2 (In Writing) through 6.4 (Technical Specifications) apply to all deliverables. Paragraph 6.5 (Certification) applies to any deliverable that is required to be certified. Paragraph 6.6 (Approval of Deliverables) applies to any deliverable that is required to be submitted for EPA approval.

**6.2 In Writing.** All deliverables under this Z2 Soil SOW must be in writing unless otherwise specified.

**6.3 General Requirements for Deliverables.** All deliverables must be submitted by the deadlines in the Z2 RA Schedule. Respondents shall submit all deliverables in electronic form. Technical specifications for sampling and monitoring data and spatial data are addressed in ¶ 6.4. All other deliverables shall be submitted to EPA in the electronic form specified by the EPA RPM. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5" by 11", Respondents shall also provide EPA with paper copies of such exhibits.

### **6.4 Technical Specifications**

- (a) Sampling and monitoring data should be submitted in standard Regional Electronic Data Deliverable (EDD) format. Respondents shall consult with the EPA RPM prior to transmitting sampling and monitoring data in order to be advised of the EDD format that the data should be transmitted in. Other delivery methods may be allowed if electronic direct submission presents a significant burden or as technology changes.
- (b) Spatial data, including spatially-referenced data and geospatial data, should be submitted: (1) in the ESRI File Geodatabase format; and (2) as unprojected

geographic coordinates in decimal degree format using North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) as the datum. If applicable, submissions should include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data should be accompanied by metadata, and such metadata should be compliant with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor (EME), complies with these FGDC and EPA metadata requirements and is available at <https://edg.epa.gov/EME/>.

- (c) Each file must include an attribute name for each site unit or sub-unit submitted. Consult <http://www.epa.gov/geospatial/geospatial-policies-and-standards> for any further available guidance on attribute identification and naming.
- (d) Spatial data submitted by Respondents does not, and is not intended to, define the boundaries of the Site.

**6.5 Certification.** All deliverables that require compliance with this ¶ 6.5 must be signed by the Respondents' Project Coordinator, or other responsible official of Respondents, and must contain the following statement:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

## **6.6 Approval of Deliverables**

- (a) **Initial Submissions**
  - (1) After review of any deliverable that is required to be submitted for EPA approval under the Z2 Soil UAO or this Z2 Soil SOW, EPA shall:
    - (i) approve, in whole or in part, the submission; (ii) approve the submission upon specified conditions; (iii) disapprove, in whole or in part, the submission; or (iv) any combination of the foregoing.
  - (2) EPA also may modify the initial submission to cure deficiencies in the submission if: (i) EPA determines that disapproving the submission and awaiting a resubmission would cause substantial disruption to the Z2 RA



Work; or (ii) previous submission(s) have been disapproved due to material defects and the deficiencies in the initial submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

- (b) **Resubmissions.** Upon receipt of a notice of disapproval under ¶ 6.6(a) (Initial Submissions), or if required by a notice of approval upon specified conditions under ¶ 6.6(a), Respondents shall, within 14 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the deliverable for approval. After review of the resubmitted deliverable, EPA may: (1) approve, in whole or in part, the resubmission; (2) approve the resubmission upon specified conditions; (3) modify the resubmission; (4) disapprove, in whole or in part, the resubmission, requiring Respondents to correct the deficiencies; or (5) any combination of the foregoing.
- (c) **Implementation.** Upon approval, approval upon conditions, or modification by EPA under ¶ 6.6(a) (Initial Submissions) or ¶ 6.6(b) (Resubmissions), of any deliverable, or any portion thereof: (1) such deliverable, or portion thereof, will be incorporated into and enforceable under the Z2 Soil UAO; and (2) Respondents shall take any action required by such deliverable, or portion thereof.

**6.7 Supporting Deliverables.** Respondents shall submit each of the following supporting deliverables for EPA approval as part of the Z2 RAWP, except that the Z2 ICIAP (if Institutional Controls are necessary), and the Z2 O&M Plan (if properties remain that are other than “unrestricted use and unrestricted exposure”) may be submitted at a later date as specified in ¶ 7.2 (Z2 RA Work Schedule). Respondents shall develop the deliverables in accordance with all applicable regulations, guidances, and policies (see Section 9 (References)). Respondents shall update each of these supporting deliverables as necessary or appropriate during the course of the Z2 RA Work and/or as requested by EPA. For those documents which EPA will make available to Respondents, EPA will separately provide instructions to Respondents on how to access a secure website which has those documents.

- (a) **Health and Safety Plan.** The Health and Safety Plan (HASP) describes all activities to be performed to protect on site personnel and area residents from physical, chemical, and all other hazards posed by the Z2 RA Work. Respondents shall develop the HASP in accordance with EPA’s Emergency Responder Health and Safety and Occupational Safety and Health Administration (OSHA) requirements under 29 C.F.R. §§ 1910 and 1926. The HASP should cover activities during the Z2 RA and be updated to cover activities after Z2 RA completion. EPA does not approve the HASP, but will review it to ensure that all necessary elements are included and that the plan provides for the protection of human health and the environment. EPA shall make an example HASP that EPA developed for the residential areas of the USS Lead Site available to Respondents.

- (b) **Emergency Response Plan.** The Emergency Response Plan (ERP) must describe procedures to be used in the event of an accident or emergency at the Site (for example, power outages, water impoundment failure, treatment plant failure, slope failure). The ERP must include:
- (1) Name of the person or entity responsible for responding in the event of an emergency incident;
  - (2) Plan and date(s) for meeting(s) with the local community, including local, State, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals;
  - (3) Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), consistent with the regulations under 40 C.F.R. Part 112, describing measures to prevent, and contingency plans for, spills and discharges;
  - (4) Notification activities in accordance with ¶ 4.6(b) (Release Reporting) in the event of a release of hazardous substances requiring reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), 42 U.S.C. § 11004; and
  - (5) A description of all necessary actions to ensure compliance with ¶ 4.6 in the event of an occurrence during the performance of the Z2 RA Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency or may present an immediate threat to public health or welfare or the environment.

EPA shall make an example ERP that EPA developed for the residential areas of the USS Lead Site available at to Respondents.

- (c) **Field Sampling Plan.** The Field Sampling Plan (FSP) addresses all sample collection activities. The FSP must be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. Respondents shall develop the FSP in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies*, EPA/540/G 89/004 (Oct. 1988). EPA shall make an example FSP that EPA developed for the residential areas of the USS Lead Site available to Respondents.
- (d) **Quality Assurance Project Plan.** The Quality Assurance Project Plan (QAPP) augments the FSP and addresses sample analysis and data handling regarding the Z2 RA Work. The QAPP must include a detailed explanation of Respondents' quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance, and monitoring samples. Respondents shall develop the QAPP in accordance with *EPA Requirements for Quality Assurance*

*Project Plans*, QA/R-5, EPA/240/B-01/003 (Mar. 2001, reissued May 2006); *Guidance for Quality Assurance Project Plans*, QA/G-5, EPA/240/R 02/009 (Dec. 2002); and *Uniform Federal Policy for Quality Assurance Project Plans*, Parts 1-3, EPA/505/B-04/900A through 900C (Mar. 2005). EPA shall make an example QAPP that EPA developed for the residential areas of the USS Lead Site available to Respondents. The QAPP also must include procedures:

- (1) To ensure that EPA and its authorized representative have reasonable access to laboratories used by Respondents in implementing the Z2 RA Work (Respondents' Labs);
  - (2) To ensure that Respondents' Labs analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring;
  - (3) To ensure that Respondents' Labs perform all analyses using EPA-accepted methods (i.e., the methods documented in *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis*, ILM05.4 (Dec. 2006); *USEPA Contract Laboratory Program Statement of Work for Organic Analysis*, SOM01.2 (amended Apr. 2007); and *USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods (Multi-Media, Multi-Concentration)*, ISM01.2 (Jan. 2010)) or other methods acceptable to EPA;
  - (4) To ensure that Respondents' Labs participate in an EPA-accepted QA/QC program or other program QA/QC acceptable to EPA;
  - (5) For Respondents to provide split samples and/or duplicate samples to EPA upon request;
  - (6) For EPA to take any additional samples that it deems necessary;
  - (7) For EPA to provide to Respondents, upon request, split samples and/or duplicate samples in connection with EPA's oversight sampling; and
  - (8) For Respondents to submit to EPA all sampling and tests results and other data in connection with the implementation of the Z2 RA Work.
- (e) **Construction Quality Assurance/Quality Control Plan (CQA/QCP).** The purpose of the Construction Quality Assurance Plan (CQAP) is to describe planned and systemic activities that provide confidence that the Z2 RA Construction will satisfy all plans, specifications, and related requirements, including quality objectives. The purpose of the Construction Quality Control Plan (CQCP) is to describe the activities to verify that Z2 RA construction has satisfied all plans, specifications, and related requirements, including quality objectives. EPA shall make an example CQA/QCP that EPA developed for the

residential areas of the USS Lead Site available to Respondents. The CQA/QCP must:

- (1) Identify, and describe the responsibilities of, the organizations and personnel implementing the CQA/QCP;
  - (2) Describe the PS required to be met to achieve Completion of the Z2 RA;
  - (3) Describe the activities to be performed: (i) to provide confidence that PS will be met; and (ii) to determine whether PS have been met;
  - (4) Describe verification activities, such as inspections, sampling, testing, monitoring, and production controls, under the CQA/QCP;
  - (5) Describe industry standards and technical specifications used in implementing the CQA/QCP;
  - (6) Describe procedures for tracking construction deficiencies from identification through corrective action;
  - (7) Describe procedures for documenting all CQA/QCP activities; and
  - (8) Describe procedures for retention of documents and for final storage of documents.
- (f) **Construction Stormwater Pollution Prevention Plan.** EPA shall make an example Construction Stormwater Pollution Prevention Plan that EPA developed for the residential areas of the USS Lead Site available to Respondents.
- (g) **Traffic Management Plan.** EPA shall make an example Traffic Management Plan that EPA developed for the residential areas of the USS Lead Site available to Respondents.
- (h) **Z2 RA Temporary Storage, Transportation and Disposal Plan.** The Z2 RA Temporary Storage, Transportation and Disposal Plan (Z2 RA TST&D Plan) must include:
- (1) Proposed routes for off-site shipment of Waste Material;
  - (2) Identification of communities affected by shipment of Waste Material;
  - (3) Description of plans to minimize impacts on affected communities;
  - (4) Description of the site setup at a Staging Area, if any, including the locations of the waste staging area and laydown yard;

- (5) Waste management control measures necessary for safety and protection of human health and the environment at a Staging Area, if any, including by not limited to erosion control, stormwater pollution prevention, dust suppression (both on the roads used by the truck traffic and near the Waste Materials), and air monitoring;
- (6) Description of maintenance to be performed on the roads used by trucks hauling Waste Materials
- (7) Health and safety requirements;
- (8) Documentation requirements; and
- (9) A description of the disposal facilities.

A TST&D Plan prepared by Defendants to a 2014 Consent Decree (that covers Z1&3 of OU1) already exists (Z1&3 TST&D Plan) and has been approved by EPA. Respondents may utilize the Z1&3 TST&D Plan as the core document for their preparation and submission of the Z2 RA TST&D Plan due hereunder, but shall submit an Addendum to the Z1&3 TST&D Plan to include any additional requirements set forth in this Z2 Soil SOW and any that may be required by EPA.

- (i) **Addendum to the Data Management Plan.** EPA shall make EPA's current Data Management Plan for residential areas of the USS Lead Site available to Respondents. Respondents shall prepare an Addendum to the Data Management Plan (ADMP) that shall describe the information that Respondents shall collect during the Z2 RA Construction and how Respondents shall collect and manage that information so that it is compatible with EPA's data management practices.

- (1) For field activities, the ADMP must include requirements to:
  - (i) Use DustTrak DRX for air monitoring and download all generated data for backup;
  - (ii) Use VIPER and associated telemetry equipment for real-time air monitoring activities;
  - (iii) Use Gillians (or equivalent) to collect air samples;
  - (iv) Fill out an Air Monitoring iForm (or equivalent) to record air sample information;
  - (v) Use XRF for soil screening (as needed);
  - (vi) Use XRF iForm (or equivalent) to record XRF QC checks and field data; and

- (vii) Use licensed surveyors or another method approved by EPA to record pre-excavation elevation and confirmation of excavation depth.
- (2) The flow chart on Page 4 of the current Data Management Plan identifies data that must be exported to Scribe (which is a software program for managing environmental data). For data that must be exported to Scribe, the ADMP must include requirements to:
- (i) Re-create digital forms for field data entry (i.e., using iForms or equivalent);
  - (ii) Ensure that export data from digital forms can be imported to Scribe without adjustments to Scribe (stated otherwise, ensure that comma-separated values (CSV) files are able to be imported to Scribe without adjustments to Scribe);
  - (iii) QA/QC CSV exports for iForms (or equivalent) to ensure information entered is correct/valid;
  - (iv) Update the field version of Scribe by subscribing to the updated version of Scribe.NET;
  - (v) Upload CSV files into field version of Scribe for creation of chain of custody (COC) for submission of samples;
  - (vi) Export the COC XML files from Scribe;
  - (vii) Email the CSV files from the digital forms and the COC XML files to the database administrator;
  - (viii) Backup all CSV and COC XML files submitted to the database administrator; and
  - (ix) QA/QC pre-elevation data, excavation depth confirmation data, and the export of this data to Scribe.

EPA will work with Respondents during their development of the ADMP and the necessary digital forms.

- (j) **Z2 O&M Plan.** The Z2 O&M Plan shall describe the requirements for inspecting, operating, and maintaining the Z2 RA where contamination below 24 inches bgs that requires Institutional Controls has been left in place. Respondents shall develop the Z2 O&M Plan in accordance with *Operation and Maintenance in the Superfund Program*, OSWER 9200.1 37FS, EPA/540/F-01/004 (May 2001). The Z2 O&M Plan must include a description of the procedures the Respondents shall use for inspections or record reviews of properties where Institutional Controls

are required. The Z2 O&M Plan must require the submission of a Z2 O&M Report following Z2 O&M activities. Remediated properties that have unlimited use and unrestricted exposure (“UU/UE”) are not required to be included in the Z2 O&M Plan.

(k) **Institutional Controls Implementation and Assurance Plan.**

- (1) The Institutional Controls Implementation and Assurance Plan (ICIAP) is required only if Respondents leave contamination in place below 24 inches bgs that requires Institutional Controls.
- (2) The ICIAP describes plans to implement, maintain, and enforce the Institutional Controls (ICs) at the Site. Respondents shall develop the ICIAP in accordance with *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*, OSWER 9355.0-89, EPA/540/R-09/001 (Dec. 2012), and *Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites*, OSWER 9200.0-77, EPA/540/R-09/02 (Dec. 2012). The ICIAP must include the following additional requirements:
  - (i) Locations of recorded real property interests (e.g., easements, liens) and resource interests in the property that may affect ICs (e.g., surface, mineral, and water rights) including accurate mapping and geographic information system (GIS) coordinates of such interests; and
  - (ii) Legal descriptions and survey maps that are prepared according to current American Land Title Association (ALTA) Survey guidelines and certified by a licensed surveyor.

## 7. SCHEDULES

- 7.1 Applicability and Revisions.** All deliverables and tasks required under this Z2 Soil SOW must be submitted or completed by the deadlines or within the time durations listed in the Z2 RA Work Schedule set forth below. Respondents may submit proposed revised Z2 RA Work Schedules for EPA approval. Upon EPA’s approval, the revised Z2 RA Work Schedules supersede the Z2 RA Work Schedule set forth below, and any previously-approved Z2 RA Work Schedules.

## **7.2 Z2 RA Work Schedule**



	<b>Description of Deliverable / Task</b>	<b>¶ Ref.</b>	<b>Deadline (dates are “no later than” dates) (“days” are calendar days)</b>
1	Z2 RAWP	4.1	The HASP, ERP, FSP, QAPP, and C-SWPPP subplans shall be submitted 60 days after EPA’s Notice of Authorization to Proceed regarding Supervising Contractor under ¶ 18.c of the Z2 Soil UAO; all remaining subplans (except the Z2 O&M Plan and the ICIAP) shall be submitted 75 days after the Notice
2	Designate IQAT (either a third party or the Supervising Contractor)	4.3	30 days after EPA’s Notice of Authorization to Proceed regarding Supervising Contractor under ¶ 18.c of the Z2 Soil UAO
3	Initial Preconstruction Conference	4.4(a)	60 days after EPA’s Notice of Authorization to Proceed regarding Supervising Contractor under ¶ 18.c of the Z2 Soil UAO
	Second Preconstruction Conference	4.4(a)	5 days before the Start of Z2 RA Construction (Line 4)
4	Start of Z2 RA Construction, (which includes mobilization for Z2 RA Construction)		The later of: (i) 30 days after Approval of Z2 RAWP; (ii) 14 days after the date of the Final ESD; or (iii) such other time as EPA may require (provided that EPA has both approved the Z2 RAWP and issued the Final ESD)
5	Z2 O&M Plan, if properties remain that are other than Unrestricted Use/Unrestricted Access	6.7(j)	60 days before Completion of Z2 RA Construction (Item 7)
6	ICIAP, if Institutional Controls are necessary	6.7(k)	60 days before Completion of Z2 RA Construction (Item 7)
7	Completion of Z2 RA Construction		Per approved Z2 RA Construction Schedule
8	Z2 RA Construction Completion Inspection	4.8(b)	As scheduled by Respondents when they believe the Z2 RA Construction is completed (Item 7)
9	Z2 RA Construction Report	4.8(c)	60 days after Z2 RA Construction Completion Inspection (Item 8)
10	Z2 RA Completion Meeting (may be consolidated with Z2 RA Construction Completion Inspection if Institutional Controls are not necessary)	4.10(c)(1)	As scheduled by Respondents when they believe the Z2 RA is completed

11	Z2 RA Completion Report (required only if Institutional Controls are necessary)	4.10(c)(2)	60 days after Z2 RA Completion Meeting (Item 10)
12	Z2 RA Work Completion Meeting (may be consolidated with Z2 RA Construction Completion Inspection and Z2 RA Completion Meeting if Institutional Controls are not necessary)	4.11(c)(1)	As scheduled by Respondent when they believe the Z2 RA Work is completed
13	Z2 RA Work Completion Report (required only if Institutional Controls are necessary)	4.11(c)(2)	60 days after the Z2 RA Work Completion Inspection (Item 11)
14	Periodic Review Support Plan, if required	4.9	Four years after start of Z2 RA Construction

## 8. STATE PARTICIPATION

**8.1 Copies.** Respondents shall, at any time they send a deliverable to EPA, send a copy of such deliverable to the State in care of:

Doug Petroff  
Project Manager, Federal Programs  
Indiana Dep't of Environmental Management  
100 North Senate Ave.  
IGCN – 11<sup>th</sup> Floor  
Indianapolis, IN 46204

EPA shall, at any time it sends a notice, authorization, approval, disapproval, or certification to Respondents, send a copy of such document to the State.

## 9. REFERENCES

**9.1** The following regulations and guidance documents, among others, apply to the Z2 RA Work. Any item for which a specific URL is not provided below is available on one of the two EPA Web pages listed in ¶ 9.2:

- (a) A Compendium of Superfund Field Operations Methods, OSWER 9355.0-14, EPA/540/P-87/001a (Aug. 1987).
- (b) CERCLA Compliance with Other Laws Manual, Part I: Interim Final, OSWER 9234.1-01, EPA/540/G-89/006 (Aug. 1988).
- (c) Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER 9355.3-01, EPA/540/G-89/004 (Oct. 1988).

- (d) CERCLA Compliance with Other Laws Manual, Part II, OSWER 9234.1-02, EPA/540/G-89/009 (Aug. 1989).
- (e) Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, OSWER 9355.5-01, EPA/540/G-90/001 (Apr.1990).
- (f) Guidance on Expediting Remedial Design and Remedial Actions, OSWER 9355.5-02, EPA/540/G-90/006 (Aug. 1990).
- (g) Guide to Management of Investigation-Derived Wastes, OSWER 9345.3-03FS (Jan. 1992).
- (h) Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, OSWER 9355.7-03 (Feb. 1992).
- (i) Guidance for Conducting Treatability Studies under CERCLA, OSWER 9380.3-10, EPA/540/R-92/071A (Nov. 1992).
- (j) National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, 40 C.F.R. Part 300 (Oct. 1994).
- (k) Guidance for Scoping the Remedial Design, OSWER 9355.0-43, EPA/540/R-95/025 (Mar. 1995).
- (l) Remedial Design/Remedial Action Handbook, OSWER 9355.0-04B, EPA/540/R-95/059 (June 1995).
- (m) EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis, QA/G-9, EPA/600/R-96/084 (July 2000).
- (n) Operation and Maintenance in the Superfund Program, OSWER 9200.1-37FS, EPA/540/F-01/004 (May 2001).
- (o) Comprehensive Five-year Review Guidance, OSWER 9355.7-03B-P, 540-R-01-007 (June 2001).
- (p) Guidance for Quality Assurance Project Plans, QA/G-5, EPA/240/R-02/009 (Dec. 2002).
- (q) Superfund Lead-Contaminated Residential Sites Handbook, OSWER 9285.7-50 (Aug. 2003).
- (r) Institutional Controls: Third Party Beneficiary Rights in Proprietary Controls (Apr. 2004).

- (s) Quality management systems for environmental information and technology programs - Requirements with guidance for use, ASQ/ANSI E4:2014 (American Society for Quality, February 2014).
- (t) Uniform Federal Policy for Quality Assurance Project Plans, Parts 1-3, EPA/505/B-04/900A through 900C (Mar. 2005).
- (u) Superfund Community Involvement Handbook, SEMS 100000070 (January 2016) available at <http://www.epa.gov/superfund/community-involvement-tools-and-resources>.
- (v) EPA Guidance on Systematic Planning Using the Data Quality Objectives Process, QA/G-4, EPA/240/B-06/001 (Feb. 2006).
- (w) EPA Requirements for Quality Assurance Project Plans, QA/R-5, EPA/240/B-01/003 (Mar. 2001, reissued May 2006).
- (x) EPA Requirements for Quality Management Plans, QA/R-2, EPA/240/B-01/002 (Mar. 2001, reissued May 2006).
- (y) USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, ILM05.4 (Dec. 2006).
- (z) USEPA Contract Laboratory Program Statement of Work for Organic Analysis, SOM01.2 (amended Apr. 2007).
- (aa) EPA National Geospatial Data Policy, CIO Policy Transmittal 05-002 (Aug. 2008), available at <http://www.epa.gov/geospatial/geospatial-policies-and-standards> and <http://www.epa.gov/geospatial/epa-national-geospatial-data-policy>.
- (bb) Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration, OSWER 9283.1-33 (June 2009).
- (cc) Principles for Greener Cleanups (Aug. 2009), available at <http://www.epa.gov/greenercleanups/epa-principles-greener-cleanups>.
- (dd) USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods (Multi-Media, Multi-Concentration), ISM01.2 (Jan. 2010).
- (ee) Close Out Procedures for National Priorities List Sites, OSWER 9320.2-22 (May 2011).
- (ff) Groundwater Road Map: Recommended Process for Restoring Contaminated Groundwater at Superfund Sites, OSWER 9283.1-34 (July 2011).
- (gg) Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance," OSWER 9355.7-18 (Sep. 2011).

- (hh) Construction Specifications Institute's MasterFormat 2012, available from the Construction Specifications Institute, <http://www.csinet.org/masterformat>.
- (ii) Updated Superfund Response and Settlement Approach for Sites Using the Superfund Alternative Approach , OSWER 9200.2-125 (Sep. 2012)
- (jj) Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites, OSWER 9355.0-89, EPA/540/R-09/001 (Dec. 2012).
- (kk) Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites, OSWER 9200.0-77, EPA/540/R-09/02 (Dec. 2012).
- (ll) EPA's Emergency Responder Health and Safety Manual, OSWER 9285.3-12 (July 2005 and updates), <http://www.epaosc.org/HealthSafetyManual/manual-index.htm>
- (mm) Broader Application of Remedial Design and Remedial Action Pilot Project Lessons Learned, OSWER 9200.2-129 (Feb. 2013).
- (nn) Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions, OSWER 9355.0-129 (Nov. 2013).
- (oo) Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind, OSWER 9200.2-144 (May 2014).
- (pp) Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105 (Feb. 2017), available at <https://www.epa.gov/superfund/superfund-post-construction-completion>.

**9.2** A more complete list may be found on the following EPA Web pages:

Laws, Policy, and Guidance: <http://www.epa.gov/superfund/superfund-policy-guidance-and-laws>

Test Methods Collections: <http://www.epa.gov/measurements/collection-methods>

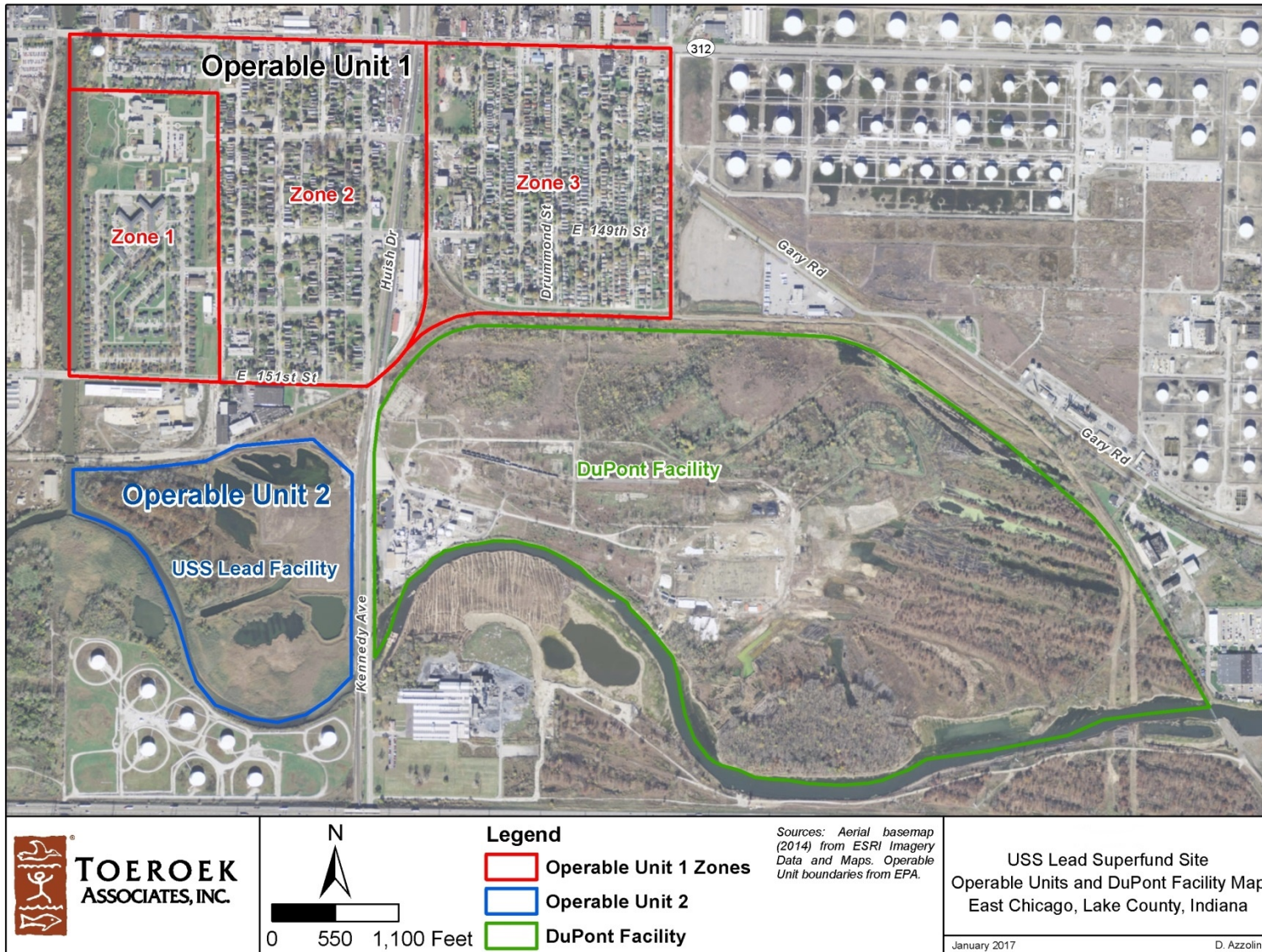
**9.3** For any regulation or guidance referenced in the Z2 Soil UAO or Z2 Soil SOW, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Z2 RA Work only after Respondents receive notification from EPA of the modification, amendment, or replacement.

# **APPENDIX B**

**TO  
Z2 SOIL UAO**

**MAP OF USS LEAD OU1 AND OU2**





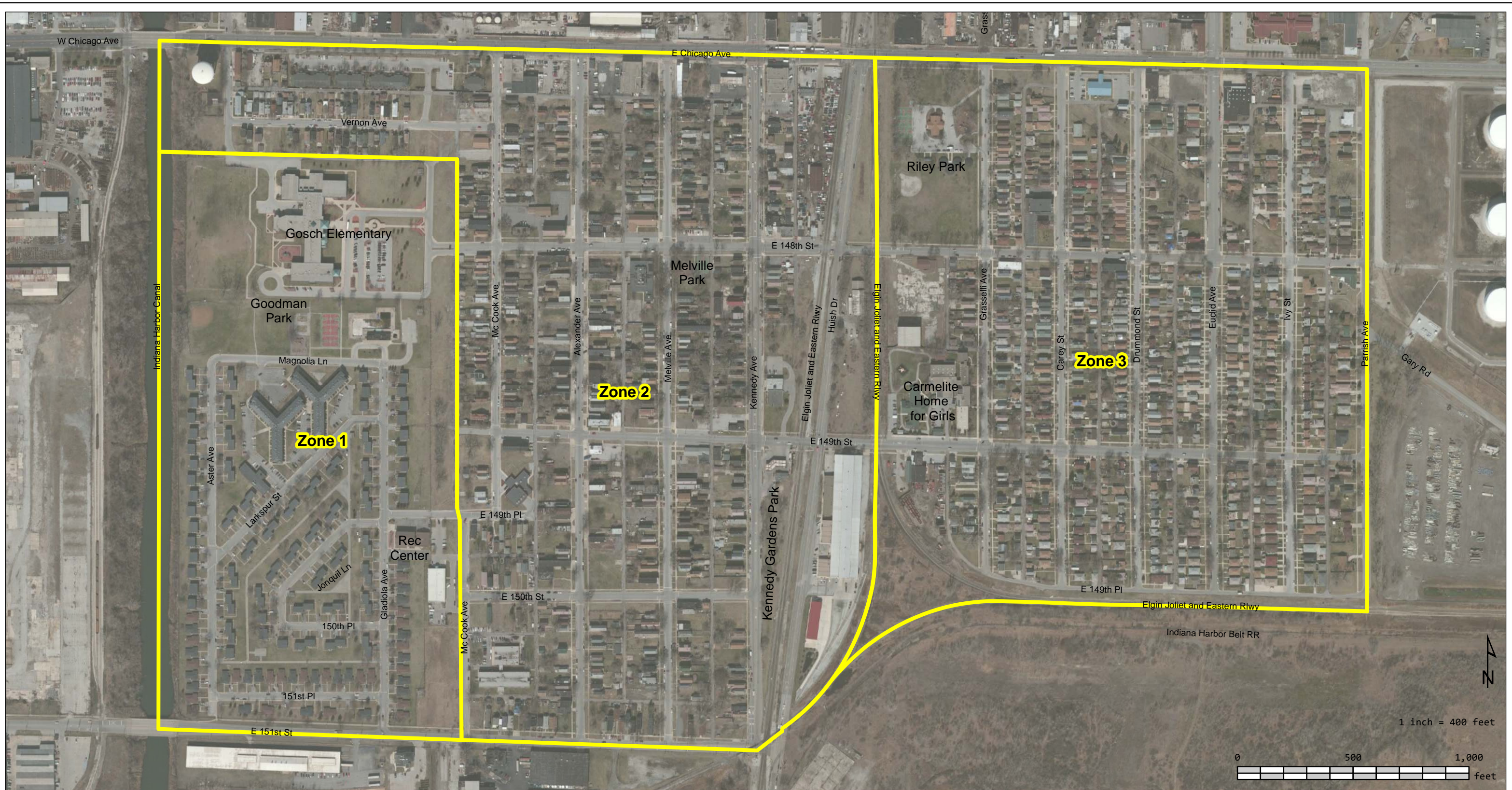
**APPENDIX B: USS Lead Superfund Site Operable Units 1 and 2**

# **APPENDIX C**

**TO  
Z2 SOIL UAO**

**MAP OF USS LEAD SITE  
OU1 – ZONES 1, 2, AND 3**





Zone

Basemap source: Esri



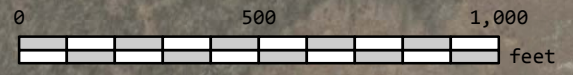
US SMELTER & LEAD REFINERY  
LAKE COUNTY, EAST CHICAGO, INDIANA

**APPENDIX C**  
**OU1 ZONES**

EPA REGION 5 RAC 2 | REVISION 0 | JULY 2014



1 inch = 400 feet





# **APPENDIX D**

**TO  
Z2 SOIL UAO**

## **RECORD OF DECISION**

US EPA RECORDS CENTER REGION 5



446987

# **U.S. Smelter and Lead Refinery, Inc. Superfund Site**

## **Operable Unit 1**

East Chicago, Lake County, Indiana

# ***Record of Decision***



**U.S. Environmental Protection Agency Region 5**

77 W Jackson Blvd.  
Chicago, IL 60604

November 2012

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- Appendix D – Feasibility Study Cost Estimate for Alternative 4A

## **Part 1 – Declaration**

### **1.1 – Site Name and Location**

U.S. Smelter and Lead Refinery, Inc. Site  
Operable Unit 1 (residential area)  
CERCLIS ID# IND047030226  
East Chicago, Lake County, Indiana

### **1.2 – Statement of Basis and Purpose**

This decision document presents the Selected Remedy for Operable Unit 1 (OU1) at the U.S. Smelter and Lead Refinery, Inc. (USS Lead) Site in East Chicago, Lake County, Indiana. The U.S. Environmental Protection Agency (EPA) chose the Selected Remedy for OU1 in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Contingency Plan (NCP). The decision is based on the Administrative Record for the USS Lead Site.

The State of Indiana concurs with the Selected Remedy.

### **1.3 - Assessment of Site**

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

### **1.4 - Description of Selected Remedy**

The USS Lead Site is being addressed as two operable units under the framework set forth in CERCLA. The selected remedy specified in this ROD addresses OU1. OU1 contains residential yards<sup>1</sup> contaminated with lead and arsenic at levels that pose a threat to human health via ingestion, inhalation and direct contact. EPA's selected remedy for OU1 addresses these risks from exposure to contaminated soils through the excavation and off-site disposal of contaminated soils. The remedial action levels (RALs) at OU1 are 400 milligrams per kilogram (mg/kg) for lead at residential properties, 800 mg/kg for lead at industrial/commercial properties, and 26 mg/kg for arsenic at both residential and industrial/commercial properties. EPA's Selected Remedy for OU1 at the USS Lead Site consists of:

---

<sup>1</sup> Yards are the risk management unit in OU1. Each individual property consists of one or more yards. Sampling during the remedial investigation demonstrated that contaminant levels in one yard were not reliably correlated with contaminant levels in other yards on the same property. The Human Health Risk Assessment evaluated the risk to human health and the environment by property, not by yard.

- Excavation of soil that contains lead or arsenic in concentrations that exceed the RALs to a maximum excavation depth of 24 inches.
- Disposal of excavated soil at an off-site Subtitle D landfill; some excavated soils may require chemical stabilization prior to off-site disposal to address exceedances of the toxicity characteristic (TC) regulatory threshold. Contaminated soil that exceeds the TC threshold is considered principal threat waste.
- If contaminated soil is identified at a depth greater than 24 inches below ground surface (bgs), a visual barrier, such as orange construction fencing or landscape fabric, will be placed above the contaminated soil before the yard is backfilled with clean soil. Institutional controls will be implemented to protect the visual barrier that separates clean backfill from impacted soils and to ensure that users of the property are not exposed to contaminated soil that remains at depth.
- Excavated soil will be replaced with clean soil to maintain the original grade. The top 6 inches of fill will consist of topsoil. Each yard will be restored as close as practicable to its pre-remedial condition.

This Selected Remedy is the first of two remedial decisions for the USS Lead Site. EPA has not yet begun the remedial investigation (RI) of Operable Unit 2 (OU2). OU2 consists of the former USS Lead property. In the future, EPA will develop a remedial investigation, feasibility study (FS), Proposed Plan, and ROD for OU2.

### **1.5 - Statutory Determinations**

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

This remedy satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). Soils at OU1 that have lead concentrations exceeding the TC threshold and that are therefore defined under the Resource Conservation and Recovery Act (RCRA) as hazardous waste will be treated prior to disposal. This treatment will reduce the mobility of the lead. The remaining volume of relatively low-level soil contamination that is being addressed in this remedy does not lend itself to any cost-effective treatment.

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

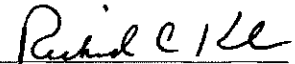
## 1.6 – Data Certification Checklist

The following information is included in the *Decision Summary* section of this ROD. Additional information can be found in the Administrative Record for this site.

Information Item	Location in ROD
Contaminants of concern and their respective concentrations	Section 2.7.2
Baseline risk represented by the contaminants of concern	Section 2.7
Cleanup levels established for contaminants of concern and the basis for these levels	Section 2.8
How source materials that constitute principal threats will be addressed	Sections 2.11 and 2.13
Current and reasonably anticipated future land use assumptions in the baseline risk assessment and the ROD	Section 2.7.1
Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	Section 2.9 and Appendix D
Key factor(s) that led to the selection of the remedy	Sections 2.10 and 2.12

## 1.7 - Authorizing Signatures

EPA, as the lead agency for the U.S. Smelter and Lead Refinery, Inc. Superfund Site (IND047030226), formally authorizes this Record of Decision.

  
Richard C. Karl, Director  
Superfund Division  
EPA Region 5

11-30-12  
Date

The State of Indiana Department of Environmental Management (IDEM), as the support agency for the USS Lead Superfund Site, formally concurs with this ROD. IDEM has prepared a separate concurrence letter which is included as Appendix A.



## **Part 2 – Decision Summary**

### **2.1 - Site Name, Location, and Brief Description**

The USS Lead Site is located in the City of East Chicago, Indiana (see Figure 1). East Chicago is located on the shore of Lake Michigan and lies approximately 18 miles southeast of Chicago, Illinois. It has a total area of approximately 16 square miles (mi<sup>2</sup>) of which approximately 14 mi<sup>2</sup> are land and 2 mi<sup>2</sup> are water. The USS Lead Site comprises two separate areas each of which is called an operable unit (OU). OU1 is a predominantly residential area located in the southern portion of the City of East Chicago, north of the former USS Lead industrial facility (see Figure 1). The USS Lead facility is referred to as OU2. This ROD sets forth the remedy for OU1. OU1 is a residential soil cleanup site. Lead is the primary contaminant of concern (COC). Accordingly, EPA has followed its 2003 *Superfund Lead-Contaminated Residential Sites Handbook* in the development of the RI, FS, and ROD for OU1.

The residential area that comprises OU1 has been contaminated by aerial deposition of windblown contaminants from the USS Lead facility and other local industrial facilities and by direct deposition of contaminated fill materials. The other industrial sources of contamination in OU1 include operations conducted by the Anaconda Copper Refining Company on property within OU1 and from property located just south of OUI owned and operated by E.I. duPont deNemours and Company (DuPont) (see Figure 2).

EPA is the lead agency for the USS Lead Site. IDEM serves as the support agency. EPA conducted the RI/FS for OUI using federal funding. EPA intends to pursue responsible parties to fund or undertake the remedial design and remedial action for OUI.

### **2.2 - Site History and Enforcement Activities**

The USS Lead facility is located at 5300 Kennedy Avenue, East Chicago, Indiana. The facility (OU2) was constructed in the early 1900s by the Delamar Copper Refinery Company to produce copper. In 1920, the property was purchased by U.S. Smelting Refinery and Mining and later by USS Lead. USS Lead operated a primary lead smelter at the facility. An electrolytic process called the "Betts process" was used for refining lead ores into high-purity lead. During production, the Betts process can release fugitive metals like lead.

United States Geological Survey aerial photographs from 1939, 1951, 1959, and 2005 show OU2 and OU1 over time (Figure 3). These photographs indicate the progression of residential development within OU1. For the area located west of Huish Avenue, the photographs show that the majority of the residences were built before 1939. For the area located east of Huish Avenue, approximately half of the homes were built before 1939, approximately 75 to 80 percent of the homes were built between 1939 and 1951, and by 1959 most of the homes were built. These photographs also show that the Anaconda Copper Company was located on the area now occupied by the Gosch Elementary School and a public housing residential complex (the southwest portion of OU1). The Gosch Elementary School and the East Chicago public housing complex were built on the former Anaconda Copper Company site after 1959.

Between 1972 and 1973, the USS Lead facility was converted into a secondary lead smelter which, instead of refining lead ore, recovered lead from scrap metal and automotive batteries. All operations at OU2 were discontinued in 1985. Two primary waste materials were generated as a result of the smelting operations: (1) blast-furnace slag and (2) lead-containing dust from the blast-furnace stack. Blast-furnace slag was stockpiled south of the plant building and once per year spread over an adjoining 21-acre wetland. The blast-furnace baghouse collected approximately 300 tons of baghouse flue dust per month during maximum operating conditions. Some of the flue dust escaped the baghouse capture system and was deposited by the wind within the boundaries of OU1. By the late 1970s, USS Lead stored onsite approximately 8,000 tons of baghouse dust.

The East Chicago area in the vicinity of OU1 has historically supported a variety of industries. In addition to the USS Lead smelting operation, other industrial operations have managed lead and other metals and are sources of contamination in OU1. Immediately east of OU2, across Kennedy Avenue, is the former DuPont site (currently leased and operated by W.R. Grace & Co., Grace Davison). At this location, DuPont manufactured the pesticide lead arsenate. Anaconda Lead Products and International Lead Refining Company, two smelter operations that managed lead and other metals, operated within OU1 at the location currently occupied by an East Chicago public housing facility. Anaconda Lead Products was a manufacturer of white lead and zinc oxide, and the International Lead Refining Company was a metal-refining facility. These facilities included the following: a pulverizing mill, white-lead storage areas, a chemical laboratory, a machine shop, a zinc-oxide experimental unit building and plant, a silver refinery, a lead refinery, a baghouse, and other miscellaneous buildings and processing areas.

Starting in 1993, USS Lead began a cleanup at its facility (OU2) pursuant to an agreement with EPA under the Resource Conservation and Recovery Act. USS Lead addressed the majority of the contamination in OU2 by excavating contaminated soils and consolidating those soils within a corrective action management unit located within OU2. As part of the OU2 RCRA activities, investigations were conducted in the residential area now known as OU1 to investigate the source and identify the extent of lead-contaminated soils. Modeling of air deposition of lead in the residential area was also performed.

Responsibility for the further investigation of conditions at OU1 and OU2 was subsequently transferred from EPA's RCRA program to its Superfund program. During this transition, EPA's Superfund program conducted some limited sampling of the residential area in 2007. The Superfund program subsequently listed the USS Lead Site on the National Priorities List (NPL) in April 2009. As part of the NPL listing process, EPA and IDEM evaluated contaminant concentrations focusing on the southwestern portion of the residential area. This evaluation was later expanded during the RI to cover the entirety of OU1. EPA sampled 7% of the properties during its full-scale remedial investigation. During these investigations, EPA identified properties with lead concentrations in surface soils greater than 1,200 mg/kg. Lead in surface soils in concentrations greater than 1,200 mg/kg poses an imminent and substantial threat to human health. EPA's emergency response program addressed these most highly-contaminated parcels. EPA removed the contaminated soils to a maximum depth of two feet and backfilled the

excavated areas with clean soils. A total of 29 properties were remediated by the Superfund emergency response program in 2008 and 2011.

Although some residential properties have been cleaned up, contamination remains at many properties within OU1. This ROD sets forth EPA's approach for addressing the contaminated soils throughout OU1 that still require cleanup.

### **2.3 – Community Participation**

The RI/FS Reports and the Proposed Plan for the USS Lead Site were made available to the public in early July 2012. These documents can be found in the Administrative Record for the site. The Administrative Record is maintained at the EPA Docket Room in Chicago, Illinois, and the East Chicago Public Libraries on Chicago Avenue and Columbus Avenue. After issuing the Proposed Plan, EPA held a public comment period between July 12 and September 12, 2012. In addition, EPA held a public meeting on July 25, 2012, to present the Proposed Plan to a community audience. When the Proposed Plan was issued, EPA mailed a fact sheet to area residents informing them about the Proposed Plan. The fact sheet advised residents that the RI, FS, and Proposed Plan were available for viewing at the public repositories. The fact sheet included the date, time and location of the public meeting. At the public meeting, EPA and IDEM representatives answered questions about the site and the remedial alternatives. EPA's responses to the comments received during the public comment period are included in the *Responsiveness Summary*, which is Part 3 of this ROD.

### **2.4 - Scope and Role of Operable Unit or Response Action**

The USS Lead Superfund Site includes the former USS Lead facility with its surrounding property (OU2) and the residential area north of it (OU1). EPA estimates that approximately 57 percent of the yards (i.e., approximately 723 of the 1,271 properties) in OU1 contain concentrations of lead and/or arsenic that pose a risk to human health. EPA has concluded that USS Lead, DuPont, Anaconda Lead and International Refining were sources of contamination to OU1 through historic aerial deposition and/or direct releases to the ground. These facilities are not ongoing sources of contamination to the residential area.

EPA has organized the USS Lead Superfund Site into two OUs:

- Operable Unit 1 – The residential area north of the former USS Lead facility. OU1 is bounded by Chicago Avenue to the north, Parrish to the east, the Calumet Canal to the west, and 150<sup>th</sup>/151<sup>st</sup> Streets to the south. This ROD addresses yards in OU1 that contain lead and/or arsenic concentrations in soil that pose a threat to human health.
- Operable Unit 2 – The former USS Lead facility, its surrounding property, and site-wide groundwater. OU2 will be addressed in a future RI/FS and decision document.

The Selected Remedy for OU1 will address the principal threats by treating contaminated soil that exceeds the toxicity characteristic regulatory threshold for lead before disposing of the soil at an off-site landfill. During the RI, EPA did not test for arsenic exceedances of the TC

threshold because very few soil samples had high enough concentrations of arsenic to warrant toxicity characteristic leaching procedure (TCLP) analysis. Although the highest arsenic soil concentration detected at OU1 during the RI was 567 mg/kg, the arsenic concentration in soil was often below 100 mg/kg, the lowest concentration of arsenic in soil that would possibly fail the TCLP test and therefore be considered a hazardous waste. Based on TCLP analysis for lead conducted during the RI, EPA estimates that OU1 soils will exceed the TC threshold for lead when concentrations exceed 2,400 mg/kg. EPA does not expect the highest arsenic concentrations found at OU1 to exceed the TC threshold. Additionally, the highest concentrations of arsenic were found to be co-located with high lead concentrations. Because of this, soils with the highest arsenic concentrations are likely to be subject to treatment because they are frequently co-located with the lead concentrations that require treatment.

## **2.5 – Site Characteristics**

### **2.5.1 - Conceptual Site Model**

The conceptual site model (CSM) for the USS Lead Superfund Site (Figure 4) considers four potentially affected media at the site: air, soil, surface water, and groundwater. The CSM shows that the USS Lead Site comprises within an urban setting historically industrial areas, the residential area (OU1), and a canal. The former smelter plants are the primary source of contamination. During plant operations, the smelters generated airborne emissions from plant stacks. Leaks and spills were also likely. Fill material used to raise the ground level in OU1 is a second potential source of contaminants. Approximately two feet of fill overlie native sands throughout OU1. Metals and polycyclic aromatic hydrocarbons (PAHs) are the main constituents of interest (COIs) associated with these sources. The water table in the vicinity of the site lies approximately 8.5 feet bgs. The groundwater flows south/southwest towards the Grand Calumet River.

Contaminants were deposited at OU1 through airborne emissions from the industrial plants and direct deposition of contaminated fill material. Other possible sources of contaminants at OU1 are fertilizers and pesticides. These chemicals may have been applied to individual properties. Fertilizer can contain measurable levels of heavy metals such as lead, arsenic, and cadmium. The DuPont facility manufactured the pesticide lead arsenate using two ingredients: lead and arsenic. Both are contaminants of concern at the USS Lead Site.

Potential migration routes for COIs were assessed according to the properties of the contaminants and fate-and-transport processes. Potential migration pathways for COIs to be released, deposited, or redistributed in surface soils include:

- particulate erosion and redeposition by wind
- runoff, particulate erosion, and redeposition by surface water
- surface water percolation
- surface soil filling and excavation activities

Contaminants may migrate into the air by two distinct emission mechanisms: entrainment of contaminated particles by the wind and volatilization of chemical compounds. The most likely

transport mechanism for the COIs at OU1 is by windborne transport of contaminated dust and soil erosion. The COIs have a strong tendency to adsorb to soil particles. Wind and the concomitant release of wind-borne dust is the primary pathway for site COIs to be released to the atmosphere.

Surface-water runoff is another migration pathway that was considered. Surface-water runoff can erode surface soils and transport particles by overland flow and result in contaminated soil being picked up and redeposited at lower elevations. Because OU1 is flat and is served by a municipal sewer system, redeposition in low-lying areas is not expected to be of major significance at the site.

Excavation and filling activities are also likely migration pathways. EPA has observed these activities at the site. Excavation potentially exposes the subsurface to fugitive dust erosion and deposition. Filling activities result in topsoil that is not as compact as native soils and which may result in faster percolation and/or erosion rates. There is also a possibility that amended fill materials may be contaminated, particularly if obtained from a nearby, contaminated source.

Human and ecological receptors can be exposed to the COIs through direct dermal exposure to soil, inhalation of windborne soils, ingestion of soils, or ingestion of produce grown in affected soils. Based upon the distribution of PAHs, EPA has concluded that their presence in OU1 is not attributable to neighboring industrial activities. Rather, it is consistent with an urban residential setting. Therefore, the Selected Remedy does not address PAHs but does address lead and arsenic in surface and subsurface soils.

### **2.5.2 - Overview of site**

OU1 encompasses approximately 322 acres and is bounded by East Chicago Avenue on the north, East 151st Street on the south, the Indiana Harbor Canal on the west, and Parrish Avenue on the east (see Figure 2). OU1 is a mixed residential and commercial/industrial area north of the former USS Lead industrial facility. The mixed-use area includes the following uses: (1) residences including single and multi-family units some of which, in the southwest corner of the area, are public housing, (2) generally small commercial/industrial operations, (3) municipal and community offices and operations, (4) two schools (the Carrie Gosch Elementary School and the Carmelite School for Girls), (5) four parks, and (6) numerous places of worship. Residences, schools, and public parks constitute the large majority of properties and acreage within OU1.

The average annual precipitation in East Chicago between 1961 and 1990 was 36.82 inches. A five-year wind-rose plot for the years 1987 to 1991 at a site in nearby Hammond, Indiana, indicates that prevailing winds are from the southwest and north at less than 20 miles per hour.

### **2.5.3 - Geologic and Hydrogeologic Setting**

During site investigations, five main soil varieties were identified within OU1, including the following: organic topsoil, fill, fill with construction debris, fill with slag, and native sand. All but the native sand were found from the surface down to depths of as much as 24 inches bgs. Native sand was typically located 18 to 24 inches bgs. Nearby soil borings indicate that the

Equality Formation underlies the top few feet of soils at OU1. The Equality Formation, also known as the Calumet Aquifer, is primarily a sand unit with some silts, clays, and gravel lenses. The Equality Formation is estimated to extend to approximately 25 feet bgs.

EPA did not evaluate groundwater as part of the remedial investigation for OU1. Site-wide groundwater will be investigated as part of the OU2 RI. Residents and businesses in East Chicago are served by a municipal water system.

#### **2.5.4 - Sampling Strategy**

EPA's sampling approach at OU1 followed the methodology described in its 2003 *Superfund Lead-Contaminated Residential Sites Handbook*. As part of the RI, EPA collected surface and subsurface soil samples between December 2009 and September 2010. EPA sampled a total of 88 properties, including 74 residential properties and 14 non-residential properties (i.e., schools, parks, and commercial properties). In total, EPA sampled 232 distinct yards (including drip zone samples and quadrants from larger properties such as parks and schools) in order to characterize the nature and extent of COIs in and around OU1. Drip zone samples are soil samples collected from beneath the gutters and downspouts of buildings. The purpose of drip zone sampling is to investigate whether airborne contamination is concentrating or has concentrated along the drip lines of roofs. These 232 separate "yards" included 75 front yards, 76 back yards, 21 quadrants, and 60 drip zones. EPA elected to consider drip zones as separate "yards" because they covered a geographic area that was not confined to a front yard, back yard, or quadrant. EPA used the term "yard" throughout the RI and the FS to represent one unit of remedial area. A single remedial area generally consists of a front yard, back yard, or drip zone of a residential property, or any quadrant of a park, commercial property, easement, or school. A residential property can have up to three yards (front, back, drip zone) and a park, commercial property, easement, or school can be divided into a maximum of four yards (otherwise referred to as quadrants in the RI).

Soils from four different horizons (0-6", 6-12", 12-18", and 18-24" bgs) were analyzed from front yards, back yards, and quadrants of larger properties. The purpose of sampling soils from different soil horizons was to evaluate vertical contamination profiles. Aerial deposition of contaminants would be expected to yield contamination profiles with higher concentrations near the surface and lower concentrations at depth.

#### **2.5.5 - Sources of Contamination**

As previously discussed, the primary sources of site-related contamination are the industrial facilities that formerly operated in and around OU1, including DuPont, Anaconda Lead, Industrial Refining and the USS Lead facility. None of these facilities are still in operation, and none of them are ongoing sources of contamination to OU1. The placement of fill material and the individual application of materials such as pesticides are other potential sources of contamination in OU1 that may be ongoing.

## 2.5.6 - Types of Contaminants and Affected Media

Metals are the primary contaminants and soil is the affected media in OU1. All soil samples were analyzed for lead. In addition, a subset of samples was analyzed for various combinations of total metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PAHs, polychlorinated biphenyls (PCBs), and pesticides to provide a basis for more fully assessing contamination in shallow soils in OU1. Although SVOCs (including PAHs), pesticides, and PCBs were sampled for and discussed in the RI and evaluated in the risk assessment, there is no reasonable basis from which to conclude that there were consistent releases of these compounds into OU1 from the local industrial facilities. Rather, EPA has concluded that the detection of these compounds is associated with other anthropogenic sources typical of a metropolitan industrial area. EPA's RI Report for OU1 includes all available sampling results and a full discussion of those results.

The sampling results were evaluated in the human health risk assessment. The risk assessment determined the contaminants of potential concern (COPCs) and identified which chemicals and affected media drive potential risk at the site. These findings are summarized in Section 2.7.2 of this ROD and discussed in greater detail in the RI Report. The human health risk assessment was completed using site-specific data. EPA has determined that the contaminants of concern (COCs) are lead and arsenic in residential soils.

## 2.5.7 - Extent of Contamination

Lead is the primary COC at OU1. EPA used the *Superfund Lead-Contaminated Residential Sites Handbook*, EPA remedial screening levels (RSLs), and the State of Indiana's Risk Integrated System of Closure Technical Resource Guidance Document to set the site screening levels (SSLs) for lead at 400 mg/kg for residential areas and 800 mg/kg for industrial areas. Although lead was found to be the most widespread contaminant at OU1, arsenic was also present at locations within the residential area. As detailed in the RI Report, the SSLs for arsenic in surface and subsurface soils are 14.1 mg/kg and 13.2 mg/kg, respectively, at both residential and commercial/industrial properties.

Data analysis indicated that lead and arsenic were generally correlated; arsenic was present in areas with high lead concentrations. Based on the data, OU1 soils typically do not exceed the arsenic SSL unless lead also exceeds the lead SSL. Additionally, lead and PAHs were not correlated; EPA did not discern a correlation between high lead concentrations and high concentrations of PAHs. The lack of correlation between PAHs and lead supports the hypothesis that PAHs are not site-related compounds and are likely associated with other anthropogenic sources.

During the RI sampling events in OU1, EPA analyzed samples from all 232 yards for lead. The surface and/or subsurface soil in 123 yards (53 percent of those tested) exceeded the lead SSL. The potential lateral extent of lead-impacted soil includes all areas within the OU1 boundaries. The area west of Huish Avenue contained a higher frequency of exceedances for lead in both surface and subsurface soil samples than the eastern half of OU1. Lead concentrations in all of

the nine properties (20 yards) sampled in the East Chicago Housing Authority complex in the southwest portion of the study area exceeded the SSL for lead.

During the RI sampling events, a total of 136 yards in OU1 were analyzed for arsenic. The surface and/or subsurface soil in 75 yards (55 percent of those tested) exceeded the arsenic SSL. EPA performed an analysis of arsenic concentrations in soils to further understand site conditions and to assess the evidence for aerial deposition of arsenic at OU1. Because arsenic concentrations in the public housing area soils likely resulted from direct deposition of contaminants from the former industrial facility and because operations at the industrial facility and construction of the housing area likely redistributed soils, the vertical profile of arsenic in the public housing area was excluded from the analysis. When the public housing area was excluded from the arsenic data set, it became evident that the arsenic in the remainder of OU1 was primarily dispersed due to aerial deposition because the shallow soil horizons contain higher arsenic concentrations than the deeper soil horizons.

An analysis of front and back yards suggests that there is an approximately 75% chance that if the COIs in one yard are in excess of the SSLs, then the COIs in the other yard at the same property will exceed the SSLs. In addition, based on the observed vertical distributions of lead, arsenic, and PAHs, there is only a 13% chance that sampling only the upper two depth intervals (0-6" and 6-12" bgs) would miss contamination in the lower two depth intervals (12-18" and 18-24" bgs). A comparison of soil type to COI concentration concluded that soil type is not a reliable indicator of the presence or absence of COIs. There is one exception to this rule: the native sands are generally free of contamination.

EPA concluded that the concentration levels of VOCs, SVOCs (including PAHs), PCBs, and pesticides do not require further evaluation. EPA found the highest lead and arsenic concentrations in OU1 in the East Chicago Housing Authority complex. The high concentrations in this area appear to be related to the historical operations at the Anaconda Copper Company facility.

## **2.6 – Current and Potential Future Site and Resource Uses**

The current land use at OU1 is largely residential and recreational (parks and school yards), with a small number of commercial and light industrial properties. The adjacent OU2 includes the RCRA landfill and wetland areas. EPA expects that the land use at OU1 will remain unchanged. The City of East Chicago has shared with EPA its development plans for OU1 and the surrounding area, which confirm that the land use within OU1 is not likely to dramatically change.

Lake Michigan is the municipal water source for East Chicago, and properties within OU1 do not access site-wide groundwater for any use. The surface water in the vicinity of OU1 is the Indiana Harbor Canal (OU1's western boundary) and the Grand Calumet River (south of OU2). The portion of the Indiana Harbor Canal near OU1 is not subject to much industrial use in contrast with much higher industrial activity in the northern part of the canal. The Grand Calumet River in this area is not navigable. Neither water body appears to be used recreationally.



In July 2009, East Chicago had a population of 29,900, of which 51.6% was Hispanic, 40.3% was African-American, and 7.2% was White, non-Hispanic. The density of East Chicago was approximately 2,496 people per square mile, and the average household size was 2.8 people (City-Data 2011). Based on the average household size and the number of homes in OU1, the approximate density within OU1 is 7,000 people per square mile. Based on an inspection of historical aerial photographs, the primary land use in East Chicago is industrial. Residential land use accounts for approximately 20% of the land within the city. OU1 is one of the most densely populated areas in East Chicago.

The East Chicago median household income is \$28,289, versus the Indiana median household income of \$45,424. The March 2011 unemployment rate for East Chicago was 12.7%, compared to Indiana's March 2011 unemployment rate of 8.8%. EPA considers East Chicago an environmental justice community. An environmental justice community is one characterized by low income and burdened with significant environmental challenges.

## **2.7 - Summary of Site Risks**

A human health risk assessment (HHRA) estimates what risks a site poses to human health if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the HHRA for the USS Lead site. More detailed information can be found in the RI Report. The HHRA relied on Tier I screening-level evaluations to identify media and exposure pathways that may pose unacceptable risks. More detailed (Tier II) risk assessments were considered if the Tier I screening level evaluations identified potentially significant risks. The HHRA evaluated the potential risks that could result to people from exposure to the contaminants at the site. EPA conducted the HHRA consistent 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. The information used in the HHRA helped define site-specific, risk-based screening levels. The HHRA determined that the COCs for the site are lead and arsenic for residential soils and that cleanup levels of 400 mg/kg for lead and 26 mg/kg for arsenic are protective of human health and the environment for current and future residential use.

The information presented here focuses on the information that is driving the need for a response action at the site and does not necessarily summarize the entire HHRA. Further information is contained in the risk assessment within the RI Report and is included in the Administrative Record.

EPA did not identify any ecological habitats in OU1 so did not conduct an ecological risk assessment.

### **2.7.1 - Summary of Human Health Risk Assessment**

The HHRA for the USS Lead site evaluated risks by individual property rather than by individual yard. Each property consists of one or more yards. The HHRA did not include lead

in its carcinogenic risk and non-carcinogenic hazard calculations because EPA's *Superfund Lead-Contaminated Residential Sites Handbook* specifies that lead cleanup levels should be calculated by using the Integrated Exposure Uptake Biokinetic (IEUBK) model. As discussed in the RI Report and explained in more detail in Section 2.7.7 of this ROD, EPA evaluated the available site-specific information (such as lead in drinking water and blood lead levels in children) in relation to the default exposure assumptions in the IEUBK model and concluded that there was no need to modify the default exposure assumptions.

The objectives of the risk evaluation using the HHRA (which includes the results of the IEUBK model) were the following: (1) to investigate whether site-related constituents detected in environmental media pose unacceptable risks to current and future human receptors, and (2) to provide information to support decisions concerning the need for further evaluation or action, based upon current and reasonably anticipated future land use. For the purposes of the risk assessment, future land uses were assumed to be the same as current land uses. Current land uses are primarily residential, commercial/industrial, and recreational. Human receptors at OUI include the following: child and adult residents; adult utility and construction workers; students; teachers (indoor and outdoor); adult and child recreationalists; and park workers (indoor and outdoor). All the receptors were assumed to be exposed to surface (current and future land use conditions) and subsurface soil (future land use conditions) through incidental ingestion, dermal contact, and inhalation of particulates in ambient air. Subsurface soils were included under the future land use conditions because residents and utility/construction workers may rework soils and expose deeper horizons.

In the HHRA risk characterization, the toxicity factors were integrated with concentrations of COIs and intake assumptions to estimate potential cancer risks and non-carcinogenic hazards. Risks and hazards were calculated using standard risk assessment methodologies. Risks were compared to EPA's acceptable risk range: from  $1 \times 10^{-6}$  (one cancer per one million exposed receptors) to  $1 \times 10^{-4}$  (one cancer per ten thousand exposed receptors). Risks less than  $1 \times 10^{-6}$  are considered insignificant. Risks within the above range are remediated at the discretion of EPA risk managers. Risks greater than  $1 \times 10^{-4}$  typically require remediation. Non-carcinogenic hazards are compared to a target hazard index (HI) of 1. Risks posed by lead in soil were evaluated by comparing lead exposure point concentrations (EPCs) in soil at each property to receptor-specific lead preliminary remediation goals (PRGs). Chemicals that have a risk identified through the risk assessment process become COCs.

Risks associated with lead are present throughout the study area. The HHRA found that risks and hazards associated with other compounds exist under both current and future land use conditions for between 30 and 40 percent of residential properties. At these properties, risks above EPA's acceptable risk range ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ ) and hazard index (greater than 1) from compounds other than lead are driven primarily by exposure to arsenic and PAHs through ingestion of homegrown produce and incidental ingestion of soil. As discussed in the RI Report, the PAHs detected in soil at OUI are typical of urban soils in the Chicago metropolitan statistical area and are not related to any specific onsite or nearby offsite sources. Therefore, PAHs are not considered site-related COCs and were not addressed in the FS.

In addition, a risk management decision was made to address risk from arsenic concentrations in soil that exceed the upper tolerance limit (UTL) for background arsenic concentrations. Because of the similarity between the bulk soil concentrations for arsenic at OU1 and the background concentrations for arsenic, EPA calculated a UTL for arsenic concentrations in soil to distinguish between soil concentrations that are distributed among the naturally-occurring values at the site and those that may be impacted by activities in and around the USS Lead site. The approach of using the UTL as a value for the RAL has been used at other CERCLA sites, including the Jacobsville Neighborhood Soil Contamination site in Evansville, Indiana. This approach is discussed in greater detail in that site's RI Report. The UTL also corresponds with the soil concentration that is equivalent to a  $1 \times 10^{-4}$  cancer risk level assuming that 25% of the total produce consumed by residents in OU1 is comprised of homegrown produce.

### 2.7.2 - Identification of Contaminants of Concern

The COCs at OU1 are lead and arsenic, with lead being the primary COC. Based on lead concentrations observed during the RI, lead-contaminated soils at the USS Lead site require remedial action to address unacceptable risks. Data analysis indicates that lead and arsenic are generally co-located. The range of detected concentrations and frequency of detections for lead and arsenic in soil at OU1 are presented in Table 1.

Exposure Point	COC	Concentration Detected (mg/kg)		Frequency of Detection	Exposure Point Concentration (mg/kg)		Statistical Measure
		Min	Max		Min	Max	
Residences	Arsenic	1.6	567	252/252	8.4	169	95 UCL
	Lead	4.7	27,100	848/850	233	5,910	MAX
Parks	Arsenic	0.99	414	40/40	31.8	43.4	95 UCL
	Lead	7	6,770	82/84	276	1,460	MAX
Schools	Arsenic <sup>1</sup>	2.9	11	21/21	N/A	N/A	95 UCL
	Lead	15.6	572	39/40	257	260	MAX

### 2.7.3 - Data Quality and Usability

Data were evaluated based on completeness, holding times, initial and continuing calibrations, surrogate recoveries, internal standards, compound identification, laboratory and field quality assurance/quality control (QA/QC) procedures and results, reporting limits, documentation practices, and application of validation qualifiers. Analytical data collected as part of Phase I and Phase II RI sampling were considered to be acceptable for use in the HHRA. Data were reduced based on consideration of essential nutrient and duplicate status as described below.

- Calcium, magnesium, potassium, and sodium are classified as essential nutrients and, therefore, were eliminated from further quantitative evaluation.

- Duplicate pairs were reduced to a single value based on an evaluation of the relative percent difference between the paired results.

## 2.7.4 - Exposure Point Concentrations

EPCs were developed for both modeling and non-modeling scenarios. The same chemical-specific EPCs were used for both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios. The approaches used to calculate EPCs under the two scenarios are presented in the HHRA.

EPCs were calculated only for chemicals with at least eight detected results. Calculations were performed for metals and PAHs in surface soil (0 to 6" bgs) and for all soil depths combined. EPCs were calculated using the 95 percent upper confidence limit of the mean following the decision rules in ProUCL 4.00.05, a statistical analysis software tool. Because EPA uses the IEUBK/Adult Lead Model in its evaluation of lead, the risk assessment used the average concentration under both RME and CTE conditions as the EPC for lead.

EPA used the approach described above to generate EPCs for all receptors except utility and construction workers. Because utility and construction workers may conduct their work within a limited area, the maximum detected concentration was used as the EPC for those receptors under both RME and CTE conditions.

EPCs were calculated following the methods and recommendations provided in EPA's risk assessment guidance. Modeling was used to generate medium-specific EPCs for media not sampled directly. Specifically, modeling was used to estimate EPCs for blood lead, outdoor air (from soil), and homegrown produce, as summarized below.

- EPA used the IEUBK model and the Adult Lead Model (ALM) to estimate soil concentrations that correspond to acceptable blood-lead concentrations for residents and non-residents, respectively. Appendix C of the HHRA presents the methodology based on the IEUBK and ALM models used to calculate acceptable receptor-specific soil lead concentrations (referred to as PRGs). The lead PRGs were compared to the lead EPCs (average lead concentrations) to evaluate whether adverse effects could result from exposure to lead in soil.
- EPA estimated concentrations of non-volatile constituents from soil in ambient air using constituent-specific and site-specific particulate emission factors as presented in the Regional Screening Level User's Guide.
- EPA evaluated the uptake of COPCs from soil into homegrown produce for current and future residents at the site using COPC-specific uptake factors. Uptakes into aboveground and belowground produce were evaluated separately. COPC-specific uptake factors were obtained from or calculated consistent with EPA's "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities."

Singular EPCs were not calculated for OU1 based on exposure scenarios. Instead, EPCs were calculated on a property-specific basis for the HHRA. EPCs for all COPCs from each of the 88

individual properties evaluated are presented in Appendix A (RAGs Table 7) of the HHRA. A summary of the EPCs for the COCs lead and arsenic is provided in Table 1 above.

### 2.7.5 - Exposure Assessment

Exposure assessment is the process of measuring or estimating the intensity, frequency, and duration of human exposure to a chemical in the environment. OUI includes the following land uses: (1) numerous residences, including single and multi-family units, some of which are public housing, (2) various, generally small commercial/industrial operations, (3) various municipal and community offices and operations, (4) two schools (the Carrie Gosch Elementary School and the Carmelite School for Girls), (5) four parks, and (6) numerous places of worship. Residences, schools, and public parks constitute the large majority of properties and acreage within the USS Lead site. These properties are unlikely to soon be redeveloped and replaced by alternate property types. As a conservative approach, places of worship and commercial/municipal properties were treated as residential properties as the likely users of these properties are residents of OUI. Industrial cleanup criteria were applied to industrial properties.

The conceptual site model links contaminant concentrations in various media to potential human exposure. The CSM identified the following exposure scenarios for each of the property types:

- Residential Properties
  - Current and future residents were assumed to be exposed to surface and subsurface soil through incidental ingestion, dermal contact, inhalation of particulates in ambient air, and ingestion of homegrown produce.
  - Current and future utility and construction workers were assumed to be exposed to subsurface soil through incidental ingestion, dermal contact, and inhalation of particulates.
- Schools
  - Current and future students, teachers, and staff were assumed to be exposed to surface and subsurface soil through incidental ingestion, dermal contact, and inhalation of particulates in ambient air.
  - Current and future utility and construction workers were assumed to be exposed to subsurface soil.
- Parks
  - Current and future recreationalists and park staff were assumed to be exposed to surface and subsurface soil through incidental ingestion, dermal contact, and inhalation of particulates in ambient air.
  - Current and future utility and construction workers were assumed to be exposed to subsurface soil.

Assumptions about exposure frequency, duration, and other exposure factors are discussed in the HHRA. Sensitive sub-populations considered in the HHRA included children and adolescents. EPA used the IEUBK model to develop soil-lead PRGs for child and adolescent receptors, including child residents, adolescent school children, and child recreationalists.

## 2.7.6 - Toxicity Assessment

The toxicity assessment provides a description of the relationship between a dose of a chemical and the potential likelihood of an adverse health effect. The purpose of the toxicity assessment is to provide a quantitative estimate of the inherent toxicity of COCs for use in risk characterization. Potential health risks for COCs are evaluated for both carcinogenic and non-carcinogenic risks.

The risk assessment for the USS Lead site used the default toxicity values presented in the EPA RSL tables. The default values were obtained from the following sources:

- Integrated Risk Information System (IRIS) on-line database;
- Provisional Peer Reviewed Toxicity Values (PPRTV) derived by EPA's Superfund Health Risk Technical Support Center;
- Technical Support Center for the EPA Superfund program;
- The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels;
- The California Environmental Protection Agency/Office of Environmental Health Hazard Assessment's toxicity values;
- Screening toxicity values in appendices to certain PPRTV assessments; and
- The EPA Superfund program's Health Effects Assessment Summary Tables (HEAST).

Toxicity values used in the HHRA for all COPCs are presented in Tables A5.1 and A5.2 (non-cancer toxicity values) and Tables A6.1 and A6.2 (cancer toxicity values) of Appendix A of the HHRA. For the COCs lead and arsenic, the cancer toxicity data are summarized in Table 2 below and the non-cancer toxicity data are summarized in Table 3.

## 2.7.7 - Risk Characterization

For carcinogens, such as arsenic, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

Where:

risk = a unitless probability (e.g.,  $2 \times 10^{-5}$ ) of an individual's developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as (mg/kg-day)<sup>-1</sup>

These risks are probabilities that are expressed typically in scientific notation (e.g.,  $1 \times 10^{-6}$ ). An excess lifetime risk of  $1 \times 10^{-6}$  indicates that an individual experiencing the RME estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as excess lifetime cancer risk because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an

**Table 2  
Cancer Toxicity Data Summary**

Pathway: Ingestion, Dermal							
COC	Oral Cancer Slope Factor		Dermal Cancer Slope factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Arsenic	1.5		1.5	(mg/kg-day) <sup>-1</sup>	A	IRIS	Nov-2010
Lead	NA		NA	NA	NA	IRIS	Nov-2010
Pathway: Inhalation							
COC	Unit Risk	Units	Inhalation Cancer Slope factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Arsenic	0.0043	(µg/m <sup>3</sup> ) <sup>-1</sup>	15	(mg/kg-day) <sup>-1</sup>	A	IRIS	Nov-2010
Lead	NA	NA	NA	NA	NA	IRIS	Nov-2010
Notes: COC: Contaminant of concern NA: Not available IRIS: Integrated Risk Information System, EPA				A - Known Human Carcinogen B1- Probable human carcinogen - indicates that limited human data are available B2- Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans C- Possible human carcinogen D- Not classifiable as a human carcinogen E- Evidence of non-carcinogenicity			
This table provides carcinogenic risk information which is relevant to the contaminants of concern in soil. At this time, slope factors are not available for lead for oral, dermal, or inhalation routes of exposures. An adjustment factor is sometimes applied, and is dependent upon how well the chemical is absorbed via the oral route. An adjustment factor of 95% was used for arsenic. Therefore, a slightly lower value than is presented above was used as the dermal carcinogenic slope factor for arsenic.							

**Table 3  
Non-Cancer Toxicity Data Summary**

Pathway: Ingestion, Dermal									
COC	Chronic/ Subchronic	Oral RfD value <sup>1</sup>	Oral RfD Units	Dermal RfD Value <sup>2</sup>	Dermal RfD Units	Primary Target Organ <sup>3</sup>	Combined UF/MF <sup>4</sup>	Sources of RfD Target Organ <sup>5</sup>	Date
Arsenic	Chronic	0.0003	mg/kg- day	0.0003	mg/kg- day	Cardiovascular Dermal	3	IRIS	Nov- 2010
Lead	NA	NA	NA	NA	NA	NA	NA	IRIS	Nov- 2010
Pathway: Inhalation									
COC	Chronic/ Subchronic	Inhalation RfC value	Inhalation RfC Units	Inhalation RfD Value	Inhalation RfD Units	Primary Target Organ <sup>6</sup>	Combined UF/MF	Sources of RfC Target Organ	Date
Arsenic	Chronic	1.5x10 <sup>-5</sup>	mg/m <sup>3</sup>	NA	NA	Development Cardiovascular CNS	NA	CalEPA	Nov- 2010
Lead	NA	NA	NA	NA	NA	NA	NA	IRIS	Nov- 2010
<p>Notes:</p> <p>COC: Contaminant of concern            NA: Value not available/not calculated            1) Oral RfD = Oral reference dose (EPA, 2010)            2) Dermal RfD = Dermal reference dose calculated as: RfDd = RfDo x GIABS (Gastrointestinal absorption efficiency EPA, 2010).            3) Primary target organ/system based on information from the Agency for Toxic Substances and Disease Registry "ToxFAQs" (ATSDR, 2010).            4) UF/MF = Uncertainty factor/modifying factor (EPA-IRIS, 2010)            5) Primary source of RfDo as cited in the RSL Tables (EPA, 2010) and date of RSL Table update. Primary sources include: 1) IRIS - Integrated Risk Information System; 2) PPRTV - Provisional Peer Reviewed Toxicity Values; 3) ATSDR = Agency for Toxic Substances and Disease Registry; 4) CalEPA - California Environmental Protection Agency; 5) HEAST - Health Effects Assessment Summary Table; 6) NJ - New Jersey Department of Environmental Quality.            6) Primary source of RfC as cited in the RSL Tables (EPA, 2010) and date of RSL Table update. Primary sources include: 1) IRIS - Integrated Risk Information System; 2) PPRTV - Provisional Peer Reviewed Toxicity Values; 3) ATSDR = Agency for Toxic Substances and Disease Registry; 4) CalEPA - California Environmental Protection Agency; 5) HEAST - Health Effects Assessment Summary Table; 6) NJ - New Jersey Department of Environmental Quality; 7) X-PPRTV = PPRTV Appendix; 8) ECAO = Environmental Criteria and Assessment Office.</p> <p>This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in soil. At this time, RfDs are not available for lead for oral, dermal, or inhalation routes of exposure. An adjustment factor is sometimes applied, and is dependent upon how well the chemical is absorbed vial the oral route. An adjustment factor of 95% was used for arsenic. Therefore, a slightly lower value than was presented above is used as the dermal non-carcinogenic slope factor for arsenic.</p>									



individual developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally-acceptable risk range for site-related exposures is  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any adverse effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs for all COCs to which a given individual may reasonably be exposed that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD}$$

Where:

CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Because lead does not pose a cancer risk and does not have a nationally-approved reference dose, slope factor, or other accepted toxicological factor which can be used to assess risk, standard risk assessment methods cannot be used to evaluate the health risks associated with lead contamination. EPA has developed the Integrated Exposure Uptake Biokinetic Model for Lead in Children to predict blood lead levels (BLLs) in children exposed to lead. The IEUBK model calculates the probability that a child will have a BLL greater than 10 micrograms of lead per deciliter of blood ( $\mu\text{g}/\text{dL}$ ). BLLs above  $10 \mu\text{g}/\text{dL}$  have been directly related to adverse health effects in adults and children. EPA developed the IEUBK model to assist in establishing lead cleanup levels at Superfund sites.

The IEUBK model for lead in children was used to evaluate the non-carcinogenic risks posed to young children as a result of the lead contamination at OU1. EPA ran the IEUBK model using the available site-specific data to predict a lead soil level that will be protective of children and other residents. Site-specific soil concentrations for lead were used in place of model default values. Drip zone samples were included in the IEUBK model calculations.

A blood-lead-level study was not conducted at OU1. EPA used the IEUBK model to develop soil-lead PRGs for child and adolescent receptors, including child residents, adolescent school children, and child recreationalists. For the remaining receptors considered in the OU1 HHRA, EPA used the ALM to develop soil-lead PRGs. For residential child receptors, the average lead concentration in soil at each property was compared to the EPA residential soil RSL of 400

mg/kg. The 400 mg/kg RSL was calculated using EPA's IEUBK model and default exposure assumptions.

Available site-specific information was below regulatory levels and did not appear to be significantly different from the default parameters of the IEUBK model. This information included the municipal lead result for drinking water (3.6 micrograms per liter ( $\mu\text{g/l}$ )), low reported blood lead concentrations in school children, and low bioavailability of lead in soil at the site based on leachability studies. For other site-specific factors, insufficient information was available (for example, localized concentrations of lead in air, water, and foodstuffs) to warrant calculation of a site-specific residential soil PRG. For these reasons, EPA determined it was the best practice to use the default parameters in the model rather than to use site-specific data for only certain inputs. The output from the IEUBK model identified residential properties with average lead concentrations in soil greater than 400 mg/kg as presenting potential lead risks to residential receptors.

PRGs for lead in soil for both adolescent school children and child recreationalists were calculated in accordance with EPA's "Assessing Intermittent or Variable Exposures at Lead Sites" (EPA-540-R-03-008). In performing the calculations, EPA assumed that the overall average concentration of lead in soil to which these receptors could be safely exposed was the residential soil PRG of 400 mg/kg. For each receptor, three inputs were identified: (1) the average concentration to which the receptor would be exposed at home, (2) the fraction of time the receptor would spend at home, and (3) the fraction of time the receptor would spend at the alternate exposure point (for an adolescent school child, this would be the school; for a child recreationalist, this would be a park). Using these inputs and the target acceptable overall average lead concentration of 400 mg/kg, EPA calculated receptor-specific soil-lead PRGs (the acceptable concentration of lead in soil at the alternate location) for schools and parks. The calculated soil-lead PRG for an adolescent school child is 583 mg/kg, and for a child recreationalist the soil-lead PRG is 693 mg/kg.

After evaluating all COPCs for the appropriate exposure scenarios, EPA retained only lead and arsenic as COCs. Non-carcinogenic effects attributable to COPCs other than lead at OU1 were found to be negligible for all exposure scenarios.

Tables 4, 5, and 6 summarize the total carcinogenic risks from all COPCs to residents, utility workers, and construction workers, respectively. Tables 7, 8, and 9 summarize the total non-carcinogenic risks from all COPCs to residents, utility workers, and construction workers, respectively. Because the HHRA evaluated risks on an individual, property-by-property basis, Tables 4 through 9 show the range of the property-specific risk results for each exposure route.

**Table 4  
Risk Characterization Summary for Residents - Carcinogens**

Scenario Timeframe: Current/Future Receptor Population: Resident Receptor Age: Adult/Child												
Medium	Exposure Location	Exposure Point	Carcinogenic Risk									
			Ingestion		Inhalation		Dermal		Home Grown Produce Ingestion		Exposure Routes Total	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Surface/Subsurface Soil	Schools	Soil On-Site Adult/Child RME	$3.9 \times 10^{-8}$	$6.2 \times 10^{-6}$	$7.5 \times 10^{-9}$	$4.7 \times 10^{-6}$	$4.9 \times 10^{-17}$	$8.1 \times 10^{-9}$	$1.2 \times 10^{-5}$	$6.4 \times 10^{-5}$	$1.2 \times 10^{-5}$	$7.5 \times 10^{-5}$
	Parks	Soil On-Site Adult/Child RME	$4.7 \times 10^{-8}$	$7.9 \times 10^{-5}$	$4.9 \times 10^{-9}$	$1.8 \times 10^{-5}$	$3.7 \times 10^{-16}$	$6.4 \times 10^{-9}$	N/A	N/A	$5.2 \times 10^{-8}$	$9.7 \times 10^{-5}$
	Residential	Soil On-Site Adult/Child RME	0.0	$1.3 \times 10^{-3}$	0.0	$2.4 \times 10^{-1}$	0.0	$1.9 \times 10^{-3}$	0.0	$4.5 \times 10^{-3}$	0.0	$7.9 \times 10^{-3}$

**Table 5  
Risk Characterization Summary for Utility Workers - Carcinogens**

Scenario Timeframe: Current/Future Receptor Population: Utility Worker Receptor Age: Adult												
Medium	Exposure Medium	Exposure Point	Carcinogenic Risk									
			Ingestion		Inhalation		Dermal		Home Grown Produce Ingestion		Exposure Routes Total	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Surface/Subsurface Soil	Schools	Soil On-Site Adult RME	0.0	$6.0 \times 10^{-6}$	0.0	$3.1 \times 10^{-11}$	0.0	$2.3 \times 10^{-6}$	N/A	N/A	0.0	$8.3 \times 10^{-6}$
	Parks	Soil On-Site Adult RME	$5.2 \times 10^{-6}$	$5.8 \times 10^{-5}$	$5.7 \times 10^{-10}$	$6.4 \times 10^{-9}$	$4.9 \times 10^{-7}$	$5.6 \times 10^{-6}$	N/A	N/A	$5.7 \times 10^{-6}$	$6.4 \times 10^{-5}$
	Residential	Soil On-Site Adult RME	$6.5 \times 10^{-8}$	$7.8 \times 10^{-5}$	$2.7 \times 10^{-13}$	$6.0 \times 10^{-9}$	$2.5 \times 10^{-8}$	$7.1 \times 10^{-6}$	N/A	N/A	$1.8 \times 10^{-7}$	$8.5 \times 10^{-5}$

**Table 6  
Risk Characterization Summary for Construction Workers - Carcinogens**

Scenario Timeframe: Current/Future Receptor Population: Construction Worker Receptor Age: Adult												
Medium	Exposure Medium	Exposure Point	Carcinogenic Risk									Exposure Routes Total
			Ingestion		Inhalation		Dermal		Home Grown Produce Ingestion		Min	Max
			Min	Max	Min	Max	Min	Max	Min	Max		
Surface/Subsurface Soil	Schools	Soil On-Site Adult RME	0.0	$3.6 \times 10^{-7}$	0.0	$3.7 \times 10^{-12}$	0.0	$1.4 \times 10^{-7}$	N/A	N/A	0.0	$5.0 \times 10^{-7}$
	Parks	Soil On-Site Adult RME	$3.1 \times 10^{-7}$	$3.5 \times 10^{-6}$	$6.9 \times 10^{-11}$	$7.7 \times 10^{-10}$	$7.0 \times 10^{-11}$	$3.4 \times 10^{-7}$	N/A	N/A	$3.1 \times 10^{-7}$	$3.8 \times 10^{-6}$
	Residential	Soil On-Site Adult RME	$3.9 \times 10^{-9}$	$4.7 \times 10^{-6}$	$3.3 \times 10^{-14}$	$1.8 \times 10^{-7}$	$5.7 \times 10^{-11}$	$1.6 \times 10^{-1}$	N/A	N/A	$7.9 \times 10^{-9}$	$1.6 \times 10^{-1}$

**Table 7  
Risk Characterization Summary for Residents - Non-Carcinogens**

		Non-Carcinogenic Risk (Hazard Index)														
Medium	Exposure Medium	Exposure Point	Ingestion			Inhalation			Dermal			Home Grown Produce Ingestion			Exposure Routes Total	
			Min	Max		Min	Max		Min	Max		Min	Max	Min	Max	
Surface/Subsurface Soil	Schools	Soil On-Site Adult/Child RME	0.0	$2.7 \times 10^{-1}$		0.0	$2.7 \times 10^{-3}$		0.0	$2.2 \times 10^{-2}$		0.0	$2.5 \times 10^{-1}$		0.0	$5.4 \times 10^{-1}$
	Parks	Soil On-Site Adult/Child RME	$4.6 \times 10^{-3}$	6.4		$1.2 \times 10^{-1}$	$5.9 \times 10^{-1}$		$4.8 \times 10^{-1}$	$4.2 \times 10^{-1}$		N/A	N/A		$5.2 \times 10^{-3}$	7.4
	Residential	Soil On-Site Adult/Child RME	0.0	$1.6 \times 10^{-2}$		0.0	$3.0 \times 10^{-1}$		0.0	2.1		0.0	$5.3 \times 10^{-2}$		0.0	$7.2 \times 10^{-2}$

Scenario Timeframe: Current/Future  
 Receptor Population: Resident Adult/Child  
 Receptor Age: Adult/Child

**Table 8**  
**Risk Characterization Summary for Utility Workers - Non-Carcinogens**

Scenario Timeframe: Current/Future  
 Receptor Population: Utility Worker  
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Non-Carcinogenic Risk (Hazard Index)									
			Ingestion		Inhalation		Dermal		Home Grown Produce Ingestion		Exposure Routes Total	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Surface/Subsurface Soil	Schools	Soil On-Site Adult RME	0.0	$6.0 \times 10^{-6}$	0.0	$3.1 \times 10^{-11}$	0.0	$2.3 \times 10^{-6}$	N/A	N/A	0.0	$8.3 \times 10^{-6}$
	Parks	Soil On-Site Adult RME	$4.5 \times 10^{-2}$	$4.9 \times 10^{-1}$	$2.3 \times 10^{-4}$	$4.2 \times 10^{-4}$	$2.9 \times 10^{-3}$	$3.2 \times 10^{-2}$	N/A	N/A	$4.8 \times 10^{-2}$	$5.2 \times 10^{-1}$
	Residential	Soil On-Site Adult RME	$2.1 \times 10^{-6}$	1.2	$3.3 \times 10^{-10}$	$1.1 \times 10^{-3}$	$3.0 \times 10^{-1}$	$4.5 \times 10^{-2}$	N/A	N/A	$3.0 \times 10^{-4}$	1.2

**Table 9**  
**Risk Characterization Summary for Construction Workers - Non-Carcinogens**

		Scenario Timeframe: Current/Future		Receptor Population: Construction Worker		Receptor Age: Adult		Non-Carcinogenic Risk (Hazard Index)									
Medium	Exposure Medium	Exposure Point	Ingestion		Inhalation		Dermal		Home Grown Produce Ingestion		Exposure Routes Total						
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max					
Surface/Subsurface Soil	Schools	Soil On-Site Adult RME	0.0	$1.9 \times 10^{-1}$	0.0	$2.7 \times 10^{-3}$	0.0	0.0	N/A	N/A	0.0	$1.9 \times 10^{-1}$					
	Parks	Soil On-Site Adult RME	$5.8 \times 10^{-1}$	6.4	$6.0 \times 10^{-3}$	$1.1 \times 10^{-2}$	$7.8 \times 10^{-3}$	$4.2 \times 10^{-1}$	N/A	N/A	$6.0 \times 10^{-3}$	6.8					
	Residential	Soil On-Site Adult RME	$2.6 \times 10^{-7}$	15	$1.6 \times 10^{-4}$	$2.4 \times 10^{-1}$	$2.8 \times 10^{-3}$	$5.8 \times 10^{-1}$	N/A	N/A	$3.0 \times 10^{-3}$	16					



Risk characterization results are discussed by property and receptor type in the following order: residential, school, and recreational properties. For each, there is a discussion of the likely exposure of the primary receptor, followed by the likely exposure to utility and construction workers (which are assumed to be potentially exposed at all properties). (See Section 2.7.5 for a discussion of the various exposure scenarios that were evaluated.)

## **Residential Properties**

The majority of OUI is made up of residential properties. Risk was evaluated discretely at each of the 74 residential properties that were tested during the RI. Exposure routes at residential properties to lead- and arsenic-contaminated surface and subsurface soils include incidental ingestion, dermal contact, inhalation of particulates in ambient air, and ingestion of homegrown produce. For lead, these were integrated together in the IEUBK model. For other COPCs, risks were quantified individually for each exposure route at each property. The HHRA evaluated risks associated with both current and future land uses. For current land use, the HHRA considered the upper 12 inches of soil in yards and 24 inches where gardens are currently located. Future land use assumes that gardens can be relocated anywhere in the yard and the HHRA considered the top 24 inches of soil throughout the yard. Individual risks for each property can be found in the HHRA, which is included in the RI Report. The sensitive subpopulation for lead is children.

The primary non-lead drivers of risk are arsenic and carcinogenic PAHs. EPA has determined that the PAHs at OUI are not site-related. The primary hazard drivers are arsenic, antimony, manganese, and mercury, as well as a series of other metals at a small number of properties. Risks and hazards are driven by ingestion of homegrown produce and incidental ingestion of soil. No carcinogenic COPCs were identified at 35 of the 74 residential properties tested.

### Residents

As shown in Table 4, the total carcinogenic risk for residents under both current and future land uses from all COPCs at the residential properties tested ranges from zero to  $7.9 \times 10^{-3}$ . Table 7 shows that the non-carcinogenic hazard index from all COPCs at the residential properties tested ranges from zero to 720. However, some of the COPCs were determined not to be site-related. The risks to residents when considering only the site-related COCs are summarized as follows:

- For residents under current land uses (exposed to the upper 12 inches of soil), 27 of the 74 residential properties tested have total current risks greater than  $1 \times 10^{-4}$ , the upper end of EPA's acceptable risk range. The total risks at these properties range from  $2 \times 10^{-4}$  to  $5 \times 10^{-3}$ .
- For residents under future land uses (potentially exposed to the upper 24 inches of soil), 36 of the 74 properties tested have total future risks greater than  $1 \times 10^{-4}$ , the upper end of EPA's acceptable risk range. The total risks at these properties range from  $2 \times 10^{-4}$  to  $5 \times 10^{-3}$ .
- Lead poses a risk to residents at 47 of the 74 residential properties that were tested.

### Utility Worker

The HHRA evaluated potential exposure of utility workers at the residential properties. As shown in Table 5, the total carcinogenic risk for utility workers from all COPCs ranges from  $1.8 \times 10^{-7}$  (below EPA's acceptable risk range) to  $8.5 \times 10^{-5}$  (within EPA's acceptable risk range). Table 8 shows that the non-carcinogenic hazard index from all COPCs ranges from 0.0003 (insignificant) to 1.2. However, when considering risks to utility workers only due to site-related COCs, non-carcinogenic hazards are less than 1 and insignificant at all properties. Lead poses a risk to utility workers at three of the 74 residential properties that were tested.

### Construction Worker

The HHRA evaluated potential exposure of construction workers at the residential properties. As shown in Table 6, the total carcinogenic risk for construction workers from all COPCs ranges from  $7.9 \times 10^{-9}$  (below EPA's acceptable risk range) to  $1.6 \times 10^{-1}$  (above EPA's acceptable risk range). Table 9 shows that the non-carcinogenic hazard index from all COPCs ranges from 0.003 to 16. However, when considering risks to construction workers only due to site-related COCs, carcinogenic risks were either less than  $1 \times 10^{-6}$  and considered insignificant or were within EPA's acceptable risk range. Non-carcinogenic hazards for construction workers due to the COCs exceed an HI of 1 at 11 of the residential properties that were tested. Lead poses a risk to construction workers at 16 of the 74 residential properties that were tested. The majority of the 16 properties are clustered in the public housing area at the southwest corner of OU1.

## **Schools**

There are two schools within the study area, the Carmelite School for Girls and Carrie Gosch Elementary School. The Carmelite School contains some residents. Therefore, the exposure assumptions were different for the two schools. Human health risks for students and teachers are summarized as follows:

### Carmelite School for Girls

Under both current (C) and future (F) land use conditions, total risks from all COPCs for adolescent students ( $5 \times 10^{-5}$  [C] and  $7 \times 10^{-5}$  [F]) and adult teachers and staff ( $4 \times 10^{-5}$  [C] and  $1 \times 10^{-4}$  [F]) are within EPA's acceptable risk range. Non-carcinogenic hazards for both receptor groups are less than an HI of 1 and considered insignificant. At Carmelite School for Girls, lead does not pose a risk to either adolescent students or adult teachers and staff.

### Carrie Gosch Elementary School

At Carrie Gosch Elementary School, under both current and future land use conditions, total risks from all COPCs for adolescent students, indoor teachers and staff, and outdoor teachers and staff are less than or equal to  $1 \times 10^{-5}$  and within EPA's acceptable risk range. Non-carcinogenic hazards are less than an HI of 1 and considered insignificant for all receptors. At Carrie Gosch Elementary School, lead does not pose a risk to any receptors.

### Construction and Utility Workers

There were no unacceptable risks for construction or utility workers at either school under current or future land use conditions.

### **Parks**

Under current land use conditions, total carcinogenic risks to the following groups are within EPA's acceptable risk range: (1) child, adolescent, and adult recreationalists; (2) indoor park workers; and (3) outdoor park workers at Riley Park, Goodman Park, and Kennedy Gardens Park. The maximum risk is  $3 \times 10^{-5}$  (within EPA's acceptable risk range) for an outdoor park worker at Goodman Park. Total non-carcinogenic hazards at all three parks are less than an HI of 1 and considered insignificant for all receptors.

Lead poses the following types of risk at each park:

- Riley Park – lead does not pose a risk to any receptors.
- Goodman Park – lead poses a risk to child recreationalists, indoor park workers, and outdoor park workers.
- Kennedy Gardens Park – lead poses a risk to all recreational receptors.

Under future land use conditions, the carcinogenic risks increase slightly for all receptors but remain within EPA's acceptable risk range, and non-carcinogenic hazards at the three parks also remain insignificant. The risks from lead remain similar to those described under current land use conditions.

### Construction and Utility Workers

There are no unacceptable risks for utility workers at the three parks under current or future land use conditions. For construction workers, the non-carcinogenic hazard index from all COPCs ranges from 0.006 to 6.8 (see Table 9), with the values exceeding 1 driven by concentrations of arsenic at or below background levels. When taking such non-site-related concentrations out of the evaluation, there are no unacceptable risks to construction workers at the three parks.

### **2.7.8 - Uncertainties**

Uncertainties are inherent in the process of quantitative risk assessment because of the use of environmental sampling results, assumptions regarding exposure, and the quantitative representation of chemical toxicity. Potentially significant sources of uncertainty for this assessment are discussed in the HHRA and include analytical data, exposure estimates, toxicity estimates, and background conditions. The uncertainties associated with analytical data are summarized below.

At OUI of the USS Lead Site, there are four primary sources of uncertainty with regard to the analytical data used in the HHRA: (1) the depth of surface soil samples, (2) the use of x-ray fluorescence (XRF) data, (3) the limited number of soil samples analyzed for constituents other than lead, and (4) a limited number of samples at each property. Each of these sources of uncertainty is summarized below.

- Surface soil samples were collected from 0 to 6 inches bgs. However, EPA guidance suggests that concentrations of some constituents, particularly lead, may be highest in the uppermost few centimeters (1 inch). Therefore, collection of surface soil samples from 0 to 6 inches bgs may result in a dilution of lead concentrations in surface soil samples. At OUI, EPA evaluated the concentration of lead in soil samples collected during the limited investigation in 2007. EPA concluded that concentrations of lead measured in soil samples collected from 0 to 1 inch bgs did not differ from measured lead concentrations in samples collected from 1 to 6 inches bgs at the same location.
- Field-based analytical methods have been found acceptable for use in investigating hazardous waste sites if a particular method (in this case XRF) is generally accepted and performed in accordance with QA/QC protocols and procedures. The XRF technique, well established and routinely used in site investigations, was performed using an established analytical method (Method 6200). Therefore, EPA concluded that XRF data (obtained by EPA) are acceptable for use in the RI and HHRA for the USS Lead Site. Furthermore, all XRF data used in the HHRA were first adjusted based on a correlation developed between samples analyzed using both XRF and laboratory analysis.
- All soil samples collected during the RI were analyzed for lead, either by XRF (and later adjusted as described above) or by an off-site laboratory. However, only 20 percent of the Phase I soil samples were sent to an off-site laboratory for total metals analysis. (Note: All Phase II soil samples were sent offsite for total metals analysis). Also, only eight Phase I soil samples were sent offsite for VOC, SVOC (including PAHs), PCB, and pesticide analyses. VOCs, non-PAH SVOCs, PCBs, and pesticides were not detected in any of those eight samples; therefore, VOCs, non-PAH SVOCs, PCBs, and pesticides were not analytes in Phase II sampling. Consequently, the EPCs (and in turn risks and hazards) for non-lead COPCs, particularly arsenic and PAHs, are subject to a moderate to large amount of uncertainty.
- As noted above, samples analyzed for COCs other than lead were collected less frequently than samples analyzed for lead. As a result, EPCs for COCs other than lead at individual properties are based on fewer samples than EPCs for lead. This means that EPCs for some analytes could not be calculated at some properties. At other properties, the EPCs are subject to at least a moderate amount of uncertainty because they are based on a limited number of samples. In such instances, the maximum detected concentration was used as the EPC. This may result in an overestimation of the EPC.

## 2.7.9 - Risk Assessment Conclusions

The risk to human health from lead and arsenic in residential soils drives the need for remedial action at OU1 of the USS Lead Site. The response action selected in this ROD is therefore necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants that may present an imminent and substantial endangerment.

## 2.8 – Remedial Action Objectives

Remedial action objectives (RAOs) are goals specific to media or operable units for protecting human health and the environment. Risk can be associated with current or potential future exposures. RAOs should be as specific as possible, but not so specific that the range of alternatives to be developed is unduly limited. Objectives aimed at protecting human health and the environment should specify: (1) COCs; (2) exposure routes and receptors; and (3) an acceptable contaminant level or range of levels for each exposure route.

As discussed in Section 2.7, the OU1 HHRA recognized the following receptors for current and future land-use scenarios: child, adolescent, and adult residents; child, adolescent, and adult recreationalists; and adult indoor and outdoor workers. Section 2.7 also details the exposure routes for each receptor. Current land uses within OU1 include residential, recreational, school, and industrial/commercial properties. For the purposes of the HHRA and the development of RAOs, EPA assumed that future land uses of all properties would be the same as current land uses. As land use and the potential for exposure to contaminated material is not likely to change, the RAO must reduce the risks posed by soils in yards at OU1.

EPA has identified the following RAO for OU1 of the USS Lead Site:

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

Portions of OU1 are currently paved or covered with buildings, which limits potential exposure. However, significant portions of OU1, including yards, parks, and lawns, are unpaved. The intent of the RAO above is to address open areas to protect residents, recreationalists, and workers. A cleanup that achieves this RAO will be protective of human health and the environment as it will ensure that the soil to which residents are exposed, now and in the future, does not pose a health risk.

## Remedial Action Levels

### Lead

As discussed in Section 2.7.7, the HHRA evaluated lead by using the IEUBK model and default exposure assumptions to calculate a screening level very similar to the 400 mg/kg RSL. Available site-specific information was not significantly different than the standard parameters

of the IEUBK model, and insufficient information was available for other site-specific factors. EPA therefore used the default parameters for the IEUBK model and the ALM in its calculation of site-specific residential soil PRGs for lead, and identified average lead concentrations in soil greater than 400 mg/kg as presenting potential lead risks to residential receptors. EPA is therefore selecting 400 mg/kg as the RAL for lead in residential yards.

At schools and parks, where the calculated soil PRG is above 400 mg/kg, EPA has conservatively chosen to use the residential RSL of 400 mg/kg as the RAL since it is likely that the children potentially exposed at schools and/or parks are also exposed at residences within OU1. Given the small size of the yards at many residences within OU1, it is possible that some children spend more time outside at schools and parks than they do at home. Selecting 400 mg/kg as the lead RAL for all property types therefore takes into account cumulative risk from exposure of children at schools and parks as well as at residential properties.

At industrial/commercial properties, EPA used the ALM to identify a RAL of 800 mg/kg for lead in soil.

### Arsenic

As discussed in Section 2.7.1, the RAL for arsenic is based upon the upper tolerance limit of naturally-occurring concentrations of arsenic at OU1. Arsenic concentrations in soil samples collected within OU1 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 at OU1 and the naturally-occurring background concentrations, EPA made a risk-management decision to use the UTL to distinguish between arsenic soil concentrations that are distributed among the naturally-occurring values at OU1 and those that may have been impacted by activities in and around the site. The 95% UTL for arsenic in soil at OU1 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 OU1 of the USS Lead Site.

EPA notes that an arsenic soil concentration of 26 mg/kg also corresponds with a risk level of  $1 \times 10^{-4}$  for residential land use if one assumes that 25 percent of the produce consumed by residents of OU1 is comprised of homegrown produce (grown within OU1).

### RAL Summary

Table 10 summarizes the remedial action levels for soils at OU1.

Table 10 Soil Remedial Action Levels for OU1 of the USS Lead Site		
Analyte Group	Analyte Name	OU1 Soil RAL
Metals	Arsenic	26 mg/kg
	Lead	400 mg/kg (Residential) 800 mg/kg (Industrial/Commercial)

## 2.9 – Description of Alternatives

This section presents the remedial alternatives for OU1, which are numbered to correspond with the numbering system used in the FS Report. The alternatives are described more fully in Section 2.9.2. The alternatives listed in bold font are those that EPA carried forward for detailed analysis in the FS.

- **Alternative 1 – No Action**
- Alternative 2 – Institutional Controls
- **Alternative 3 – On-site Soil Cover + Institutional Controls**
- **Alternative 4A – Excavation of Soil Exceeding RALs + Off-site Disposal + Ex-situ Treatment Option**
- **Alternative 4B – Excavation to Native Sand + Off-site Disposal + Ex-situ Treatment Option**
- Alternative 5 – *In-situ* Treatment by Chemical Stabilization

In accordance with EPA guidance, the potential remedial alternatives identified in the FS and listed 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 cost (capital and operation and maintenance [O&M]). The purpose of the screening evaluation was to reduce the number of alternatives chosen for a more thorough analysis. EPA eliminated Alternative 2 (exclusive reliance on institutional controls to prevent exposure) and Alternative 5 (in-place treatment by chemical stabilization) from further consideration because EPA did not consider them to be effective for OU1. Alternative 2 does not reduce human health risk from exposure to COCs because the impacted soils would remain in place without protective barriers. Alternative 5, chemical stabilization through the introduction of ground fish bones to achieve phosphate immobilization, was eliminated because it is not proven for long-term effectiveness; there are few case studies available for review.

## 2.9.1 - Common Element of Alternatives

### Pre-Remedial Sampling

Prior to remedy implementation, pre-remedial sampling must be conducted at the remainder of the properties in OUI (i.e., those that have not yet been tested) to determine which yards require remediation. The pre-remedial sampling will take place during the remedial design phase. All field activities will be conducted in accordance with an EPA-approved, site-specific quality assurance project plan. The sampling methodologies employed will be the same as those used during the RI field work. Because EPA has secured access to fewer than 25% of the properties in OUI, additional access agreements for the remaining properties will be obtained before initiating the pre-remedial field investigation. The pre-remedial sampling results will be used in the remedial design to identify the yards that require remediation. For Alternative 4A, the pre-remedial sampling will also identify the depth of RAL exceedances in each yard. The cost of the pre-remedial sampling is included in each retained alternative, with the exception of Alternative 1, No Action.

### Assumed Number of Properties Requiring Remediation

Based on the representative sampling conducted during the RI, of the 1,271 properties in OUI, 53 percent or 672 properties are likely to require remedial action to address risks associated with lead. An additional four percent or 51 properties are likely to require remediation to address risks associated only with arsenic. In total, 723 properties are likely to require remediation.

## 2.9.2 – Summary of Remedial Alternatives

### Alternative 1 – No Action

*Estimated Capital Cost: \$0*

*Estimated Total O&M Cost: \$0*

*Cost Estimate Contingency: \$0*

*Estimated Present Worth Cost: \$0*

*Estimated Construction Timeframe: None*

Regulations governing the Superfund program generally require that the “no action” alternative be evaluated to establish a baseline against which EPA and the public can compare the costs and benefits of other alternatives. Under this alternative, EPA would take no action at OUI to prevent exposure to the soil contamination, and statutory five-year reviews would not be required.

### Alternative 3 – On-site Soil Cover + Institutional Controls

*Estimated Capital Cost: \$16,705,000*

*Estimated Total O&M Cost: \$735,000*

*Cost Estimate Contingency: \$3,500,000*

*Estimated Present Worth Cost: \$20,900,000*

*Estimated Construction Timeframe: 18 months*



Alternative 3 would achieve the RAO of preventing exposure to contaminated soil by installing a soil cover that limits direct contact with impacted soil. A visible barrier, such as orange construction fencing or landscaping fabric, would be placed over the contaminated soil and then the contaminated soil and visible barrier would be covered with clean soil. Contamination would be left in place and capped with a 12-inch-thick soil cover as specified in EPA's *Superfund Lead-Contaminated Residential Sites Handbook*. The soil cover would be composed of 6 inches of imported select borrow material topped with 6 inches of top soil, and is meant to prevent direct contact with contaminated soil. The soil cover would be placed directly on top of the existing grade. After installation of the soil cover, each yard would be restored to its pre-remedial condition. As part of the O&M cost calculations, EPA assumed that the soil cover would be inspected and repaired as needed on a semi-annual basis for the first 5 years, followed by an annual inspection for years 6 through 30. Annual repairs would include re-grading portions of the soil cover, placing additional soil to maintain the 12-inch cover, and seeding or sodding the yards as needed. Institutional controls would be implemented to maintain the integrity of the soil cover so that users of the impacted yards would not be exposed to COCs in soil. Institutional controls may include property restrictions, such as the following:

- limiting gardening to raised beds;
- requiring that all subsurface work (utility maintenance, foundation work, etc.) be done in accordance with the remedial design in order to protect workers and residents;
- requiring that sufficient coverage of impacted soils be maintained.

In accordance with CERCLA requirements, EPA would perform five-year reviews of this remedy since impacted soil would be left in place above levels that allow for unlimited use and unrestricted exposure. After remediation work is complete, this alternative would allow for the continued residential use of impacted yards.

**Alternative 4A - Excavation of Soil Exceeding RALs + Off-site Disposal + Ex-situ Treatment Option**

*Estimated Capital Cost: \$24,795,000*

*Estimated Total O&M Cost: \$67,000*

*Cost Estimate Contingency: \$4,980,000*

*Estimated Present Worth Cost: \$29,900,000*

*Estimated Construction Timeframe: 26 months*

Alternative 4A would achieve the RAO of preventing exposure to contaminated soil by removing impacted soil that exceeds RALs, to a maximum excavation depth of 24 inches, while leaving in place soils that do not exceed the RALs. This alternative requires excavation of soil exceeding RALs, disposal of excavated soil at an off-site Subtitle D landfill, and, as necessary, chemical stabilization of some excavated soil to address lead concentrations that exceed the toxicity characteristic regulatory threshold. Based upon testing conducted during the RI, EPA estimates that soil with lead concentrations above 2,400 mg/kg (an estimated 7% of the excavated yards at OU1) will exceed the TC regulatory threshold. EPA considers the soils that exceed the TC regulatory threshold to be principal threat waste, and under Alternative 4A, the principal threat wastes would be treated.

Pre-remedial sampling would be conducted at impacted properties to determine the approximate excavation depth required in each yard. The maximum excavation depth would be 24 inches, but may be less than 24 inches at many properties. Confirmation samples would be collected as needed during the excavation work to determine the final excavation depth (up to 24 inches) and to confirm that all soils exceeding RALs within the top 24 inches were excavated. If contaminated soil is identified at a depth greater than 24 inches bgs, a visual barrier such as orange construction fencing or landscape fabric would be placed above the contaminated soil and beneath the clean backfill soil. In such instances, institutional controls would be implemented, in the same way as described in Alternative 3, to ensure that users of the property are not exposed to COCs in soil. Unlike the ICs for Alternative 3, however, the ICs for Alternative 4A would not limit gardening to raised beds.

Based on the results of the RI, the native sand/soil horizon is estimated to be no more than 24 inches bgs and is clean. During the RI, native sand was encountered at most sample locations between 0 and 24 inches bgs. For this reason, EPA expects that excavating to a maximum depth of 24 inches under Alternative 4A would remove all of the soil exceeding RALs at the majority of the impacted yards within OU1.

Since no local stockpile area has been identified, EPA assumes that soil would be loaded directly into roll-off containers and transported to the landfill. If a stockpiling location is identified that is acceptable to the community, then excavated soils could be stockpiled prior to being transported off-site for disposal.

Excavated soil would be replaced with clean soil, including 6 inches of top soil, to maintain the original grade. Each yard would be restored as close as practicable to its pre-remedial condition. Once the properties are sodded or seeded, O&M of the sod or seed, including watering, fertilizing, and cutting, would be conducted for 30 days. After the initial 30-day period, property owners would be responsible for the maintenance of their own yards. Because some soil exceeding RALs would likely be left in place at OU1 (e.g., within some yards deeper than 24 inches bgs), a five-year review would be required in accordance with CERCLA. After remediation is complete, this alternative would allow for the continued residential use of impacted yards.

**Alternative 4B - Excavation to Native Sand + Off-site Disposal + Ex-situ Treatment Option**

*Estimated Capital Cost: \$37,760,000*

*Estimated Total O&M Cost: \$0*

*Cost Estimate Contingency: \$7,560,000*

*Estimated Present Worth Cost: \$45,400,000*

*Estimated Construction Timeframe: 40 months*

Alternative 4B would achieve the RAO of preventing exposure to contaminated soil by removing all of the soil at impacted yards to the native sand, even if some of the excavated soils do not exceed RALs. EPA has observed that lead is not found in the native sand layer. Under this alternative, EPA would not collect confirmation samples during the excavation work. Instead, EPA would assume that, for yards that have soils exceeding the RALs, complete removal of all

soils above the native sand layer would achieve the RAO. The goal of this alternative is the total removal of soil at identified yards down to the native sand, disposal of excavated soil at an off-site Subtitle D landfill, and, as necessary, chemical stabilization of some excavated soil to address lead concentrations that exceed the TC regulatory threshold. EPA considers the soils that exceed the TC regulatory threshold to be principal threat waste, and under Alternative 4B, the principal threat wastes would be treated.

Soil in those yards that have RAL exceedances would be excavated from the surface grade down to the native sand/soil horizon without pre-remedial testing to determine the depth of contamination. Based on the results of the RI, the native sand/soil horizon is estimated to be no more than 24 inches bgs. During the RI, native sand was encountered at most sample locations between 0 and 24 inches bgs. RI results indicated that the native sand beneath the fill soils is both clean and by sight very easily distinguished from soil and fill material. The cost estimate for this alternative assumes that all soil above the native sand would be excavated and disposed offsite with no post-excavation confirmation samples.

Since no local stockpile area has been identified, EPA assumes that soil would be loaded directly into roll-off containers and transported to the landfill. If a stockpiling location is identified that is acceptable to the community, then excavated soils could be stockpiled prior to being transported off-site for disposal.

Excavated soil would be replaced with clean soil, including 6 inches of top soil, to maintain the original grade. Each yard would be restored as close as practicable to its pre-remedial condition. Once the properties are sodded or seeded, O&M of the sod or seed, including watering, fertilizing, and cutting, would be conducted for 30 days. After the initial 30-day period, property owners would be responsible for the maintenance of their own yards. This alternative would result in the removal of all impacted soils (since excavations would go down to the native sand, and the native sand layer is clean). No institutional controls would be needed, and CERCLA would not require five-year reviews because waste would not be left in place above levels that allow for unlimited use and unrestricted exposure. After remediation is complete, this alternative would allow for the continued residential use of impacted yards.

## **2.10 – Comparative Analysis of Alternatives**

As required by CERCLA, nine criteria were used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the *Record of Decision* summarizes the performance of each alternative against the nine criteria and notes how they compare to the other options under consideration.

The nine evaluation criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. Threshold criteria, which include overall protection of human health and the environment and compliance with ARARs, are requirements that each alternative must meet in order to be eligible for selection. Primary balancing criteria, which include long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants through treatment, short-term effectiveness, implementability, and cost, are used to weigh major trade-offs among alternatives. Modifying criteria, which include state/support agency

acceptance and community acceptance, can be fully considered only after public comment is received on the Proposed Plan, so were not evaluated in the FS. In the final balancing of trade-offs between alternatives, upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria. The nine evaluation criteria are discussed below.

### **2.10.1 - Overall Protection of Human Health and the Environment**

This criterion assesses how well the alternatives achieve and maintain protection of human health and the environment.

Alternative 1 (No Action) would provide no improvement over current conditions, would provide no risk reduction, and would not be protective of human health or the environment.

Alternatives 3, 4A, and 4B are each expected to be effective remedies for OU1 that would be protective of human health and the environment. Protection of human health and the environment would be achieved by addressing potential pathways of exposure to contaminated soils. Alternative 3 relies on a soil cover and compliance with institutional controls, such as restricting gardens to raised beds, to achieve protectiveness. Alternatives 4A and 4B would achieve protectiveness through removal of contaminated soils. As discussed in Section 2.5.1, the exposure pathways through which people can be exposed to the lead- and arsenic-contaminated surface and subsurface soils at OU1 are ingestion, direct contact, and inhalation.

Ingestion of contaminated soils in yards is the primary exposure route at OU1. Residents may be exposed to contaminants adhering to soils through ingestion of homegrown produce or through direct ingestion of contaminated soil. Alternatives 3, 4A, and 4B are all considered effective at preventing ingestion of contaminants.

Exposure to contaminated soils through direct contact may result from recreational activities, gardening, landscaping, or excavation activities. Each of the active alternatives would prevent most direct contact by covering or removing the contaminated soils. However, direct contact may be more likely to result from unauthorized excavation activities under Alternative 3 because the contaminated soils would remain in place under a soil cover that is only 12 inches thick.

Exposure through inhalation would most likely occur through windborne transport of contaminated dust and soil due to the COCs' low volatility and strong tendency to adsorb to soil particles. Each of the active alternatives would prevent exposure to contaminated dust over the long term by removing or covering the contaminated soils. However, the remedial activities may generate dust and cause short-term exposure, particularly under Alternatives 4A and 4B, which would excavate contaminated soils.<sup>2</sup>

Alternatives 3, 4A, and 4B address potential exposure to contaminants by covering or removing the contaminated soil. Alternative 4B would eliminate all potential exposure pathways because

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<sup>2</sup> Any dust generated under Alternative 3 would be created by the placement of clean soils as cover material, since excavation of contaminated soils is not part of that alternative.

all of the soil at yards that exceed the RALs would be removed down to native sand. Alternatives 3 and 4A would reduce or eliminate potential exposure pathways. Alternative 3 would leave contaminated soil behind at all properties under a 12-inch soil cover, and EPA would rely on institutional controls (such as prohibiting excavation work deeper than 12 inches and limiting gardening to raised beds) to prevent exposure. Alternative 4A would leave contaminated soil in place at some properties at depths greater than 24 inches. At those properties where contaminated soil remains at depth, EPA would rely on institutional controls (such as prohibiting excavation of contaminated soils) to prevent exposure.

Each active remedial alternative is expected to be protective of human health and the environment, provided that the cover is properly maintained under Alternative 3 and institutional controls are effective under Alternatives 3 and 4A. Active Alternatives 3 and 4A could allow exposure to contaminated soils through unauthorized excavation, if institutional controls are not effective. The potential for such exposure is highest for Alternative 3 where the greatest volume of contaminated soils would remain in place.

### **2.10.2 - Compliance with Applicable or Relevant and Appropriate Requirements**

This criterion assesses how the alternatives comply with regulatory requirements. Federal and state regulatory requirements that are either applicable or relevant and appropriate are known as ARARs. Only state requirements that are more stringent than federal requirements are ARARs. There are three different categories of ARARs: chemical-specific, action-specific, and location-specific ARARs. Potential ARARs were identified during the FS and were included in Table 1 of EPA's July 2012 Proposed Plan.

Alternatives 3, 4A and 4B would all comply with ARARs. Alternative 1 would not comply with ARARs.

The ARARs that have been identified for the Selected Remedy are included in this ROD as Appendix B.

### **2.10.3 - Long-term Effectiveness and Permanence**

This criterion evaluates the effectiveness of the alternatives in protecting human health and the environment in the long term, after the cleanup is complete.

Alternative 1 would not provide any degree of long-term effectiveness or permanence because no action would be taken. Each of the remaining, active alternatives would meet the RAO and provide long-term effectiveness and permanence once the RAO is met. The active alternatives are combinations of proven and reliable remedial processes, and the potential for failure of any individual component is low. The evaluation of the active alternatives against this criterion resulted in the following findings:

- Alternative 3 would achieve long-term effectiveness through covering the metals-contaminated soil onsite as the primary component of the remedy, with O&M and

institutional controls to ensure and verify the ongoing effectiveness and permanence of the remedy. Implementation of Alternative 3 would introduce topographic changes to the properties that would need to be maintained to ensure protectiveness. Therefore, the long-term effectiveness of this alternative is completely dependent on (1) O&M to prevent erosion and potential exposure to contaminated soils that remain in place, and (2) institutional controls to prevent unauthorized activities that could result in exposure to contaminated soils that remain in place.

- Alternative 4A would achieve long-term effectiveness by removing soil that exceeds RALs and disposing of it at an off-site disposal facility. Alternative 4A would likely leave some contaminated material in place deeper than 24 inches bgs if the contamination exceeding RALs extends deeper than 24 inches. (Native sand was encountered above 24 inches bgs at all but a few locations in OUI where borings were advanced.) Any material exceeding RALs that is left in place would require O&M and institutional controls to maintain the effectiveness and permanence of the remedy.
- Alternative 4B would achieve long-term effectiveness by removing all non-native soils down to native sand (estimated to be no more than 24 inches bgs at most properties) from yards that exceed RALs and disposing of those soils at an off-site disposal facility.

Alternatives 3, 4A, and 4B are all proven methodologies that meet the requirements for long-term effectiveness and permanence. Compared to Alternative 3, Alternatives 4A and 4B would provide an additional level of protectiveness because wastes above RALs would be removed and sent off-site for disposal. Alternative 4B would provide the greatest degree of long-term effectiveness and permanence because all soil exceeding RALs would be removed from impacted yards.

#### **2.10.4 - Reduction of Toxicity, Mobility, or Volume through Treatment**

This criterion addresses the preference for selecting remedial actions that use treatment technologies that permanently and significantly reduce the toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to 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.

EPA has estimated that approximately 7% of the soils at OUI have lead concentrations that exceed the TC threshold and that would therefore be considered hazardous waste. These soils are considered principal threat wastes due to their toxicity and potential to leach to groundwater.

Alternatives 1 and 3 would not reduce the toxicity, mobility, or volume of contaminated materials since no treatment would be applied. Alternatives 4A and 4B would reduce the toxicity and mobility of those soils with lead levels that exceed the TC threshold through the use of ex-situ treatment prior to disposal. The amount of material requiring treatment is expected to be the same for Alternatives 4A and 4B. The treatment used under Alternatives 4A and 4B would not reduce the volume of contaminated materials.

### **2.10.5 - Short-term Effectiveness**

This criterion examines the effectiveness of the alternatives in protecting human health and the environment during implementation of the cleanup until the cleanup is complete. It considers protection of the community, workers, and the environment during the cleanup. For OU1, the short-term effectiveness criterion is primarily related to the volume of contaminated soils addressed in each alternative, the time necessary to implement the remedy, potential risks to workers, and potential impacts to the community during implementation of the remedy.

Each of the active alternatives would have short-term impacts that include increased potential for exposure to lead-contaminated soils and construction-related risks. Potential for exposure to lead-contaminated soils would increase in the short term through creation of dust during excavation activities and increased potential for workers to come in contact with lead-contaminated soils above RALs. Construction-related risks include the potential for vehicle accidents, traffic and noise from construction vehicles, increased wear on local roads, and other risks associated with construction work. These impacts can be mitigated by implementing a project-specific health and safety plan, keeping excavation areas properly wetted to reduce dust generation, planning truck routes to minimize disturbances to the surrounding community, and using other best management practices.

There are no short-term impacts associated with Alternative 1 since no action would be taken. Of the action alternatives, Alternative 3 requires the least disturbance of lead-contaminated soils and the shortest duration of construction. Compared to Alternative 3, Alternatives 4A and 4B present greater short-term impacts because they require a greater amount of material to be moved to and from the site. Construction of these alternatives would also take longer than Alternative 3. The duration of construction work for the action alternatives progresses from an estimated 18 months for Alternative 3, to 26 months for Alternative 4A, to 40 months for Alternative 4B. Increasing the duration of construction means increased truck traffic, potential for vehicle accidents, construction-related and exposure risks to workers, as well as extending the time during which the local community would be subjected to increased dust and noise.

### **2.10.6 - Implementability**

This criterion assesses 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 additional 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 1 could easily be implemented as no action would be taken. Alternatives 3, 4A, and 4B are proven, could be readily implemented, and have been used successfully for other environmental cleanup projects. In addition, Alternatives 3, 4A, and 4B could all be completed using readily available conventional earth-moving equipment. EPA expects that most of the necessary services and construction materials are readily available. Qualified commercial contractors with experience are available locally to perform the work.

Alternative 3 would be more difficult to implement than Alternatives 4A and 4B since it requires a more detailed remedial design plan to maintain safe grading for each of the contaminated yards. Raising the grade of each impacted yard by 12 inches under Alternative 3 would pose technical and administrative challenges. The areas where the soil cover must be tied into the existing grade (such as at streets) would require excavation and would likely erode more rapidly than the surrounding areas. This could pose physical safety concerns for the elderly and young. Each yard would need to undergo a custom remedial design to achieve proper storm water drainage.

All of the alternatives are administratively feasible. Although no permits would be required, a similar level of coordination would be needed with state and local parties during design and construction activities for the action alternatives. However, Alternative 3 would likely be more difficult to implement because property owners may not want the grade of their properties raised by 12 inches; access may therefore be difficult to obtain.

### **2.10.7 - Cost**

This criterion evaluates the capital and operation and maintenance costs of each alternative. Present-worth costs are presented to help compare costs among alternatives with different implementation times.

The present worth costs for the alternatives are presented within the descriptions of alternatives in Section 2.9.2 of this ROD. The detailed cost estimates and associated assumptions for all alternatives are in the FS and other documents within the administrative record. The cost estimates are consistent with the level of estimation required in the FS phase. The estimate is within a range of accuracy of +50 to -30 percent. A final cost estimate will be developed and refined during the remedial design process.

Alternative 1 has no associated capital or O&M costs since no action would be taken. The remaining three alternatives are progressively more expensive. Alternative 3 is the least costly action alternative (\$20.9 million) and Alternative 4A is the next most costly option (\$29.9 million). Alternative 4B is the most costly alternative (\$45.4 million), costing more than twice as much as Alternative 3. The cost savings anticipated to be realized in Alternative 4B by not collecting and analyzing post-excavation confirmation samples are more than offset by the increased cost of handling and transporting for off-site disposal a greater volume of soil, since the process of removing all soils down to the native sand would include soils that do not exceed the RALs.

### **2.10.8 - State/Support Agency Acceptance and Community Acceptance**

State/support agency acceptance considers the state's preferences among or concerns about the alternatives, including comments on regulatory criteria or proposed use of waivers. Community acceptance considers the community's preferences or concerns about the alternatives.



The State of Indiana supports the selection of Alternative 4A as the Selected Remedy. The State's concurrence letter is included as Appendix A.

During the public comment period, the community expressed general support for Alternative 4A, although some citizens and the City of East Chicago supported Alternative 4B. All attendees who expressed their opinion at the proposed plan public meeting strongly disliked Alternative 3. A complete list of the public comments and EPA's response to the comments is contained in the *Responsiveness Summary*, which is Part 3 of this ROD. In addition, the transcript from the proposed plan public meeting is included in the administrative record.

## 2.10.9 – Comparative Analysis Summary

Appendix C provides a summary, in table form, of the comparative analysis of the alternatives described in Sections 2.10.1 through 2.10.8 above.

## 2.11 – Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or will present a significant risk to human health or the environment should exposure occur. Conversely, low-level threat wastes are those source materials that generally can be reliably contained and that will present only a low risk in the event of exposure. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

Wastes that generally will be considered to constitute principal threats include but are not limited to the following:

- **Liquid source material** - wastes contained in drums, lagoons or tanks, or free product in the subsurface (i.e., non-aqueous phase liquids) containing contaminants of concern (generally excluding groundwater).
- **Mobile source material** - surface soil or subsurface soil containing high concentrations of chemicals of concern that are (or potentially are) mobile due to wind entrainment, volatilization (e.g., volatile organic compounds), surface runoff, or subsurface transport.
- **Highly toxic source material** – buried, drummed non-liquid wastes; buried tanks containing non-liquid wastes; or soils containing significant concentrations of highly toxic materials.

Wastes that generally will not constitute principal threats include but are not limited to the following:

- **Non-mobile contaminated source material of low to moderate toxicity** - surface soil containing chemicals of concern that generally are relatively immobile in air or

groundwater (i.e., non-liquid, low volatility, low leachability contaminants such as high molecular weight compounds) in the specific environmental setting.

- **Low toxicity source material** - soil and subsurface soil concentrations not greatly above reference dose levels or that present an excess cancer risk near the acceptable risk range if exposure were to occur.

At OU1 of the USS Lead site, EPA considers soils with lead concentrations exceeding the TC threshold to be principal threat waste that requires chemical stabilization prior to disposal. Without treatment, lead from such soils could potentially leach to groundwater.

Cleanup Alternatives 4A and 4B will best address the principal threat wastes at OU1 by chemically stabilizing those soils with lead concentrations above the TC threshold prior to disposal.

## **2.12 – Selected Remedy**

The Selected Remedy for OU1 of the USS Lead Site is Remedial Alternative 4A: Excavation of Soil Exceeding RALs + Off-site Disposal + *Ex-situ* Treatment Option.

### Summary of the Rationale for the Selected Remedy

EPA chose Alternative 4A as the Selected Remedy because it represents the best balance of the evaluation criteria among all the alternatives. Alternative 4A meets the RAO of reducing exposure of residents to contaminated soils that pose a health risk through the removal and off-site disposal of those soils, and allows for the continued residential use of impacted residential properties within OU1. Alternative 4A is more easily implemented and requires fewer restrictions on property use than Alternative 3, which involves placing a soil cover on the contaminated soil. Alternative 4A also reduces risk within a more reasonable time frame and at a lower cost than the other excavation alternative (Alternative 4B), and provides for long-term reliability of the remedy.

Based on the information available at this time, EPA and the State of Indiana believe that the Selected Remedy will (1) be protective of human health and the environment, (2) comply with ARARs, (3) be cost-effective, and (4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it will treat those soils constituting principal threats, the remedy also will meet the statutory preference for the selection of a remedy that involves treatment as a principal element.

### Description of the Selected Remedy

The Selected Remedy achieves protectiveness by removing impacted soil that exceeds RALs, to a maximum excavation depth of 24 inches, while leaving in place soils with concentrations below the RALs. The RALs for lead are 400 mg/kg at residential properties and 800 mg/kg for commercial/industrial properties. The RAL for arsenic is 26 mg/kg. Under the Selected Remedy, soil exceeding RALs will be excavated from impacted yards within OU1 to a maximum depth of 24 inches bgs and transported off-site for disposal at a Subtitle D landfill.

Excavated soil that exceeds the TC regulatory threshold will be chemically stabilized prior to disposal. EPA estimates that soil with lead concentrations above 2,400 mg/kg (an estimated 7% of the excavated yards at OU1) exceeds the TC regulatory threshold and considers these soils to be principal threat waste.

Pre-remedial sampling will be conducted at impacted properties to determine the approximate excavation depth required in each yard, and confirmation samples will be collected as needed during the excavation work to confirm that all soils exceeding RALs within the top 24 inches were excavated. If contaminated soil is identified at a depth greater than 24 inches bgs, a visual barrier such as orange construction fencing or landscape fabric will be placed above the contaminated soil and beneath the clean backfill soil. In such instances, institutional controls will be implemented to ensure that users of the property are not exposed to COCs in soil. The institutional controls will be deed restrictions that will require the use of the proper procedures for handling contaminated material in the event that any future excavation work must intrude into the underlying contamination.

EPA assumes that soil will be loaded directly into roll-off containers and transported to the landfill for disposal. If a stockpiling location that is acceptable to the community is identified, then excavated soils could be stockpiled prior to being transported to the landfill.

Excavated soil will be replaced with clean soil, including 6 inches of top soil, to maintain the original grade. Each yard will be restored as close as practicable to its pre-remedial condition. Once the properties are sodded or seeded, O&M of the sod or seed, including watering, fertilizing, and cutting, will be conducted for 30 days. After the initial 30-day period, property owners will be responsible for the maintenance of their own yards. Since some soil exceeding RALs will likely be left in place at OU1 (e.g. within some yards deeper than 24 inches bgs), statutory five-year reviews of the remedy will be required in accordance with CERCLA.

#### Summary of the Estimated Remedy Costs

The estimated cost of implementing the Selected Remedy at OU1 is \$29.9 million. A detailed cost estimate for the Selected Remedy, Alternative 4A, is included as Appendix D. The cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data that will be collected during the remedial design phase. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

#### Expected Outcome of the Selected Remedy

The expected outcome of the Selected Remedy is that residents in OU1 will no longer be exposed to soil that poses a threat to human health. The land use of the properties will remain unchanged, and the Selected Remedy will allow for the continued residential use of impacted yards. As noted above, some properties may require institutional controls, for those situations where contamination remains in place at depths greater than 24 inches bgs.

## **2.13 – Statutory Determinations**

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

### **Protection of Human Health and the Environment**

The current and potential future risks at OU1 are due to the presence of lead and arsenic in residential soils. Implementation of the Selected Remedy, Alternative 4A, will be protective of human health and the environment through the removal of soils with lead concentrations above 400 mg/kg at residential properties, schools and parks, 800 mg/kg at commercial or industrial properties, and/or arsenic concentrations above 26 mg/kg. The site-specific RAO was developed to protect current and future receptors that are potentially at risk from exposure to the contaminants at OU1. The Selected Remedy will achieve the RAO. Institutional controls will be employed at those properties where contamination is left in place at depths greater than 24 inches bgs in order to ensure that the remedy remains protective.

### **Compliance with Applicable or Relevant and Appropriate Requirements**

Section 121(d) of CERCLA requires that Superfund remedial actions meet ARARs. Appendix B provides all ARARs that have been identified for the remedial action. The Selected Remedy will comply with the identified ARARs.

### **Cost-Effectiveness**

EPA has concluded that the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: “A remedy shall be cost-effective if its costs are proportional to its overall effectiveness” (NCP §300.430(f)(1)(ii)(D)). For OU1, this determination was made by evaluating the “overall effectiveness” of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the Selected Remedy was determined to be proportional to its costs. The Selected Remedy therefore represents a reasonable value for the money to be spent.

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

EPA has determined that the Selected Remedy for OU1 represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site disposal, and considering state and community acceptance. The Selected Remedy removes the contaminated soils at OU1 from the top 24 inches of impacted yards, and treats those materials constituting principal threats. The Selected Remedy therefore provides a permanent solution for both the low-level and principal threat wastes at OU1 that is effective in the long term, and achieves significant reductions in leachability to groundwater. The short-term risks associated with the Selected Remedy are greater than those presented by Alternative 3 and less than those presented by Alternative 4B, but those risks are offset by implementability and cost considerations.

### **Preference for Treatment as a Principal Element**

By treating those soils that exceed the TC threshold prior to disposal, the Selected Remedy addresses the principal threats posed at OU1 through the use of chemical stabilization treatment technologies. By utilizing treatment as a portion of the remedy, the Selected Remedy satisfies to the maximum extent practicable the statutory preference for remedies that employ treatment as a principal element.

### **Five-Year Review Requirements**

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

## **2.14 – Documentation of Significant Changes**

The Proposed Plan for OU1 was released for public comment on July 12, 2012. The Proposed Plan identified as the preferred alternative Remedial Alternative 4A, Excavation of Soil Exceeding RALs + Off-site Disposal + *Ex-situ* Treatment Option. After carefully reviewing all written and verbal comments submitted during the public comment period, EPA has determined that no significant changes to the remedy as originally identified in the Proposed Plan are necessary or appropriate. While not considered a significant change, EPA notes that the cost estimates and estimated construction timeframes for Alternatives 3, 4A and 4B are slightly different in the ROD than in the Proposed Plan. After release of the Proposed Plan, the cost and time estimates were revised as a result of refined estimates of the volume of contamination that would need to be addressed under each of the alternatives. The revised cost and time estimates neither impact the outcome of the comparison of alternatives nor alter EPA's selection of Alternative 4A as the Selected Remedy.

## **Part 3 – Responsiveness Summary**

The Proposed Plan for the USS Lead Site was released for public comment on July 12, 2012. At the request of the City of East Chicago, Indiana, EPA extended the public comment period for thirty days until September 12, 2012. EPA held a public meeting in East Chicago, Indiana, on July 25, 2012, to describe the Proposed Plan and answer questions about the different cleanup alternatives. The public meeting also provided the community with an opportunity to comment on the proposed cleanup alternative and the other alternatives evaluated. EPA received several general comments and a few technical comments at the public meeting. Additional comments were provided to EPA in writing during the comment period. These comments and responses are divided into two parts in this *Responsiveness Summary*. Part 1 includes general stakeholder issues and lead agency responses. Part 2 includes specific technical comments related to the alternatives evaluated in the Proposed Plan.

### **3.1 – Stakeholder Comments and Lead Agency Responses**

**Comment:** A resident expressed support for EPA's preferred remedy (Alternative 4A).

**Response:** EPA has noted the support.

**Comment:** Two persons stated that EPA should select Alternative 4B.

**Response:** EPA carefully considered Alternative 4B during its comparative analysis of the various cleanup alternatives. Under Alternative 4B, impacted yards would be excavated down to native sand without confirmation sampling, which means that clean soils that do not exceed RALs would also be excavated and transported off-site for disposal along with contaminated soils. EPA selected Alternative 4A, which excavates contaminated soils to a maximum depth of 24 inches and includes confirmation sampling, because it represents the best balance of the evaluation criteria. EPA determined that Alternative 4B is not significantly more protective in the long term than Alternative 4A. It is, however, much more expensive, would take longer to implement, and would pose higher short-term risks to the community than Alternative 4A. Because Alternative 4B is estimated to cost about \$15 million more than Alternative 4A while providing only an insignificant increase in long-term effectiveness, it is much less cost effective than Alternative 4A. Both alternatives remove all of the soils above RALs that pose a risk to residents – namely the contamination within the top two feet of impacted yards.

**Comment:** Several persons commented that EPA should conduct medical testing of residents in the area, particularly lifelong residents. One commenter stated that she is a life-long resident of the area and suffer from illnesses.

**Response:** EPA does not intend to conduct medical testing as a part of the remedy. EPA is confident that the remedy, once implemented, will reduce to an acceptable level the risk to human health and the environment posed by lead- and arsenic-contaminated soils. Section 104 of CERCLA (the Superfund law) authorized the creation of the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR has the primary

responsibility at the federal level for performing health assessments. The Indiana Department of Health and the Lake County, Indiana, Department of Health may also be better positioned to address these concerns.

**Comment:** A commenter requested that EPA conduct health studies on residents in conjunction with implementation of the remedy. The commenter stated that they are a life-long resident of the area and suffer from illnesses.

**Response:** EPA conducts cleanups based upon the current or future risk of human or environmental exposure to contaminated material. This approach is conservative in that there does not need to be actual current exposure – or evidence of adverse impacts to human health or the environment – for EPA to require a cleanup. Health studies are based upon current conditions and at USS Lead would reflect how current residents are using their yards. As future residents may use yards differently than current residents, health studies done on current residents may not reflect future health risks posed to future residents. For these reasons, EPA does not conduct health studies as a part of the remedy selection process.

**Comment:** EPA should not dispose of contaminated soil removed from the USS Lead Site at the new East Chicago Landfill.

**Response:** EPA does not yet know where the contaminated soil excavated from OUI will be sent for disposal. EPA does not always select the disposal location during the remedy selection process, but does require that the disposal location be permitted to accept the waste materials from the site and be in compliance with federal and state regulations. EPA will decide where to dispose of the contaminated soil from OUI during the remedial design phase.

**Comment:** One commenter stated that he did not believe the soil at his property is contaminated and for that reason does not want his property excavated.

**Response:** EPA will respect the wishes of individual homeowners if they refuse access to their property, though it strongly encourages homeowners to allow their yards to be tested and remediated if appropriate. All testing and cleanup work will be conducted at no cost to the property owner.

**Comment:** The City of East Chicago commented that EPA should consider area restoration and reuse and partner with the city throughout the cleanup process.

**Response:** The area that makes up OUI of the USS Lead Site is predominantly residential. EPA's Selected Remedy will maintain current land uses within OUI. Further, the Selected Remedy does not prevent construction or redevelopment at any property within OUI, although if any properties have contamination left behind deeper than 24 inches bgs, institutional controls would require that all subsurface work at those properties be done in accordance with approved procedures. Additionally, EPA will communicate and coordinate closely with the city during the OUI cleanup process.

### 3.2 – Technical and Legal Issues

**Comment:** EPA should evaluate use of the USS Lead property as a disposal facility.

**Response:** EPA does not intend to dispose of contaminated material at the USS Lead facility (OU2) for the following reasons: (1) The residential portion of the USS Lead Site is located within an environmental justice community that is already home to several disposal facilities. Further disposal at the USS Lead property, immediately adjacent to the southern edge of OU1, would increase the environmental burden already borne by the residents of OU1; (2) contamination still remains at the USS Lead property that requires further evaluation; and, (3) some of the material that will be excavated and require disposal will be a hazardous waste; the corrective action management unit located within the USS Lead facility is not a hazardous waste landfill and cannot accept such wastes.

**Comment:** The ATSDR's January 27, 2011, report does not support EPA's determination that the USS Lead Site requires a cleanup.

**Response:** ATSDR's statement that, "Breathing the air, drinking tap water or playing in soil in neighborhoods near the USS Lead Site is not expected to harm people's health," is based upon low blood lead levels in children within East Chicago. In determining whether to perform response actions, EPA evaluates the current and potential threats to human health and the environment posed by exposure to hazardous substances. EPA estimates these threats by using risk calculations that are based upon the physical characteristics of the site and the general characteristics of the hazardous substances. Present day blood lead levels reflect neither current nor future risk of exposure. EPA has analyzed the current and potential threats posed by contaminated soil within the residential portion of the USS Lead Site and concluded that soils with lead levels exceeding 400 mg/kg and arsenic levels exceeding 26 mg/kg pose a risk to the health of residents living within OU1. EPA has concluded that these conditions require it to undertake response actions.

**Comment:** Several persons commented that a RAL for lead of 400 mg/kg is too conservative. They recommended that EPA calculate a site-specific Preliminary Remediation Goal for lead and noted that the RAL of 400 mg/kg (the standard output from the IEUBK model) is not site-specific. They also stated that EPA should perform a bioavailability study for the site, and argued that a bioavailability study would likely conclude that lead in the residential portion of the USS Lead Site poses a low risk because it is not readily bioavailable.

**Response:** EPA did evaluate the use of site-specific inputs for the IEUBK model but decided to use the IEUBK model set to the general default parameters. EPA compared the available site-specific data with the default parameters and concluded that the site-specific information was not significantly different from the default inputs. For example, EPA looked at lead uptake through drinking water at the USS Lead site. The source drinking water lead data is from samples collected annually by the City of East Chicago at 30 residential taps within East Chicago. In 2011, the lead in drinking water in East Chicago was reported as 3.6 ppb (or 4 ppb if you round up to the nearest integer). The



default drinking water input for the IEUBK model is 4 ppb. As these concentrations are not significantly different, EPA deemed it appropriate to use the base input parameter.

**Comment:** EPA should not select cleanup Alternative 4A (excavation with confirmation sampling to a maximum depth of 24 inches) as it is not cost effective. The commenter added that Alternative 3 (installation of a 12-inch soil cap) is cost effective and should be the selected remedy.

**Response:** EPA determines cost effectiveness by comparing the cost of an alternative with its long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, and short-term effectiveness. Alternative 3 would leave all contaminated materials in place and would introduce topographic changes to the properties. These changes would need to be maintained to ensure the remedy's permanence and long-term effectiveness. Alternative 4A removes the soil contamination within the top two feet bgs and restores yards to their existing topography, so erosion of soil barriers is not a concern with Alternative 4A. Alternative 4A therefore offers greater long-term effectiveness and permanence than Alternative 3. Alternative 4A represents the best combination of all the balancing criteria. Alternative 4A will also treat those soils considered to be principal threat waste, while the principal threat waste would go untreated in Alternative 3. For these reasons, Alternative 4A is more cost-effective than Alternative 3, despite its higher absolute cost.

**Comment:** One commenter stated that it is inappropriate for EPA to require the excavation of all soils at yards down to 24 inches if EPA collects a single sample with a concentration of lead above 400 mg/kg.

**Response:** The commenter's statement is not accurate. Under Alternative 4A, the decision to clean up any given yard will typically be made based on the results of composite soil samples collected from discrete 6-inch horizons. A composite soil sample combines the soil collected from several different areas within the yard, and therefore represents the average concentration in that yard. The only exception to this is that single, discrete soil samples will be considered when evaluating the contamination levels in gardens and play areas. Additionally, contaminated yards will not automatically be excavated to the depth of 24 inches. The maximum excavation depth is 24 inches, but could be less based on the amount of contamination present in a particular yard.

**Comment:** Alternative 3 would be preferable to the community as it is less intrusive in the community.

**Response:** During the public meeting on July 25, 2012, the community expressed general disapproval of Alternative 3.

**Comment:** USS Lead Refinery, Inc. is bankrupt and unable to fund a cleanup.

**Response:** EPA's remedy selection process is independent of available funding. EPA intends to pursue other potentially responsible parties to design and conduct the Selected Remedy.

**Comment:** It is unclear if EPA followed the *Superfund Lead-Contaminated Residential Sites Handbook* in consideration of future land use or sampling techniques.

**Response:** EPA followed the Residential Lead Sites Handbook throughout the RI and FS processes, including sampling techniques and consideration of future land use.

**Comment:** The *Superfund Lead-Contaminated Residential Sites Handbook* is not straightforward.

**Response:** EPA disagrees with this comment and is confident in its ability to follow and interpret the cited document.

**Comment:** Several persons commented that EPA should consider alternative remediation techniques.

**Response:** EPA did consider alternative remediation techniques during the Feasibility Study. In-situ treatment technologies for soils contaminated with metals largely consist of encapsulation or the introduction of soil amendments to make the metals less bioavailable. These technologies show promise but the duration of their effectiveness is not yet known. It is possible that following treatment, metals over time may again become bioavailable. For these reasons, EPA decided that an alternative treatment technology remedy for OU1 of the USS Lead Site would not be protective of human health and the environment. EPA elected not to carry an alternative remediation technique remedy forward into the final array of cleanup alternatives.

**Comment:** The City of East Chicago stated its support for Alternative 4B (excavation down to native sand without confirmation sampling) over Alternative 4A (excavation to a maximum depth of 24 inches with confirmation sampling) because the former is more protective than Alternative 4A.

**Response:** EPA has determined that at OU1 of the USS Lead Site, soils that exceed RALs in the top 24 inches of residential yards pose a threat to current and future residents. Alternative 4A may leave some contaminated soil deeper than 24 inches bgs at a limited number of yards, but EPA has concluded that soil deeper than 24 inches does not pose a risk to residents, and institutional controls will be implemented in situations where contamination remains at depth. Alternative 4B is not significantly more protective in the long term than Alternative 4A. It is, however, much more expensive, would take longer to implement, and would pose higher short-term risks to the community than Alternative 4A. Because Alternative 4B is estimated to cost about \$15 million more than Alternative 4A while providing only an insignificant increase in long-term effectiveness, it is much less cost effective than Alternative 4A. Both alternatives remove all of the soils above RALs that pose a risk to residents – namely the contamination within the top two feet of impacted yards.

**Comment:** The City of East Chicago supports Alternative 4B over Alternative 4A because excavation to native sand would not leave in place any contaminated soil. If contaminated soil is left in place, the remedy requires the installation of subsurface barriers, maintenance of a soil cover, and the recording of deed restrictions or other requirements for construction activities at some properties located within the site. Alternative 4B is consistent with EPA's *Superfund Lead-Contaminated Residential Sites Handbook* that sets forth EPA's preference for permanent remedies that allow for remediated yards to be returned to unrestricted use. Furthermore, leaving contaminated material below 24 inches will make it more difficult or costly for the city or others to redevelop properties.

**Response:** EPA recognizes that leaving some contaminated soils in place imposes burdens on the city and affected property owners. EPA has concluded, however, that these burdens do not warrant the expenditure of an additional \$15 million when the expenditure will not yield any greater protection of human health or the environment.

**Comment:** A reader cannot determine which properties are to be remediated.

**Response:** EPA intentionally removed references to individual addresses out of concern for the privacy of the property owners.

**Comment:** There are areas of the RI/FS in which EPA's data analysis is not transparent. Also, the text and tables present conflicting information. Finally, steps could be taken to increase the clarity of EPA's data analysis.

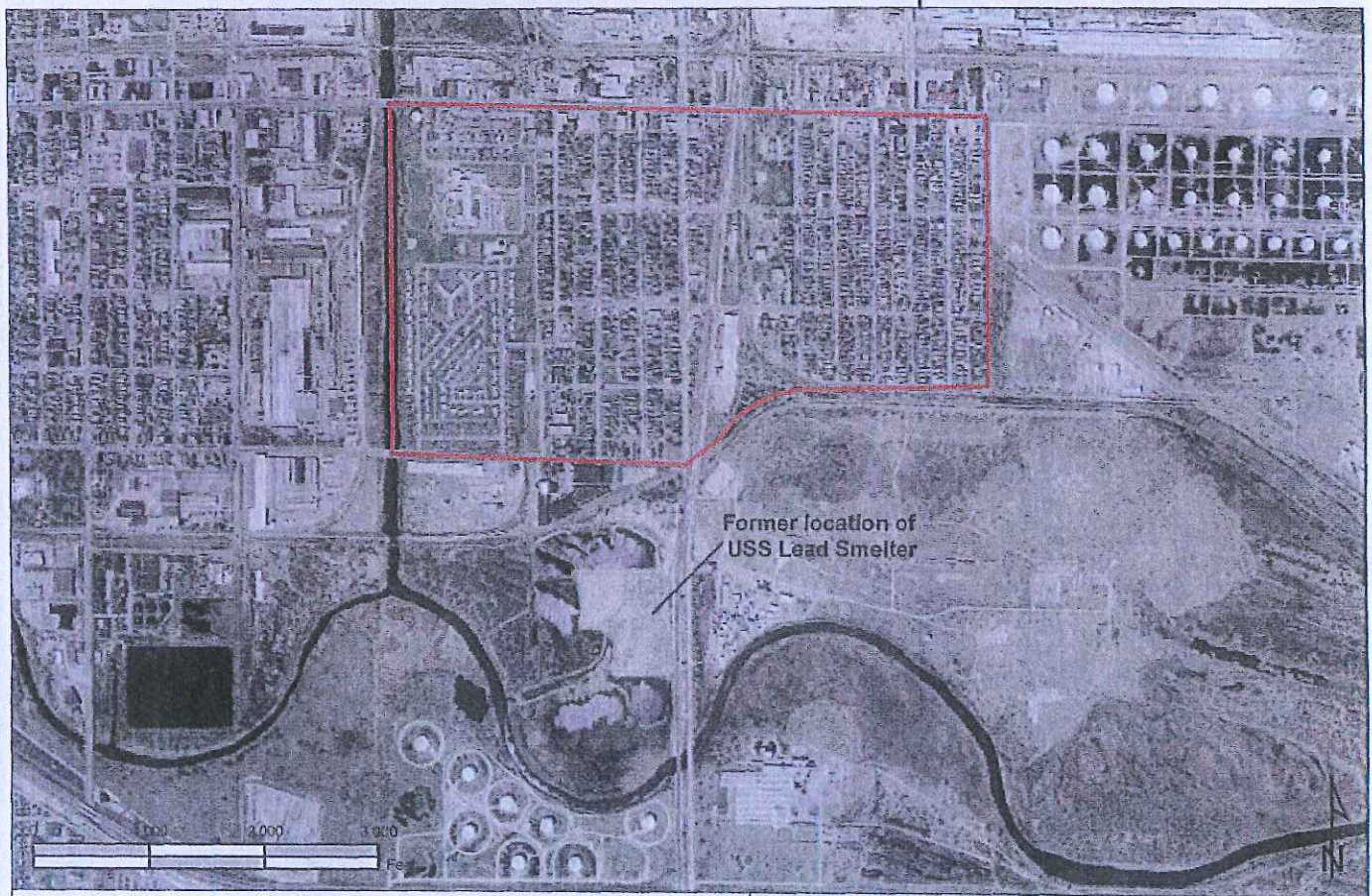
**Response:** EPA is not aware of places within the RI/FS where statements in the text conflict with information presented in the tables. EPA has provided tables to indicate which data were included in statistics and how they were evaluated. The Human Health Risk Assessment Appendix to the RI contains close to 1700 pages of detailed tables that provide the data EPA considered for its evaluation of risks to human health. Section 5.2 of the RI contains a detailed description of the data upon which the RI is based. Section 5.3 of the RI contains a detailed description of the statistical treatment of data and data used for each contaminant of concern.


**Comment:** It is difficult to follow EPA's calculations for the purpose of estimating remedial volume.

**Response:** Volume estimates are based on a number of factors, including the number of yards within each sub-area of the site, the average yard size for different types of properties, the proportion of those yards estimated to require cleanup, and the anticipated depths of excavation for the various different remedial alternatives. EPA calculated these volumes based on the information it collected during the RI so that it could conduct a comparison of relative costs of cleanup alternatives. During the remedial design phase, EPA will calculate more precise remedial volumes based upon data from many, if not all, of the properties in OUI.

## FIGURES





 OU1 boundary

Imagery sources (clockwise from upper left):  
 ESRI Resource Center  
 Google Maps  
 ISDP (Indiana Spatial Data Portal)

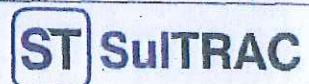


US SMELTER & LEAD REFINERY  
 LAKE COUNTY, EAST CHICAGO, INDIANA

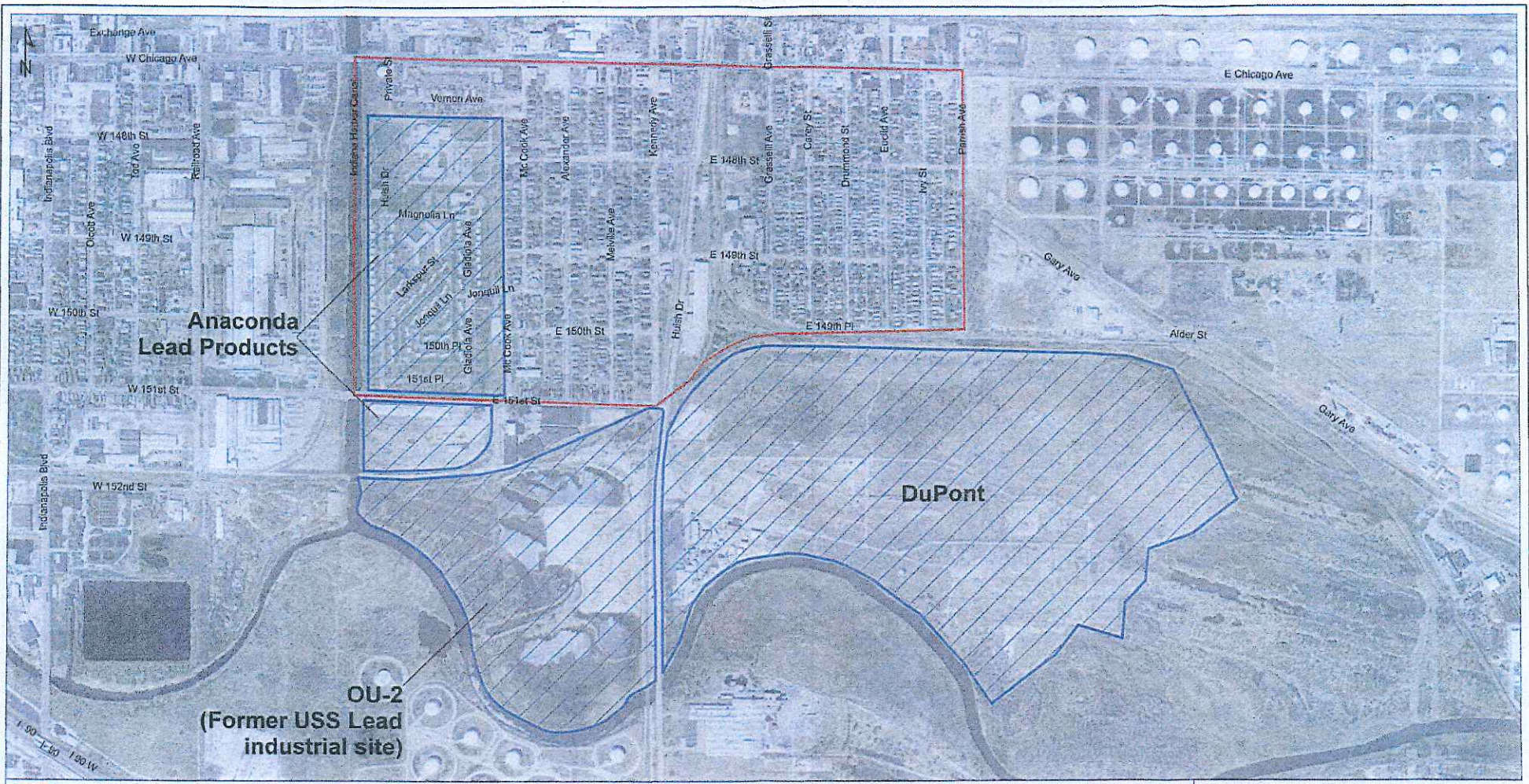
RECORD OF DECISION

**FIGURE 1**  
**USS LEAD RESIDENTIAL AREA**  
**SITE LOCATION MAP**

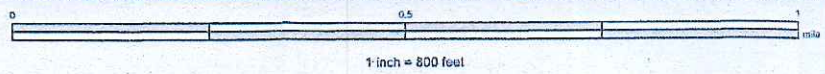
EPA REGION 5 RAC 2 | REVISION 0 | AUGUST 2012







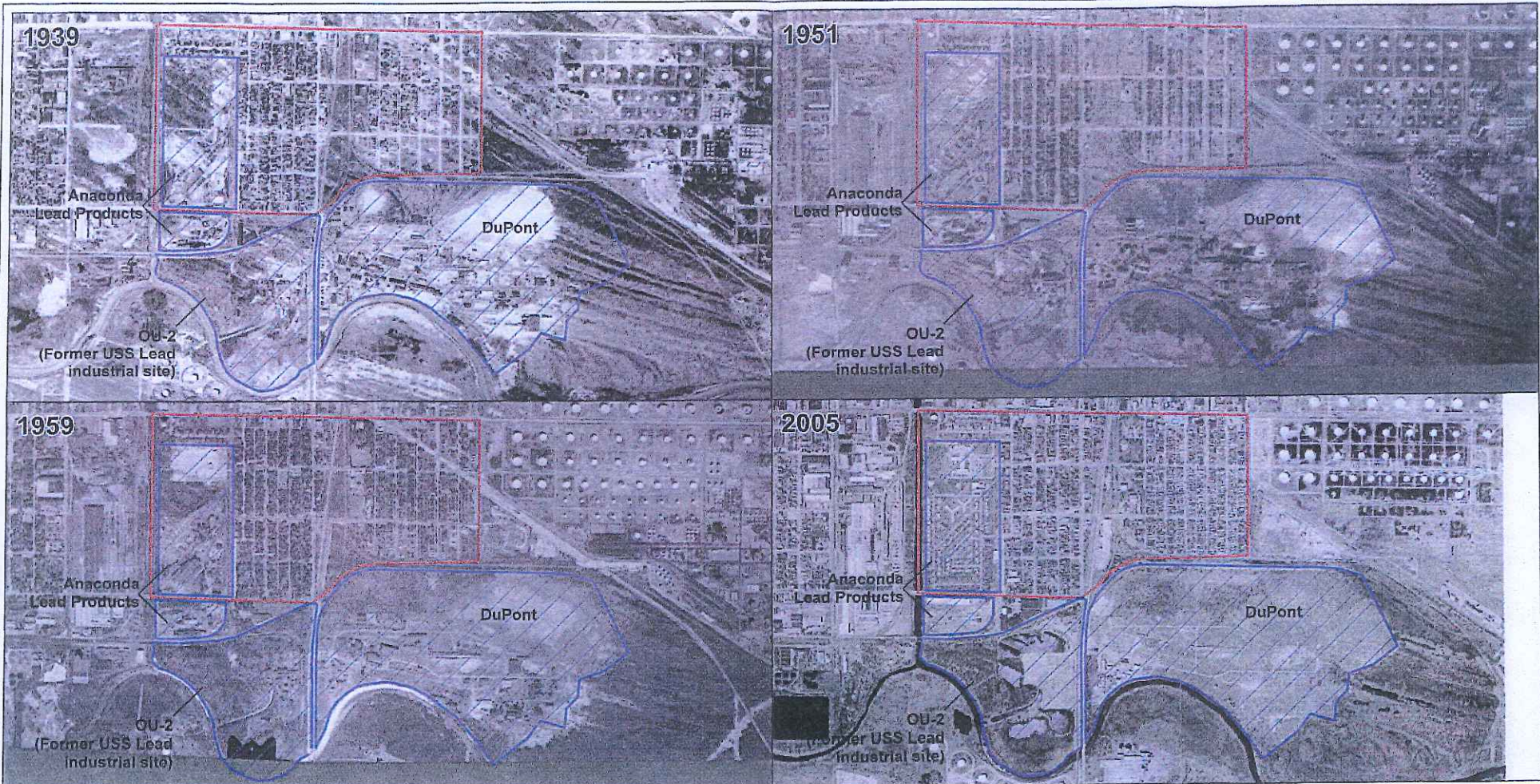
- OU-1 boundary
- Industrial sites




Imagery source:  
ISDP (Indiana Spatial Data Portal)

**US SMELTER & LEAD REFINERY**  
 LAKE COUNTY, EAST CHICAGO, INDIANA  
 RECORD OF DECISION  
**FIGURE 2**  
 HISTORICAL OVERVIEW OF STUDY AREA  
 EPA REGION 5 RAC 2 | REVISION 9 | AUGUST 2012





 OU-1 boundary  
 Industrial sites

Imagery sources (clockwise from upper left):  
 Indiana State Archives,  
 USGS EarthExplorer,  
 ISDP (Indiana Spatial Data Portal),  
 USGS EarthExplorer

Note: Graphic scale is approximate for the 1939, 1951 & 1959 Imagery

0 1,000 2,000 3,000 4,000 5,000 approximate feet    1 inch approximately = 1,500 feet



US SMELTER & LEAD REFINERY  
 LAKE COUNTY, EAST CHICAGO, INDIANA

RECORD OF DECISION

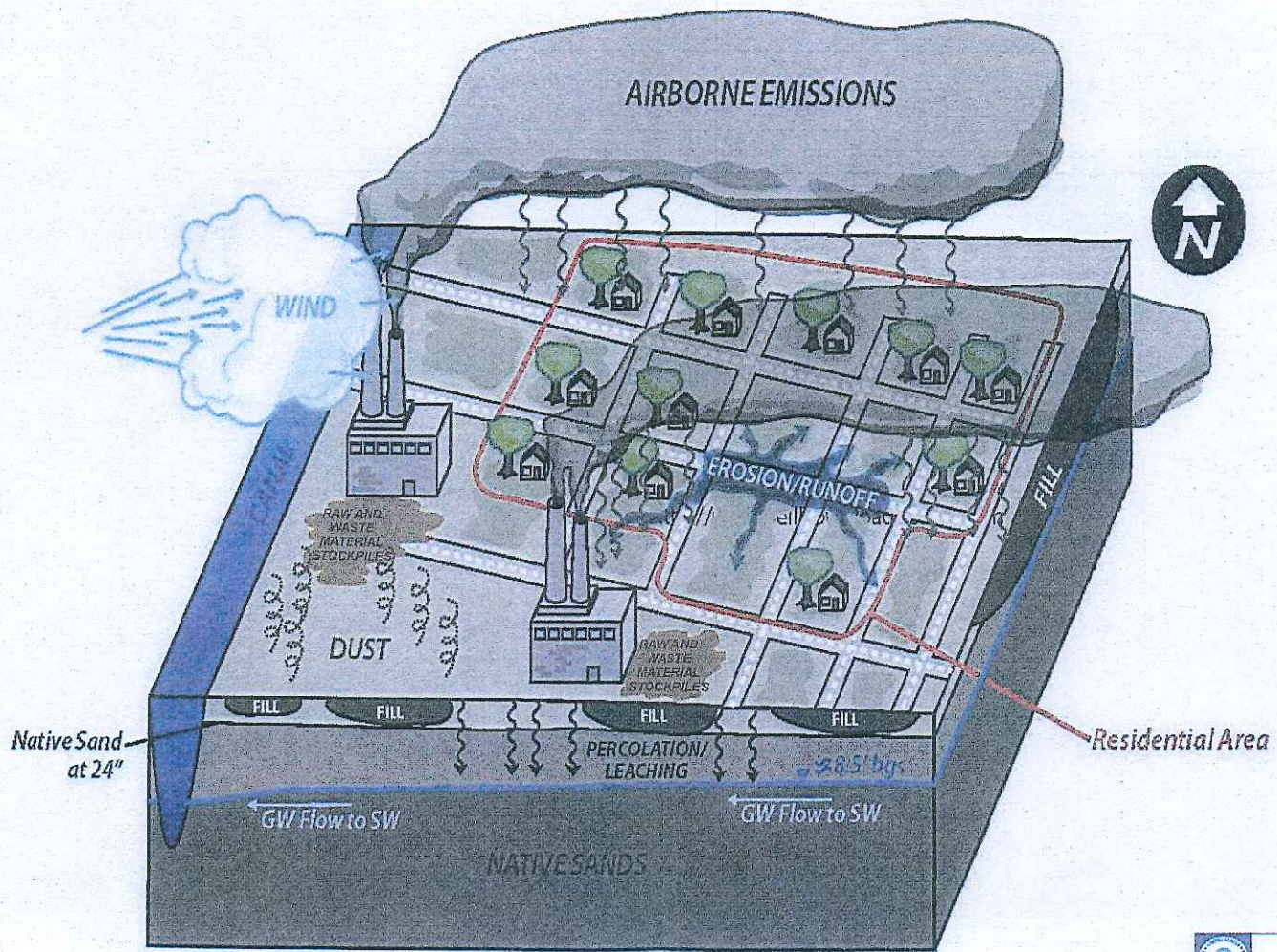
**FIGURE 3**

HISTORICAL IMAGERY

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US SMELTER & LEAD REFINERY  
LAKE COUNTY, EAST CHICAGO, INDIANA

RECORD OF DECISION

FIGURE 4

CONCEPTUAL SITE MODEL

EPA REGION 5 RAC 2 | REVISION 0 | AUGUST 2012

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APPENDIX A

State Concurrence Letter



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

*Mitchell E. Daniels, Jr.*  
Governor

*Thomas W. Easterly*  
Commissioner

100 North Senate Avenue  
Indianapolis, Indiana 46204  
(317) 232-8603  
Toll Free (800) 451-6027  
[www.idem.IN.gov](http://www.idem.IN.gov)

September 25, 2012

Ms. Susan Hedman  
Regional Administrator  
U.S. EPA, Region V  
77 West Jackson St.  
Chicago, Illinois 60604-3507  
Mail Code: SRF-6J

Dear Ms. Hedman:

Re: Draft Record of Decision (ROD)  
USS Lead Superfund Site  
East Chicago, Indiana

The Indiana Department of Environmental Management (IDEM) has reviewed the U.S. Environmental Protection Agency's draft Record of Decision (ROD) document for the USS Lead Superfund site in East Chicago, Indiana. IDEM is in full concurrence with the major components of the selected remedy outlined in the document which include the following:

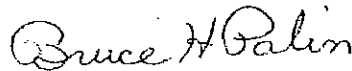
- Excavation of impacted soils that exceed Remedial Action Levels (RALs) to a maximum depth of two feet below the ground surface (bgs) and replacement with clean soil.
- Chemical stabilization of excavated soils, as necessary prior to disposal, to address soils exceeding the toxicity characteristic (TC) regulatory threshold.
- Disposal of excavated soils at an off-site Subtitle D landfill.
- Placement of a buried visual barrier, such as orange construction fencing, above soils exceeding the RALs if such soils are identified at a depth greater than two feet bgs, and the placement of Environmental Restrictive Covenants (ERCs) to protect the barrier.

Ms. Susan Hedman  
Page 2

IDEM staff agree that the selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. IDEM staff have been working closely with Region V staff in the selection of an appropriate remedy and are satisfied with the selected alternative.

Please be assured that IDEM is committed to accomplish cleanup at all Indiana sites on the National Priorities List and intends to fulfill all obligations required by law to achieve that goal. We look forward to beginning remediation work on this project.

Sincerely,



Bruce H Palin  
Assistant Commissioner  
Office of Land Quality

BP:DP:bl

cc: Peggy Dorsey, IDEM  
Bruce Oertel, IDEM  
Rex Osborn, IDEM  
Michael Berkoff, EPA

## APPENDIX B

### List of Applicable or Relevant and Appropriate Requirements

**APPENDIX B**  
**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
<b>CLEAN AIR ACT (CAA) of 1974</b>				
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).
<b>FLOODPLAIN MANAGEMENT EXECUTIVE ORDER No. 11988</b>				
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	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 B**  
**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
	<p>selected unless a determination is made that no practicable alternative exists. If no practicable alternative exists, potential harm must be minimized and action taken to restore and preserve the natural and beneficial values of the floodplain.</p>			
<b>CLEAN WATER ACT (CWA) OF 1977</b>				
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.	Action-specific	Relevant and Appropriate	

**APPENDIX B**  
**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
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	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.
<b>FISH AND WILDLIFE COORDINATION ACT</b>				
Fish and Wildlife Coordination Act; 16 U.S.C. §§661 et seq. 16 USC 742a 16 USC 2901 40 CFR 6.302 50 CFR 402	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 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.	Location-specific	Applicable	

**APPENDIX B**  
**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
<b>RESOURCE CONSERVATION AND RECOVERY ACT OF 1976</b>				
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	Applicable 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	Relevant and Appropriate	Relevant for treatment of soils that are characteristic hazardous wastes.
Land Treatment [40 CFR 264.270 to 264.283 Subpart M]	Establishes standards applicable for owners and operators of facilities that treat or dispose of hazardous waste in land treatment units to ensure that hazardous constituents placed in or on the treatment zone are degraded, transformed, or immobilized within the treatment zone.	Action-specific	Relevant and Appropriate	Applicable if treatment of residue piles to render them non-hazardous occurs in a land treatment unit.
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.



**APPENDIX B**  
**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
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 3.1-1]	Applies to contaminated containment components, contaminated soils, and structures and equipment contaminated with waste.	Action-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.	Action-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 IAC 3.1-7 and 329 IAC 3.1-8]	All hazardous waste must be properly packaged, with labels, markings, and placards, prior to transport.	Action-specific	Relevant and Appropriate	
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 on-site 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).	Action-specific	Applicable	

**APPENDIX B**  
**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
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)	Action-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.	Action-specific	Relevant and Appropriate	
Use and management of containers [40 CFR 265, Subpart J and 329 IAC 3.1-10]	Hazardous waste stored on-site in containers for 90 days or less shall be managed in accordance with the standards of 40 CFR 265, Subpart I (329 IAC 3.1-10).	Action-specific	Relevant and Appropriate	
<b>SOLID WASTE DISPOSAL ACT</b>				
Identification and Listing of Hazardous Waste (40 CFR 261) Subpart B	Sets criteria for identifying a hazardous waste.	Action-specific	Relevant and Appropriate	

**APPENDIX B**  
**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
Identification and Listing of Hazardous Waste (40 CFR 261) Subpart C	Identifies the characteristics of a hazardous waste.	Action-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	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	
<b>ENDANGERED SPECIES ACT</b>				
Endangered Species Act [16 USC 1531]; 50 CFR. 200	Requires that federal agencies ensure that any action authorized, 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.	Location-specific	Applicable	No endangered species are known to be present on the site that would be affected by remedial actions.

**APPENDIX B**  
**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
<b>NATURAL HISTORIC PRESERVATION ACT</b>				
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. Would be applicable during remedial activities if scientific, historic, or archaeological artifacts are identified during implementation of the remedy.
<b>DEPARTMENT OF TRANSPORTATION</b>				
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	
<b>OTHER FEDERAL GUIDELINES TO BE CONSIDERED</b>				
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 the incremental cancer risk from exposure to site	Chemical-specific	To Be Considered	Levels may be considered for use as cleanup goals.

**APPENDIX B**  
**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
	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.
EPA Area of Contamination Policy under RCRA	Allows wastes within an Area of Contamination to be consolidated and treated in-situ without triggering RCRA LDRs or minimum technology requirements. This policy does not have the effect of law.	Action-specific	To Be Considered	Applicable to on-site consolidation, treatment and covering/capping of soils and sediments.
EPA's Contained-in Policy under RCRA	Deals with management of remediation waste. This policy 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:	Action-specific	Applicable	The Act is considered an ARAR for construction activities performed during the implementation of remedies.

**APPENDIX B**  
**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
	Hazardous Waste Operations and Emergency Response. General worker safety is covered elsewhere within the law.			
<b>INDIANA ADMINISTRATIVE CODE</b>				
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	
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.	Action-specific	Relevant and Appropriate	
Indiana Air Pollution Control Regulations (IAC Title 326)	This law applies to the regulation of air emissions, for activities such as excavation, that have the potential to create dust and sets emissions limits for particulates.	Action-specific and may be Chemical-specific	Relevant and Appropriate	
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	

**APPENDIX B**  
**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
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	
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.
Voluntary Remediation of Hazardous Substances and Petroleum (Indiana Code [IC] 13-25-5)	IC 13-25-5 established the Voluntary Remediation Program in 1993 and gave the IDEM the authority to establish guidelines for voluntary site closure. Under this authority IDEM developed a non-rule policy document, the Risk Integrated System of Closure (RISC), to guide site closures within the authority of IDEM's remediation programs. This guidance document does not have the effect of law.	Chemical-specific	To Be Considered	The RISC document provides a methodology for establishing remedial goals and determining that remediation has been achieved. The RISC policy does not apply to Superfund sites, but does apply to remedial sites under several state programs, including the state version of RCRA, the state Leaking Underground Storage Tank program, the State Cleanup Program (state equivalent of the Federal Superfund Program) and the Voluntary Remediation Program.

## APPENDIX C

### Remedial Alternatives Evaluation Summary



APPENDIX C  
 Remedial Alternatives Evaluation Summary  
 USS Lead Site, OU-1  
 East Chicago, Indiana

Evaluation Criteria	Alternative 1 No Action	Alternative 3 On-Site Soil Cover + Institutional Controls	Alternative 4A Excavation of Soil Exceeding RALs + Off-Site Disposal + Ex Situ Treatment Option	Alternative 4B Excavation to Native Sand + Off-Site Disposal + Ex Situ Treatment Option
<b>Overall Protection to Human Health and the Environment</b> Protection of human health and the environment	Not protective	Protective	Protective	Protective
<b>Compliance with ARARs</b> Location-specific ARARs Action-specific ARARs Chemical-specific ARARs	Not in compliance Not in compliance Not in compliance	In compliance In compliance In compliance	In compliance In compliance In compliance	In compliance In compliance In compliance
<b>Long-Term Effectiveness and Permanence</b> Magnitude of residual risk Adequacy and reliability of controls Need for 5-year review	Residual risk remains No controls Required	Some residual risk Somewhat reliable Required	Minimal residual risk Reliable to very reliable May be required	No residual risk Very reliable Not required
<b>Reduction of Toxicity, Mobility, or Volume through Treatment</b> Treatment processes used and materials treated Amount of hazardous material destroyed or treated Expected reduction in toxicity, mobility, or volume of the waste Irreversibility of treatment	None None None Not applicable Not applicable	None None None Not applicable Not applicable	Some treatment utilized ~7% treatment Toxicity and mobility reduced Not likely reversible Metals less than TC threshold Partially satisfies	Some treatment utilized ~7% treatment Toxicity and mobility reduced Not likely reversible Metals less than TC threshold Partially satisfies
Type and quantity of residuals that will remain following treatment	Does not satisfy	Does not satisfy	Partially satisfies	Partially satisfies
Statutory preference for treatment	High	High	Moderate-High	Moderate-High
<b>Short-Term Effectiveness</b> Protection of workers during remedial action Protection of the community during remedial action Potential environmental impacts of remedial action	Not applicable Not applicable Protection not achieved	High High Low Immediate	Moderate-High Moderate-High Low Immediate	Moderate-High Moderate-High Low Immediate
Time until protection is achieved	Not applicable	Immediate	Immediate	Immediate
<b>Implementability</b> Technical feasibility Reliability of technology Administrative feasibility Availability of services, equipment, and materials	Not applicable Not applicable Not applicable Not applicable	Moderate Somewhat reliable Difficult Readily available	Easy Very reliable Feasible Readily available	Easy Very reliable Feasible Readily available
<b>Cost</b> Total construction cost Total engineering and construction management cost Total present worth O&M Period of analysis (yrs) Total cost (including 20% contingency)	\$0 \$0 \$0 NA \$0	\$13,905,000 \$2,800,000 \$735,000 30 \$20,900,000	\$21,600,000 \$1,195,000 \$67,000 30 \$29,900,000	\$32,800,000 \$4,960,000 \$0 NA \$45,400,000

## APPENDIX D

### Feasibility Study Cost Estimate for Alternative 4A

**APPENDIX D**  
**FEASIBILITY STUDY COST ESTIMATE**  
**ALTERNATIVE 4A: EXCAVATION OF SOIL EXCEEDING RALS + OFF-SITE**  
**DISPOSAL + EX SITU TREATMENT OPTION**  
**USS Lead Site, OU-1**  
**East Chicago, Indiana**

Estimate Category	Cost			TOTAL
	Eastern Area	Southwestern Area	Northwestern Area	
<b>PRE-REMEDIAL DESIGN SAMPLING</b>				
Sample Labor	\$583,000	\$408,000	\$451,000	\$1,442,000
ODCs	\$84,000	\$60,000	\$66,000	\$210,000
<b>REMEDY CONSTRUCTION</b>				
Preconstruction Activities	\$180,000	\$186,000	\$173,000	\$539,000
Site Preparation and Access	\$460,000	\$685,000	\$268,000	\$1,413,000
Institutional Controls	\$5,000	\$5,000	\$5,000	\$15,000
Contaminated Soil Excavation and Backfilling	\$2,203,000	\$3,793,000	\$1,548,000	\$7,544,000
Contaminated Soil Transportation and Disposal	\$1,509,000	\$2,411,000	\$943,000	\$4,863,000
Soil Cover	\$1,000	\$2,000	\$1,000	\$4,000
Property Restoration	\$1,407,000	\$2,278,000	\$927,000	\$4,612,000
Contractor's Oversight, Health & Safety, Quality Control	\$280,000	\$455,000	\$175,000	\$910,000
<b>Construction Subtotal</b>	<b>\$6,700,000</b>	<b>\$10,300,000</b>	<b>\$4,600,000</b>	<b>\$21,600,000</b>
<b>ENGINEERING &amp; CONSTRUCTION MANAGEMENT</b>				
	\$991,000	\$1,548,000	\$656,000	\$3,195,000
<b>OPERATIONS AND MAINTENANCE</b>				
	\$27,068	\$18,961	\$20,971	\$67,000
<b>Project Subtotal</b>	<b>\$7,700,000</b>	<b>\$11,900,000</b>	<b>\$5,300,000</b>	<b>\$24,900,000</b>
20% Contingency	\$1,540,000	\$2,380,000	\$1,060,000	\$4,980,000
<b>Project Total</b>	<b>\$9,200,000</b>	<b>\$14,300,000</b>	<b>\$6,400,000</b>	<b>\$29,900,000</b>

# **APPENDIX E**

**TO  
Z2 SOIL UAO**

**PROPOSED EXPLANATION OF  
SIGNIFICANT DIFFERENCES**



# PROPOSED EXPLANATION OF SIGNIFICANT DIFFERENCES

## U.S. SMELTER AND LEAD REFINERY, INC. SUPERFUND SITE EAST CHICAGO, LAKE COUNTY, INDIANA

EPA Region 5

December 2017

### I. INTRODUCTION

The United States Environmental Protection Agency (EPA) is proposing this Explanation of Significant Differences (ESD) to document the significant increase in cost between the estimated cost of the remedy selected in the 2012 Record of Decision (ROD) for Zones 2 and 3 of Operable Unit 1 (OU1) of the U.S. Smelter and Lead Refinery, Inc. Superfund Site (Site) and the current estimated cost of the remedy for those two Zones. Previously, the estimated cost for Zones 2 and 3 was \$22.8 million; currently, the estimate is \$84.9 million. Notwithstanding this projected increase in costs, EPA has determined that the remedy selected in the 2012 ROD—excavation of contaminated soil and off-site disposal (with an off-site soil treatment option)—is still the correct remedy for Zones 2 and 3 and continues to meet the requirements of the National Oil and Hazardous Substances Contingency Plan (NCP). EPA would have selected this remedy even if the projected costs in 2012 had been more consistent with the current estimate. Thus, this ESD does not propose any changes to the remedy selected for Zones 2 and 3 of OU1. It merely explains the differences in the costs between then and now.<sup>1</sup>

Under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), as amended, EPA is required to publish an Explanation of Significant Differences when, after issuance of a Record of Decision,<sup>2</sup> subsequent enforcement or remedial actions differ in any significant respects from the final plan set forth in the ROD. Sections 300.435(c)(2)(i) and 300.825(a)(2) of the NCP set forth the criteria for issuing an ESD and requiring that an ESD be published if, after issuance of the ROD, there is a significant, but not fundamental, difference in the scope, performance, or cost of the remedy. A difference is significant, but not fundamental, if it affects basic features of the remedy such as timing and cost, but does not affect the overall approach to managing hazardous waste at a site.<sup>3</sup>

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<sup>1</sup> This ESD does not address Zone 1 of OU1 of the Site. In 2016 and 2017, all residents of Zone 1 were relocated out of their housing complex and the housing complex was slated for demolition. Consequently, for the former residential and park areas of Zone 1, EPA is in the process of preparing a Feasibility Study Addendum to the 2012 ROD. EPA may fundamentally change the remedy for those areas, which would necessitate a ROD Amendment. In addition, there may be changes in the land use for some areas of Zone 1 that currently house a former elementary school. Therefore, no areas of Zone 1 are addressed in this ESD.

This ESD also does not include costs associated with indoor response actions. Those actions were performed pursuant to EPA's removal, not remedial, authorities.

<sup>2</sup> A ROD documents the EPA's remedy decision.

<sup>3</sup> See 55 Fed. Reg. 8,666, 8,771-72 (Mar. 8, 1990).

The remedial investigation (RI)<sup>4</sup> performed by the EPA at OU1 of the Site identified lead and arsenic in soil as the contaminants of concern. EPA's 2012 ROD estimated it would cost \$29.9 million to implement the selected remedy across all areas of OU1, which were then designated as an "eastern" area, a "southwestern" area, and a "northwestern" area. In 2014, OU1 was subdivided into three geographic "zones": Zones 1, 2, and 3. These Zones differed to some extent from the "areas" previously identified, but the original "area" costs were relatively easily reallocated to the "Zones." EPA estimated it would cost \$13.4 million to remediate Zone 2 and \$9.4 million to remediate Zone 3, for a total of \$22.8 million for both Zones.<sup>5</sup>

From approximately May 2015 to early 2016, extensive soil sampling in Zones 2 and 3 was conducted during remedial design to better delineate the extent of contamination at each property.<sup>6</sup> Based on that sampling, EPA determined that the actual volume of contaminated soil that needs to be excavated is greater than what was originally estimated. In addition, based largely on more up-to-date engineering estimates, EPA determined that the "per unit" cost of various tasks required by remediation work is greater than what was originally estimated. As a result of the increased volume of contaminated soil and the increased per unit costs of remediating that soil, the current estimated cost of remediating Zones 2 and 3 has increased to \$84.9 million.<sup>7</sup>

## II. SITE BACKGROUND

The U.S. Smelter and Lead Refinery, Inc. Superfund Site is located in the City of East Chicago, Indiana. The Site has been divided into two operable units (OUs). *See* Appendix A. 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 151<sup>st</sup> Street/149<sup>th</sup> Place, and on the west by the Indiana Harbor Canal. OU1 has been further subdivided in Zones 1, 2, and 3. *See* Appendix A. Operable Unit 2 (OU2) includes the 79-acre former USS Lead facility as well as groundwater beneath the entire Site. The Site was placed on the National Priorities List (NPL) in April 2009.

Contamination in OU1 is largely derived from historic operations at three nearby facilities: (1) the USS Lead facility; (2) a facility formerly located in Zone 1 and owned and operated by subsidiaries of the Anaconda Copper and Mining Company (the "Anaconda facility"); and (3) the E. I. Du Pont de Nemours facility located just southeast of OU1 (the "DuPont facility").

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<sup>4</sup> An RI determines the nature and extent of contamination at a site for the purposes of developing a ROD. EPA sampled 7.4% of properties in OU1 during the RI.

<sup>5</sup> *See* Appendix B: *Technical Memorandum: Final Comparison of Original Cost Estimates and Current Cost Estimates for Zones 2 and 3 of Operable Unit 1, USS Lead Superfund Site*, at Table 1 (December 2017) ("Z2&3 ESD Technical Memorandum").

<sup>6</sup> Remedial design determines the extent of contamination at properties that are not sampled during the RI.

<sup>7</sup> EPA has taken a conservative approach to the current cost estimate. Once remedial design is completed, EPA typically targets a cost estimate that is within +15% to -10% of the final cost. *See A guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, OSWER 93355.0-75 at 2-4 (July 2000). That said, the current estimate of \$84.9 million includes a 20% contingency both because remedial design is not yet completed and because the original estimate used a 20% contingency. It is likely that the 20% contingency is high for both Zones, but especially for Zone 3 where more than 50% of the properties have already been remediated.

The USS Lead facility was constructed in 1906 and used an electrolytic process (the Betts process) to refine lead bullion that was shipped from Midvale, Utah, to East Chicago.<sup>8</sup> Because lead refining produces a number of byproducts, the USS Lead facility also included various secondary metal treatment operations—such as secondary lead smelting—and operated a weed killer (lead arsenate) plant. In addition, throughout its history, the USS Lead facility accepted scrap lead from a variety of sources for treatment in its secondary lead smelting operations involving a blast furnace. In approximately 1972, the USS Lead facility stopped refining lead bullion and instead increased its blast furnace capacity to treat more scrap lead material. Operations at the USS Lead facility ceased in 1985.

Among other sources of contamination from the USS Lead facility, slag from the blast furnace was routinely placed in piles on the ground and left exposed to the elements. Lead and arsenic particulate was disposed of into the environment as fumes from operations, as dust from the baghouses, and as dust from lead waste piles (*e.g.*, slag and baghouse dust) stored on the grounds.

The Anaconda facility operated three inter-related processes. In 1912, a lead refinery was built on the site and used a pyrometallurgical process to refine lead bullion that was shipped from Toole, Utah, to East Chicago. In 1919, a white lead plant was constructed to produce white lead for use as an ingredient in lead paint. Finally, in 1922, a zinc oxide plant was added to the facility.

As with the USS Lead facility, the Anaconda facility also operated numerous secondary metal treatment processes. Byproducts of the operations included slag, lead waste, and arsenic. Among other sources of contamination, arsenic was burned off and was supposed to be recovered in flues and a baghouse. In addition, lead and arsenic particulate was disposed of into the environment in the same manner as with the USS Lead facility. Operation of the white lead process generated additional releases.

Significant quantities of lead were refined from 1912 until 1946, when refining operations at the Anaconda facility ceased. However, secondary smelting and white lead production continued into the 1950s. The Anaconda facility was demolished over the course of the 1960s and early 1970s. In approximately 1972, the West Calumet Housing Complex was constructed on the facility's footprint.

The DuPont facility 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) and zinc chloride (1900–1969). Among other sources of contamination, lead and arsenic particulate generated from these operations was disposed of into the environment as stack emissions, precipitator dust, and dust from exposed waste piles stored on the grounds of the site. General operations at the facility contracted significantly during the 1980s and 1990s. The DuPont facility is undergoing corrective action under federal RCRA authorities.

Similarly, in the 1990s, USS Lead began a cleanup of its facility under state and federal RCRA programs. In the early 2000s, as part of RCRA corrective action at the facility, the scope of

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<sup>8</sup> The ROD incorrectly stated that the USS Lead facility was constructed to produce copper. EPA, USS Lead Record of Decision at 7 (Nov. 2012).

investigation was expanded somewhat beyond the facility's boundaries into OU1. In 2007, responsibility for further investigation was transferred from EPA's RCRA program to its Superfund program. Limited sampling was performed in 2007, resulting in the 2008 removal of contaminated soils from several residential properties. In April 2009, EPA placed the Site on the NPL. EPA performed its remedial investigation of OU1 from June 2009 to June 2012.<sup>9, 10</sup>

EPA's completed remedial investigation identified lead and arsenic in soil as the contaminants of concern for OU1. Based on that investigation and on the corresponding feasibility study, EPA issued its Record of Decision for OU1 in November 2012. The remedy selected in the ROD was as follows:

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

Consistent with the ROD and pursuant to a consent decree with two potentially responsible parties, from November 2014 to August 2016, EPA performed remedial design activities in Zones 1 and 3. Remedial design activities in Zone 2 began in August 2016 and is ongoing. Based on these remedial designs, EPA started remediation work in both Zones 2 and 3 in the fall of 2016 and

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<sup>9</sup> To date, it appears that soil contamination in the former USS Lead facility has largely been remediated through RCRA corrective action. Pursuant to a 2017 Administrative Settlement Agreement and Order on Consent between EPA and USS Lead, however, remaining contamination in OU2—that is, in the soil and in the groundwater under the entire Site—will be the subject of a remedial investigation beginning in early 2018. A proposed plan, public comment period, and record of decision for OU2 will follow that investigation.

<sup>10</sup> In 2011, EPA performed additional soil removal actions at several residential properties in OU1 based on sampling data collected during the remedial investigation.



continued that work throughout 2017.<sup>11</sup> As of December 2017, EPA has remediated 289 properties consistent with the ROD. Additional work will continue in 2018 and thereafter.<sup>12</sup>

### **III. EXPLANATION OF SIGNIFICANT DIFFERENCES AND NO CHANGE IN THE REMEDY SELECTED**

#### **A. Explanation of the Significant Differences**

EPA estimated that it would cost \$22.8 million to remediate Zones 2 and 3 based on data generated during the remedial investigation and feasibility study. *See* App. B at Table 1. The principal assumptions underlying the original estimate were: (1) the number of contaminated properties; (2) the size of those properties; (3) the extent of contamination at those properties; and (4) the per unit cost of various tasks involved in remediation. The original cost estimate was based on a sample size of 7.4% of properties in OU1.

At this time, approximately 90% of the properties in Zones 2 and 3 have been sampled. Based on the results of this sampling, EPA has determined that the number of properties requiring remediation, the size of those properties, and the extent of contamination at those properties are all greater than what was originally estimated. These changes have increased the total estimated volume of contaminated soil to be excavated from approximately 47,000 cubic yards to approximately 88,000 cubic yards. This increased quantity of soil correspondingly increased the construction management costs and the contingency costs and required a longer duration for remediation and oversight than originally estimated. In addition, based largely on more up-to-date engineering estimates, EPA has determined that the per unit cost of various tasks involved in remediation is greater than what was originally estimated. For example, the estimated rate for excavating and replacing one cubic yard of contaminated soil increased from \$115 to \$471.

As a result of these major factors, the estimated cost to implement the selected remedy in Zones 2 and 3 is now \$84.9 million. The Z2&3 ESD Technical Memorandum included as Appendix B provides a full explanation of the significant differences between the original and current cost estimate.

#### **B. No Change in the Remedy Selected**

In the 2012 ROD, EPA evaluated two remedial alternatives in addition to the one selected: (1) on-site soil cover plus institutional controls (Alternative 3); and (2) excavation to native sand plus off-site disposal (Alternative 4B).<sup>13</sup>

Alternative 3: Consistent with its determination in the ROD and upon further review, EPA has concluded that capping hundreds of residential yards and then implementing institutional controls

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<sup>11</sup> Soil remediation work in Zone 2 in 2016 and 2017 was performed pursuant to EPA's removal authorities. However, that work was performed consistent with and after issuance of the ROD.

<sup>12</sup> Work in Zone 1 has been put on hold. *See* Note 1.

<sup>13</sup> As required by law, EPA also evaluated a "no action" alternative. That alternative remains inappropriate in light of the contamination that exists in Zones 2 and 3.

poses a number of technical, legal, and administrative difficulties. Among the technical challenges is the difficulty of developing effective, property-specific cap designs and grading. Capping would also result in significant topographic changes to the property, compared to the current remedy which restores properties to their existing use. These caps would require extensive operation and maintenance by individual property owners. Further, institutional controls required by a capping remedy would involve significantly greater restrictions and monitoring requirements that would burden the owners' and tenants' use of their property. Finally, capping is inconsistent with EPA's preference for remedies that include treatment, which permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances.

Based on general community reactions at the July 25, 2012 public meeting held for the proposed plan and on extensive community engagement since then, EPA expects poor community acceptance of this alternative. Poor community acceptance could make it more difficult for EPA to secure access to implement the remedy and could significantly increase costs. Finally, 289 properties in Zones 2 and 3 have already been remediated pursuant to the preferred remedy selected in the ROD; it would be inappropriate and unfair for EPA to subject the owners and residents of properties that have not yet been remediated to a different, more burdensome remedy.

Alternative 4B: The increased costs described above would proportionally increase the cost of Alternative 4B. Therefore, the reasons set forth in the ROD for not selecting Alternative 4B still apply at this time.

#### **IV. SUPPORT AGENCY COMMENTS**

The Indiana Department of Environmental Management supports this proposed ESD.

#### **V. FIVE YEAR REVIEWS**

If this remedy results in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, EPA will review the remedy no less often than every five years from the start of construction to ensure that the remedy is, or will be, protective of human health and the environment.

#### **VI. AFFIRMATION OF STATUTORY DETERMINATIONS**

The remedy selected in the 2012 ROD remains fundamentally unaltered, and the statutory determinations made in the ROD still apply. The significant change to the remedial action is an increase in the cost due primarily to an increase in the estimated volume of contaminated soil and an increase in the per unit costs of the remediation work.

The remedy will continue to be protective of human health and the environment and will comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action. The remedy remains technically feasible, cost-effective and satisfies the requirements of CERCLA and the NCP.

## VII. PUBLIC PARTICIPATION AND THE ADMINISTRATIVE RECORD

Pursuant to NCP § 300.435(c)(i), EPA will publish a brief description of this ESD in the local newspaper. An electronic copy of this ESD will also be available online at: <https://www.epa.gov/uss-lead-superfund-site>. Further, EPA will hold a 60-day public comment period that will run from December 18, 2017 to February 16, 2018. A public meeting will be scheduled for January, where EPA will answer questions regarding this ESD and provide the public with further opportunities to provide comments. Because EPA will already hold a 60-day public comment period (instead of a typical 30-day public comment period), no extensions of time will be granted. EPA will review and consider all submitted comments before finalizing this ESD.

Pursuant to NCP § 300.825(a)(2), once this ESD is finalized, it will become part of the Administrative Record file for the site. The Administrative Record for the response actions related to the site 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

The Administrative Record file and other relevant reports and documents are also available for public review at the EPA Region 5 office at the following location:

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

*Hours: Monday to Friday: 8:00 am – 4:00 pm*

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

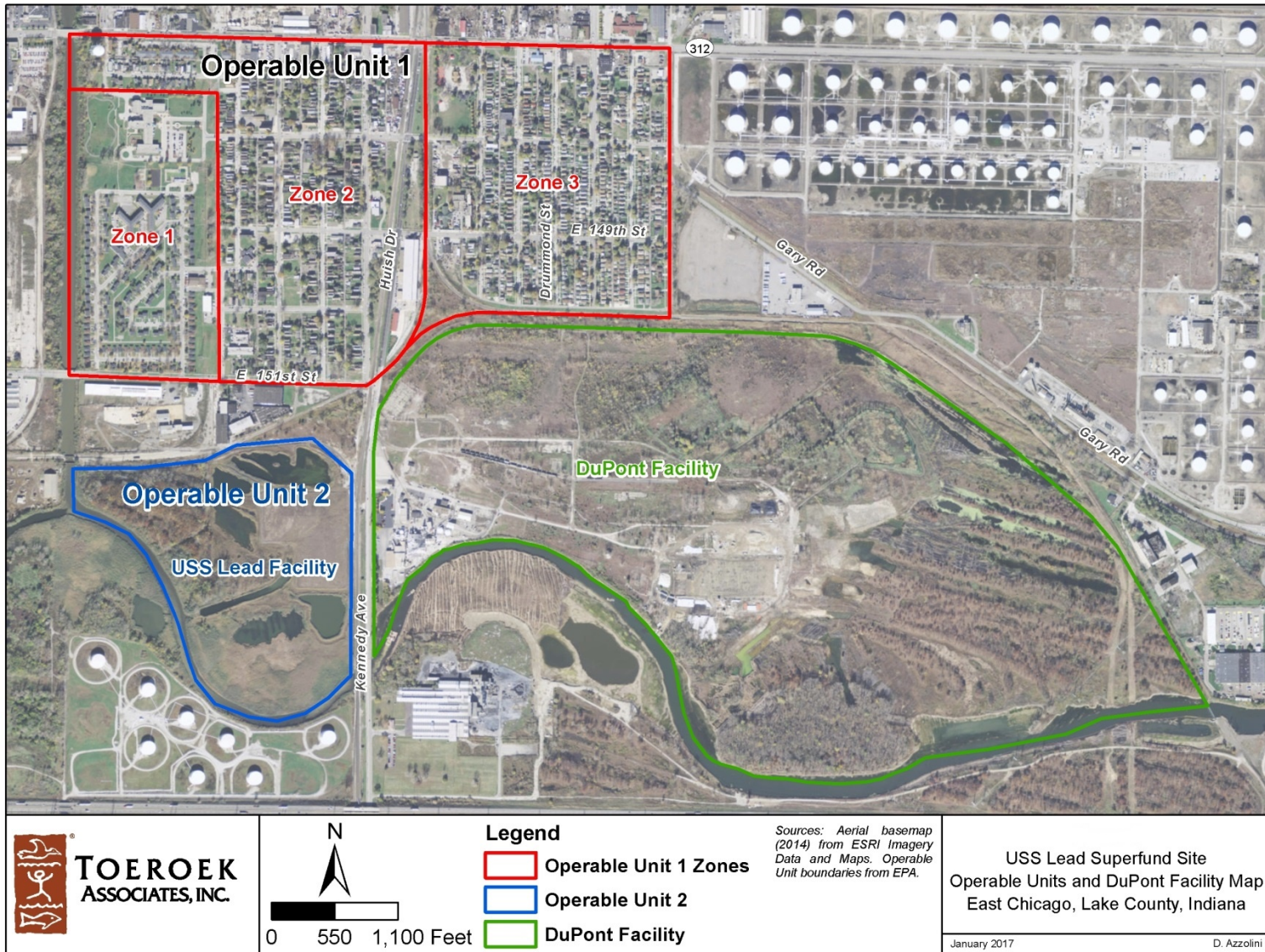
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# **APPENDIX A**

## **MAP OF USS LEAD SUPERFUND SITE**



**APPENDIX A: USS Lead Superfund Site Operable Units, Zones, and DuPont Facility**

## **APPENDIX B**

**TECHNICAL MEMORANDUM: FINAL COMPARISON  
OF ORIGINAL COST ESTIMATE AND CURRENT COST  
ESTIMATES FOR ZONES 2 AND 3 OF OU1**

**REMEDIAL ACTION CONTRACT 2  
REGION 5**

**TECHNICAL MEMORANDUM:**

**COMPARISON OF ORIGINAL AND CURRENT COST ESTIMATES  
FOR REMEDIAL ACTION IN ZONES 2 AND 3 OF OPERABLE UNIT 1**

**U.S. SMELTER AND LEAD RESIDENTIAL AREA SUPERFUND SITE  
EAST CHICAGO, LAKE COUNTY, INDIANA**

**Prepared for:  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
Region 5  
77 West Jackson Boulevard  
Chicago, IL 60604**

**Prepared by:  
SulTRAC**

Date Submitted:	December 4, 2017
EPA Region:	5
Work Assignment No:	327-TATA-0528
Contract No:	EP-S5-06-02
Prepared by:	SulTRAC
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## EXECUTIVE SUMMARY

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This technical memorandum was prepared to compare estimated costs to remediate all properties in Zones 2 and 3 at the USS Lead site as estimated in the 2012 Feasibility Study, with a current cost estimate based on current remedial designs. The 2012 FS costs were estimated based on limited sampling conducted during the remedial investigation and on then-assumed unit rates for conducting various remediation tasks. The current estimated costs are based on a much more precise estimate of the total number of properties that will require remediation and volumes of contaminated soils present at each property, based on remedial design sampling conducted from 2014 to 2017, and on updated cost assumptions for the unit rates for the various tasks. The 2012 FS estimated that remediating all contaminated properties in Zones 2 and 3 would cost approximately \$22.8 million. The current estimate to remediate all properties in Zones 2 and 3 is \$84.9 million.

The principal underlying causes for the disparity between costs estimated in 2012 and current estimates are differences in quantities of contaminated soils that need to be removed and replaced and differences in unit rates. Specifically:

- Estimated quantities of soils that require remediation have nearly doubled from 47,250 cubic yards estimated in the 2012 FS to a current estimate of 88,300 cubic yards.
- Estimated unit rates such as costs to excavate and backfill each cubic yard of soil have increased significantly from the FS to the current estimate based on more labor-intensive excavation, higher wages paid to laborers, and a higher level of oversight than assumed for the FS.
- The increased quantity of soils to be remediated increased construction management costs and required a longer duration of remediation and oversight.
- Contingency costs across all tasks increased with the increased volume of soil and higher unit rates.

## 1.0 INTRODUCTION

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SulTRAC received Work Assignment 327-TATA-0528 under Contract Number EP-S5-06-02 to compare estimated costs to remediate properties in Zones 2 and 3 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site (USS Lead Site or Site), East Chicago, Lake County, Indiana that were presented in the Feasibility Study (SulTRAC 2012a) with current estimates using updated quantities and unit rates based on RD sampling conducted to date and revised engineering estimates. The Feasibility Study compared estimated costs for three areas within Operable Unit 1 (OU1) for four different remedial alternatives considered (SulTRAC 2012a). This Technical Memorandum only considers costs associated with the selected alternative (Alternative 4A – Excavation of Soil Exceeding RALs + Off-Site Disposal + *Ex Situ* Treatment Option).

A total of eighty-eight properties were sampled during the RI in a rough grid pattern at a frequency of two to three properties per block to provide spatial coverage of the entire site. The FS and Record of Decision (ROD) (EPA 2012) for the site divided operable unit 1 (OU1) into the northwestern, southwestern, and eastern geographic areas, based on similar incidence and levels of contamination in these areas. In 2014, after the FS was completed, OU1 was divided into three different geographic areas designated as Zones 1, 2, and 3. In 2014, SulTRAC reallocated the costs for the three *areas* identified in the FS into costs



associated with the three *zones*. Estimated costs to remediate all properties within OU1 were simply divided into different geographical groups between the FS and 2014. Total estimated costs for the three *areas* identified in the FS are equal to total estimated costs for the three *zones* identified in 2014, except for rounding errors.

The ROD estimated total remediation costs of \$29.9 million for the northwestern, southwestern, and eastern areas. These same costs of \$29.8 million were reallocated to Zones 1, 2, and 3 in 2014. (The \$100,000 difference between the total estimated costs included in the ROD and the reallocated 2014 costs is due to rounding.) Because the remedial alternative for Zone 1 (the West Calumet Housing Complex) is currently being reviewed and possibly modified, this discussion is limited to Zones 2 and 3.

Based on the costs from the three areas presented in the ROD as reallocated to the three zones in 2014, a total cost of \$22.8 million was estimated to remediate Zones 2 (\$13.4 million) and Zone 3 (\$9.4 million) (Table 1). These costs will subsequently be called the “original” costs. Tables 2, 3, and 4 show the basis for the original cost estimates. Based on an original estimate of 512 properties that require remediation in Zones 2 and 3, a per property remediation cost of approximately \$44,500 per property was estimated.

This memorandum has been prepared to identify differences between the original estimated costs and current estimated costs to remediate properties in Zones 2 and 3, and to explain the basis for the differences. Major cost categories to remediate Zones 2 and 3 as originally estimated and as currently estimated are presented below.

**Cost Estimates to Remediate Zones 2 and 3  
 USS Lead Superfund Site  
 East Chicago, Indiana**

	2012 Feasibility Study	Current Cost Estimate	Cost difference
Pre-remedial design sampling	\$1,500,000	\$3,900,000	\$2,400,000
Remedy construction	\$15,000,000	\$59,400,000	\$44,400,000
Engineering and Construction Management	\$2,400,000	\$7,400,000	\$5,000,000
O&M	\$ 62,000	\$ 62,000	\$0
Contingency	\$3,800,000	\$14,100,000	\$10,300,000
<b>Total Estimated Cost</b>	<b>\$22,800,000</b>	<b>\$84,900,000</b>	<b>\$62,100,000</b>

Note: Individual costs do not sum to total costs due to rounding.

**2.0 BASIS FOR ORIGINAL COST ESTIMATE**

As part of the Feasibility Study, estimated costs to remediate properties under remedial alternative 4A were derived from the estimated number of yards to be remediated and various components of the remedy including (1) costs to sample and prepare remedial designs for each property, (2) costs to excavate contaminated soils, (3) costs to transport and dispose (T&D) of contaminated soils, (4) costs to backfill excavated areas, (5) costs to restore properties, (6) contractor oversight costs, (7) engineering and construction management, and so on.

RI sampling and RD sampling was based on “yards,” defined as individual remediation units that consisted of front or back yards at typical residential properties, quadrants at larger properties, and other individual

units such as side yards, gardens, and areas where soil was relocated. Sampling results from the RI showed little correlation in contamination in front yards, back yards, and quadrants at a single property. Consequently, remediation costs were estimated based on individual yards, rather than individual properties.

**Pre-remedial design sampling:** Anticipated costs to sample each property were estimated based on the number of properties to sample, and past experience sampling properties during the RI. Estimated analytical costs assumed that samples would be analyzed by CLP laboratories or X-ray fluorescence, and that a small number of samples would be submitted to a private laboratory for TCLP analyses. The original estimate assumed that approximately 14 hours per property would be required to secure access and collect five-point composite samples from all of the yards at a particular property. A pre-remedial design sampling cost of \$1.5 million was originally estimated.

**Remedy construction:** Remedy construction costs to remediate all properties in Zones 2 and 3 that were anticipated to require remediation were estimated by identifying each step in the remedial process, estimating unit rates and the number of units to execute that step, and summing the costs associated with each step to derive a total cost. Soil excavation costs, T&D costs, and backfill costs were based on the estimated volume of soil to be removed and replaced with clean fill, which was calculated using the estimated number of yards that would require remediation, the average size of the yards, and the percentage of yards that would require remediation to 6-, 12-, 18-, and 24-inches, based on sampling 88 of 1195 properties in Zones 1, 2, and 3 (7.4%) (see Tables 2 and 3).

The estimated volumes of soil and areas of each yard were multiplied by unit rates for various components of the remedy such as excavation of contaminated soils, backfill placement, topsoil placement, and restoration by seeding or installing sod over backfilled areas. Unit rates for each of the major components of the remedial process that were used for the original cost estimate are shown in Table 1. Descriptions of tasks included in each unit rate are detailed in Table 4. Unit rates presented originally were typically assigned based on engineering judgement or by project experience at other residential soil remediation sites such as the Jacobsville site in Evansville, Indiana.

Remedial contractor oversight costs were accounted for both as a subtask within “Remedy Construction” labeled “Contractors Oversight, Health and Safety, and Quality Control”, and as part of “Engineering and Construction Management”. Costs of \$35,000 per month for 22 months were estimated for Contractor's Oversight, Health & Safety, and Quality Control. Based on unit rates used, this corresponds with 2 personnel providing remedial contractor oversight.

A total remedy construction cost of approximately \$15 million was estimated to remediate all properties in Zones 2 and 3 based on estimated quantities derived from the RI sampling and estimated unit rates.

**Engineering and construction management:** Costs for preparing remedial designs, procuring a remedial contractor, onsite construction management, and reporting were estimated at a rate of \$35,000 per month plus 10% of construction cost for a total \$2.4 million. A total duration of 22 months was estimated to remediate an estimated 512 properties in Zone 2 and 3 with 2 more personnel providing remedial contractor oversight (these were in addition to the two oversight personnel providing oversight under the remedy construction task).

**Operations and maintenance:** A cost of \$62,000 was originally estimated to conduct unspecified operations and maintenance (O&M) and five-year remedy reviews in Zones 2 and 3.

**Contingency:** A contingency of 20% of anticipated sampling costs, remedy construction costs, engineering and construction management costs, oversight and reporting, and O&M costs was added to the project subtotal cost to cover contingencies. The estimated contingency cost amounted to \$3.8 million.

Based on the costs discussed above, a total project cost of \$22.8 million was originally estimated to remediate all Zone 2 and 3 properties.

### **3.0 CURRENT COST ESTIMATES**

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Current cost estimates are based on units, unit rates, and cost assumptions that were updated based on current pricing and much more extensive RD sampling. The current cost estimate presented in Table 1 incorporates both the currently estimated units (such as volume of soil to be remediated) and current unit rates (such as cost to excavate and backfill each cubic yard of soil) and are based on current remedial designs and current unit rates. Current unit rates were derived in small part from actual incurred costs but predominantly from the Engineer's Estimate of the most recent remedial design report (SulTRAC 2017).

Specifically, SulTRAC provides a detailed Engineer's Estimate with each group of remedial designs submitted to the EPA for the USS Lead Site. The most recent RD document (SulTRAC 2017) submitted to EPA in September of this year included remedial designs for 94 Zone 3 properties and, in Appendix E, it included total estimated costs to remediate those 94 properties. That "Engineer's Estimate" is attached to this technical memorandum as Appendix A.

From the Engineer's Estimate, the total costs and units (i.e. yards, cubic yards, square yards) to remediate 94 Zone 3 properties were used as a basis to develop the new unit rates used in this document. To simplify the comparison between the more detailed cost categories used in the Engineer's Estimate to the less detailed categories used in the original cost estimate, each cost category from the Engineer's Estimate was mapped to a cost category used in the original estimate as detailed in Table 4. For example, to derive the new unit rate for Contaminated Soil Excavation and Backfilling, total estimated costs for 6 categories from the Engineer's Estimate (Excavation [mechanical], Excavation [manual], Backfill Placement, Topsoil Placement, Gravel Placement, and Geotechnical Testing) were summed (\$4,883,711) and divided by the total cubic yardage being excavated from the 94 properties (10,362 yd<sup>3</sup>), to derive a new unit rate of \$471/yd<sup>3</sup> for Contaminated Soil Excavation and Backfilling. Current unit rates for all categories from the original cost estimate and their derivations are detailed in Table 4.

**Pre-remedial design sampling:** SulTRAC has sampled 966 properties in Zones 2 and 3 and has incurred actual costs of \$2.8 million to sample these properties. The actual sampling cost was derived by adding costs expended under the field investigation / data acquisition task (Task 3), sample analysis acquisition (Task 4), analytical support / data validation (Task 5), data management (Task 6), and project management (Task 1) of work assignments (WA) 198, 308, and 320 from May 2015 to the present. Through October 2017, SulTRAC has expended \$2.8 million including \$430,000 in travel costs, subcontractors, and other direct costs, and approximately \$2.4 million and 29,000 hours of labor to obtain access, sample, and manage resulting data for 966 properties in Zones 2 and 3 (approximately \$2,900 per property).

111 properties remain to be sampled, due to lack of access from the owner of record. Thirteen of these properties were not sampled because the property owner refused access. Assuming that SulTRAC samples the remaining 98 properties and incurs the same estimated cost per property to sample them, additional sampling costs of approximately \$282,000 are anticipated. Therefore, a total cost of approximately \$3.1 million is estimated to sample all properties in Zones 2 and 3.

Contract laboratory program (CLP) laboratory costs of approximately \$876,500 have been incurred to date, as reported by EPA on November 28. These actual laboratory costs have been included along with sampling costs to derive a total estimated pre-remedial design sampling cost of \$3.9 million in the current cost estimate.

**Remedy construction:** Remedy construction costs to remediate all properties in Zones 2 and 3 that are expected to require remediation are presented as “Current cost estimate” in Table 1. To date, SulTRAC has sampled approximately 966 of the 1,077 properties in Zones 2 and 3 (90%). The total number of properties in Zones 2 and 3 decreased from the original count of 1,153 to the current count of 1,064 for several reasons including combining adjacent parcels with common ownership into single properties, zoning changes, and not counting properties where the owners refused to allow sampling or remediation. Based on sampling conducted to date, 713 of the 966 properties sampled in Zones 2 and 3 (74%) are known to require remediation. If 74% of the 98 properties that have not yet been sampled also require remediation, 72 additional properties and a total of 785 properties in Zones 2 and 3 will require remediation.

Current estimated costs presented in Table 1 are based on (1) volumes of soil to be removed, which are known much more precisely based on RD sampling of 90% of properties in Zones 2 and 3 than the original costs, which were based on sampling only 7.4% of properties, and (2) current estimated unit rates, which are based on a much more detailed cost estimate prepared for a recent remedial design document (SulTRAC 2017).

Using the limited sampling conducted during the RI, SulTRAC estimated that approximately 47,250 cubic yards (CY) of soil in Zones 2 and 3 would require excavation, disposal, and replacement with clean fill. Based on the much more extensive sampling conducted during the remedial design (RD), SulTRAC now estimates that a total of 88,300 CY of soil in Zones 2 and 3 will require excavation, disposal, and replacement with clean fill, about double the original estimate. The 88,300 CY consists of approximately 69,700 CY of soil estimated for the 713 properties currently known to need remediation plus an estimated 18,600 CY of soil for the remaining 98 properties that have not yet been sampled. (Note: many of the properties that have not yet been sampled are commercial properties and railroad rights-of-way and therefore the average property size for these properties is considerably larger than the average size of the sampled properties.)

Treatment and disposal costs for the updated estimate are based on actual costs incurred of \$40 per ton, as reported by EPA on November 27. Remedial designs provide volume of soil to be excavated and disposed of, but disposal of this material is priced in tons. For the purposes of estimating costs here, volume is converted to weight using density of the material, which depends on variables such as water content, soil composition, and inclusion of foreign materials such as bricks, debris, and slag. A disposal cost of \$40 per ton and density conversion of 1.15 tons per cubic yard resulted in the disposal cost of \$46 per cubic yard used for this cost estimate.

Based on updated units and unit rates, the remedy construction task for all properties in Zones 2 and 3 is now estimated at \$59.4 million.

**Engineering and construction management:** The original engineering and construction management cost category included remedial design costs and as well as procurement, contractor oversight and reporting costs. Thus, we include estimates for these costs in the current estimate.

- **Remedial design costs:** To date, SulTRAC has prepared remedial designs for approximately 500 properties in Zones 2 and 3, at a cost of approximately \$380,000 (\$760 per remedial design). This estimated cost to prepare remedial designs was calculated by adding the costs incurred under the Pre-final/Final design task (Task 11) of WAs 198, 308, and 320 from May 2015 to the present. Assuming that a total of 785 remedial designs will need to be prepared at a cost of \$760 per remedial design, a total of approximately \$600,000 is estimated to prepare remedial designs for all properties in Zones 2 and 3 that may ultimately require remediation. These costs were included in engineering and construction management unit costs.
- **Procurement, contractor oversight and reporting costs:** The Engineer's Estimate for 94 Zone 3 properties (SulTRAC 2017) included estimated costs to procure a remedial contractor, provide remedial oversight, and prepare a remedial action report. As noted above, remedial oversight costs appear in two locations in the original cost estimate: as a "Contractor's Oversight, Health and Safety, and Quality Control" subtask included in the "Remedy Construction" task and separately in the "Engineering and Construction Management" task. SulTRAC assigned the Engineer's Estimate subtasks to the Contractor's Oversight task or the Remedy Construction task as shown in Table 4. Because the original construction management costs were estimated on a monthly rate, SulTRAC divided the Engineer's Estimate totals by the seven months expected to complete the 94-property remedial project to derive an equivalent monthly rate for the current cost estimate that could be compared to the original cost estimate. The total duration to complete remediation of all properties in Zones 2 and 3 is now expected to be 48 months. This duration was estimated by prorating the 14 months of work required in 2017 to remediate 229 Zone 2 and 3 properties (16.4 properties per month) to derive the 48-month period required to remediate all 785 properties that are expected to require remediation.

**Contingency:** A contingency cost of \$14.1 million is estimated for the project, based on 20% of the remedial design sampling costs, remedy construction costs, and oversight and reporting costs for Zones 2 and 3.

**Institutional controls and operations and maintenance costs:** Institutional controls and O&M costs are a relatively minor component of the total cost for the remedy and were not updated.

#### **4.0 COMPARISON OF ORIGINAL COST ESTIMATE WITH CURRENT COST ESTIMATE**

Based on the original cost estimate, which was prepared using the very limited RI sampling and estimated unit rates, and the current cost estimate, which is based on the much more detailed RD sampling and a much more detailed evaluation of unit rates using updated material, equipment, and labor costs, a cost difference of \$62.1 million was identified. The basis for this cost difference is detailed below:

**Pre-remedial design sampling:** Estimated costs to conduct pre-design sampling have increased by approximately \$2.4 million between the original and current estimates, as shown in Table 1. The original estimate assumed a cost of \$1,315 to sample each property, for a total cost of \$1.5 million to sample all properties in Zones 2 and 3. A cost of \$3.9 million is now estimated to sample all properties in Zones 2 and 3 as described under pre-remedial design in Section 3.

Increases in sampling and analysis costs from the original estimate were caused by several factors, including:

- **Sampling deeper than originally assumed:** The original estimate assumed that sampling would cease when zones of refusal were encountered; In fact, sampling at the majority of properties was advanced to 2.5 feet below ground surface using the much more labor-intensive pry bars, pick axes, and in some cases, a subcontracted mechanical excavation contractor.
- **Use of contract laboratory program (CLP) laboratories instead of X-ray fluorescence (XRF) field instruments to measure lead and arsenic content of soil samples from Zone 2:** To achieve more rapid turn-around time for individual samples so that work in Zone 2 could begin together with work in Zone 3, and to avoid delays associated with generating a complete data set to create an XRF correction factor, SulTRAC sent all samples from Zone 2 and selected samples from Zone 3 to CLP laboratories for analysis, at costs of \$790,000 and \$86,500, respectively. CLP laboratory costs were not included in the FS cost estimate.
- **Use of private laboratories and third-party data validators:** To achieve more rapid analytical turn-around time, SulTRAC sent selected samples to a private laboratory. SulTRAC incurred costs of approximately \$92,000 to analyze samples and validate data that was not included in the original cost estimate.
- **Data management:** To make data available to the various stakeholders in the project, SulTRAC conducted intensive data management activities, including entering all field data in field tablet computers, the SCRIBE database, and a Geoportal and producing numerous graphics.

**Remedy Construction:** Estimated costs for remedy construction have increased by approximately \$44.4 million between the original and current estimates, as shown in Table 1. These differences are driven primarily by a difference in the estimated volume of soil to be remediated and the increased unit rates for soil excavation and backfill.

The differences between original and current estimates of soil volumes that require remediation are shown in Table 3. Using the limited sampling conducted during the RI, SulTRAC originally estimated that approximately 47,250 cubic yards (CY) of soil in Zones 2 and 3 would require excavation, disposal, and replacement with clean fill. Based on the much more extensive sampling conducted during the remedial design (RD), SulTRAC now estimates that a total of 88,300 CY of soil in Zones 2 and 3 will require excavation, disposal, and replacement with clean fill, about double the original estimate.

The primary reasons for the increase in estimated soil volume are that the average estimated size of the yards to be remediated has increased, the estimated number properties requiring remediation has increased, and the estimated depth of required remediation at these properties has increased from the original estimates.

- **Average size of yards:** As shown in Table 2, the average yard sizes originally used to estimate costs were smaller than the current estimated excavation areas used for the current estimated costs. The properties sampled during the Remedial Investigation were selected to achieve an even spatial distribution of properties throughout OU1 rather than on anticipated contaminant concentrations or the size of the property. For the original estimate, only those properties that were sampled were considered when estimating the average yard size.

Average yard size for residential properties increased from 1,254 ft<sup>2</sup> to 1,406 ft<sup>2</sup> in Zone 2 and from 900 ft<sup>2</sup> to 1,512 ft<sup>2</sup> in Zone 3. The increase in yard size between the original and current estimates was caused by using a much larger sample size (90% of properties sampled for current estimate vs. 7.4% of properties sampled used for original estimate) and to some degree by combining adjacent parcels with common ownership into single properties for the RD.

Yard size estimates for commercial properties used in the original estimate were biased low because some larger properties (including utility corridors and commercial properties) were not considered during the Feasibility Study, although this effect was mitigated to some extent by including the parks that were sampled.

- **Number properties requiring remediation:** The estimated number of Zone 2 and Zone 3 properties requiring remediation increased from 512 to 785 (494 in Zone 2 and 291 in Zone 3). This increase was caused by a higher incidence of contamination detected during the more comprehensive sampling of the RD (90% of properties) than the RI (7.4% of properties).
- **Depth of required remediation:** The original estimate assumed that a small percentage of the properties would require remediation to deeper soil intervals. For example, it was originally assumed that 4% of the residential properties in Zone 2 and 3% of the residential properties in Zone 3 would require remediation to 24-inches. Based on the much more extensive RD sampling, SulTRAC now estimates that 17% of the residential properties in Zone 2 and 14% of the residential properties in Zone 3 will require remediation to 24-inches (see Table 3).
- **Unit rates:** The estimated unit rates for activities such as preconstruction activities, excavation and backfill, and oversight have increased significantly between the FS and current estimates. Causes for this increase include:
  - Labor costs from 2012 were updated based on 2017 prevailing wage requirements (original labor costs were not based on prevailing wages);
  - Changes in material and equipment costs from 2012 to 2017;
  - Inclusion of manual excavation that was not considered in the formulation of the original cost estimate;
  - The original oversight costs assumed four persons would provide oversight (split between construction management and remedy construction), current estimates assume that a team of seven persons will provide remedial construction oversight.

**Engineering and construction management:** Estimated engineering and construction management costs have increased by approximately \$5.0 million between the original and current estimates, as shown in Table 1. Estimated engineering and construction management costs are based on 10% of estimated remedy

construction costs, plus an estimated duration of the project multiplied by a monthly construction oversight cost. Most of the cost difference between the original and the current estimate is the result of the increased remedy construction cost. The expected increase in project duration from 22 months to 48 months accounts for about \$140,000 of the cost difference.

## **5.0 SUMMARY**

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The disparity between the original cost estimate and the current estimate is accounted for primarily by a difference in quantities of contaminated soils that need to be removed and replaced and differences in unit rates. The principal underlying causes that have increased costs are:

- Estimated volumes of soils that require remediation have increased substantially. The original excavation volume was based on a small sample size of 7.4% of properties and the current estimate is based on much more robust RD soil sampling of 90% of properties in Zones 2 and 3. The RD sampling has shown that more yards require remediation than were originally estimated, and the contaminated intervals are larger and deeper than anticipated.
- Estimated unit rates such as costs to excavate and backfill each cubic yard of soil have increased significantly based on higher wages paid to laborers, a higher level of oversight, and manual excavation that was not considered originally.
- The increased quantity of soils to be remediated increased construction management costs and also required a longer duration of remediation and oversight.
- Contingency costs across all tasks increased with the increased volume of soil and higher unit rates.



## **6.0 REFERENCES**

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SulTRAC 2012a. “Feasibility Study, US Smelter and Lead Refinery Superfund Site, Lake County, Indiana.” June 20.

SulTRAC 2012b. “Remedial Investigation Report, U.S. Smelter and Lead Refinery Superfund Site, Lake County, Indiana.” June 20.

SulTRAC 2017. “Draft Remedial Design for 94 Zone 3 Properties, U.S. Smelter and Lead Residential Area Superfund Site East Chicago, Lake County, Indiana.” September.

U.S. EPA 2012. “U.S. Smelter and Lead Refinery, Inc. Superfund Site, Operable Unit 1, East Chicago, Lake County, Indiana, Record of Decision.” November.

Table 1  
Original Cost Estimate vs Current Cost Estimate  
USS Lead  
East Chicago, Indiana

Estimate Category	Units	Unit Rates	Unit Rates	Number of Units			Number of Units			Difference <sup>2</sup>	Original Cost Estimate			Current Cost Estimate			Difference <sup>3</sup>	
		2012 FS	Current <sup>1</sup>	Original cost estimate	Current cost estimate	Difference	Zone 2	Zone 3	Total		Zone 2	Zone 3	Total	Zone 2	Zone 3	Total		
<b>PRE-REMEDIAL DESIGN SAMPLING</b>																		
Sample Collection Labor & Other Direct Costs	Total Properties * Rate	Total Properties	\$1,315	\$2,873	639	514	1,153	594	470	1,064	(89)	\$840,700	\$676,000	\$1,516,700	\$1,706,562	\$1,350,310	\$3,056,872	\$1,540,172
Contract laboratory program (CLP) laboratory costs <sup>4</sup>		Lump sum													\$790,000	\$86,500	\$876,500	\$876,500
<b>Pre-remedial Design subtotal</b>												<b>\$841,000</b>	<b>\$676,000</b>	<b>\$1,500,000</b>	<b>\$2,500,000</b>	<b>\$1,400,000</b>	<b>\$3,900,000</b>	<b>\$2,400,000</b>
<b>REMEDY CONSTRUCTION</b>																		
Preconstruction Activities <sup>5</sup>	Yards Requiring Remediation * Rate + Flat Cost of \$144,000 per Zone	Unremediated Yards	\$83	\$1,530	626	479	1,105	991	479	1,470	365	\$196,000	\$180,000	\$376,000	\$1,516,834	\$732,385	\$2,249,219	\$1,873,219
Site Preparation and Design Agreements	Estimated Total Area * Rate	Total Area (sq yd)	\$7.50	\$5.59	96,698	66,796	163,494	163,050	99,813	262,862	99,369	\$730,000	\$500,000	\$1,230,000	\$911,447	\$557,953	\$1,469,400	\$239,400
Institutional Controls	\$5,000 Lump Sum Per Zone	Zones	\$5,000	\$5,000	1	1	2	1	1	2	-	\$5,000	\$5,000	\$10,000	\$5,000	\$5,000	\$10,000	\$0
Contaminated Soil Excavation and Backfilling	Estimated Total Volume * Rate	Total Volume (cu yd)	\$115	\$471	28,093	19,157	47,250	55,647	32,642	88,288	41,038	\$3,231,000	\$2,203,000	\$5,434,000	\$26,209,547	\$15,374,272	\$41,583,819	\$36,149,819
Contaminated Soil Transportation and Disposal	Estimated Total Volume * Rate	Volume (cu yd)	\$79	\$46	28,093	19,157	47,250	55,647	32,642	88,288	41,038	\$2,219,000	\$1,513,000	\$3,732,000	\$2,559,743	\$1,501,521	\$4,061,265	\$329,265
Soil Barrier for Soil Below 24 inches		Total Area (sq yd)		\$1.35				34,240	20,961	55,201		\$2,000	\$1,000	\$3,000	\$46,225	\$28,297	\$74,521	\$71,521
Property Restoration	Estimated Total Area * Rate	Total Area (sq yd)	\$21	\$15	96,698	66,796	163,494	163,050	99,813	262,862	99,369	\$2,036,000	\$1,407,000	\$3,443,000	\$2,445,745	\$1,497,190	\$3,942,934	\$499,934
Contractor's Oversight, Health & Safety, Quality Control	Duration in Each Zone * Rate	Months	\$35,000	\$125,407	13	9	22	31	17	48	26	\$455,000	\$315,000	\$770,000	\$3,887,617	\$2,131,919	\$6,019,536	\$5,249,536
<b>Construction Subtotal</b>												<b>\$8,900,000</b>	<b>\$6,100,000</b>	<b>\$15,000,000</b>	<b>\$37,600,000</b>	<b>\$21,800,000</b>	<b>\$59,400,000</b>	<b>\$44,400,000</b>
<b>ENGINEERING &amp; CONSTRUCTION MANAGEMENT</b>	Duration in Each Zone * Rate + 10% of Construction Subtotal + \$760 per design	Months	\$35,000	\$18,993	13	9	22	31	17	48	26	\$1,435,000	\$995,000	\$2,430,000	\$4,681,420	\$2,701,785	\$7,383,205	\$4,953,205
<b>OPERATIONS AND MAINTENANCE</b>																		
<b>Project Subtotal</b>												<b>\$11,200,000</b>	<b>\$7,800,000</b>	<b>\$19,000,000</b>	<b>\$44,800,000</b>	<b>\$26,000,000</b>	<b>\$70,800,000</b>	<b>\$51,800,000</b>
20% Contingency	20% of Project Subtotal											\$2,240,000	\$1,560,000	\$3,800,000	\$8,960,000	\$5,200,000	\$14,160,000	\$10,360,000
<b>Project Total</b>												<b>\$13,400,000</b>	<b>\$9,400,000</b>	<b>\$22,800,000</b>	<b>\$53,800,000</b>	<b>\$31,200,000</b>	<b>\$84,900,000</b>	<b>\$62,100,000</b>

<sup>1</sup> - All values are taken from the last column in Table 4

<sup>2</sup> - Difference in number of units between original and current estimates

<sup>3</sup> - Cost difference between original and current estimate

<sup>4</sup> - Contract laboratory costs were not included in original estimate, current cost estimate includes actual costs for CLP analytical services and data validation

<sup>5</sup> - Preconstruction activities: A flat cost of \$144,000 for mobilization and project plans used in original estimate was not prorated to per property unit rate

Note: Values in this table have been rounded

Table 2  
Remedial Soil Areas and Volumes Based on Depth  
USS Lead  
East Chicago, Indiana

**Original Estimate**

	Number of Yards	Property type	% Yards Requiring Remediation	Yards Requiring Remediation	Properties Requiring Remediation	Average Excavation Area per Yard (sq ft)	Total area requiring remediation (sq ft)	Total area by property type (sq ft)	Total volume by property type (cu yd)
<b>Zone 2</b>									
Residential	1,154	Residential	53%	612	306	1,254	767,448	767,448	24,332
Park/school/church	28	Commercial	50%	14	4	7,345	102,830	102,830	3,761
Industrial/commercial/easement	220		0%	-	-	984	-		
<i>Zone total</i>	<b>1,402</b>			<b>626</b>	<b>310</b>		<b>870,278</b>		<b>28,093</b>
<b>Zone 3</b>									
Residential	974	Residential	41%	399	182	900	359,100	359,100	11,104
Park/school/church	12	Commercial	67%	8	2	10,026	80,208	242,064	8,053
Industrial/commercial/easement	96		75%	72	18	2,248	161,856		
<i>Zone total</i>	<b>1,082</b>			<b>479</b>	<b>202</b>		<b>601,164</b>		<b>19,157</b>
<b>TOTAL</b>	<b>2,484</b>			<b>1,105</b>	<b>512</b>		<b>1,471,442</b>		<b>47,250</b>

**Current Estimate**

	Number of Yards	Property type	% Yards Requiring Remediation	Yards Requiring Remediation	Properties Requiring Remediation	Average Excavation Area per Yard (sq ft)	Total area requiring remediation (sq ft)	Total area by property type (sq ft)	Total volume by property type (cu yd)
<b>Zone 2</b>									
Residential	1,366	Residential	68%	934	465	1,406	1,246,167	1,304,630	47,280
Park/school/church	72		40%	29	13	2,644	58,463		
Industrial/commercial/easement	120	Commercial	24%	29	16	4,367	162,816	162,816	8,367
<i>Zone total</i>	<b>1,558</b>			<b>991</b>	<b>494</b>		<b>1,467,447</b>		<b>55,647</b>
<b>Zone 3</b>									
Residential	948	Residential	46%	434	272	1,512	644,691	679,463	23,440
Park/school/church	13		38%	5	2	18,588	34,772		
Industrial/commercial/easement	109	Commercial	36%	39	17	5,276	218,850	218,850	9,202
<i>Zone total</i>	<b>1,070</b>			<b>479</b>	<b>291</b>		<b>898,314</b>		<b>32,642</b>
<b>TOTAL</b>	<b>2,628</b>			<b>1,470</b>	<b>785</b>		<b>2,365,760</b>		<b>88,288</b>

\*Totals may not reflect counts due to rounding

Table 3  
Removal Volume Estimates Based on Depth of Impacted Soil  
USS Lead  
East Chicago, Indiana

**Original Estimate**

	Total Area Requiring Remediation (sq ft)	Percent RAL Exceedances 0-6"	Volume 0-6 inches (cu yd)	Percent RAL Exceedances 0-12"	Volume 0-12 inches (cu yd)	Percent RAL Exceedances 0-18"	Volume 0-18 inches (cu yd)	Percent RAL Exceedances 0-24"	Volume 0-24 inches (cu yd)	Total Volume (cu yd)
<b>Zone 2</b>										
Residential	767,448	42%	5,898	49%	13,786	6%	2,430	4%	2,218	24,332
Park/school/church	102,830	31%	590	50%	1,910	10%	577	9%	684	3,761
Industrial/commercial/easement	-	0%	-	0%	-	0%	-	0%	-	-
<i>Zone Total</i>	<i>870,278</i>									<i>28,093</i>
<b>Zone 3</b>										
Residential	359,100	44%	2,925	48%	6,384	5%	998	3%	798	11,104
Park/school/church	80,208	36%	538	53%	1,579	6%	258	5%	285	2,660
Industrial/commercial/easement	161,856	35%	1,052	54%	3,240	7%	621	4%	480	5,393
<i>Zone Total</i>	<i>601,164</i>									<i>19,157</i>
<b>TOTAL</b>	<b>1,471,442</b>									<b>47,251</b>

**Current Estimate**

	Total Area Requiring Remediation (sq ft)	Percent RAL Exceedances 0-6"	Volume 0-6 inches (cu yd)	Percent RAL Exceedances 0-12"	Volume 0-12 inches (cu yd)	Percent RAL Exceedances 0-18"	Volume 0-18 inches (cu yd)	Percent RAL Exceedances 0-24"	Volume 0-24 inches (cu yd)	Total Volume (cu yd)
<b>Zone 2</b>										
Residential	1,246,167	36%	6,781	30%	12,606	17%	10,408	17%	15,082	44,878
Park/school/church	58,463	18%	122	24%	495	41%	1,134	18%	651	2,402
Industrial/commercial/easement	162,816	13%	280	13%	1,490	35%	2,271	39%	4,326	8,367
<i>Zone Total</i>	<i>1,467,447</i>									<i>55,647</i>
<b>Zone 3</b>										
Residential	644,691	34%	3,770	34%	7,056	18%	5,309	14%	6,723	22,858
Park/school/church	34,772	80%	529	20%	53	0%	-	0%	-	582
Industrial/commercial/easement	218,850	38%	1,292	38%	2,610	8%	1,126	15%	4,173	9,202
<i>Zone Total</i>	<i>898,314</i>									<i>32,642</i>
<b>TOTAL</b>	<b>2,365,760</b>									<b>88,288</b>

\*Totals may not reflect counts due to rounding

Table 4  
2012 FS and 2017 RD Cost Estimate Unit Rate Comparison  
USS Lead Site  
East Chicago, Indiana

2012 Feasibility Study Cost Estimate Unit Rates			94 Zone 3 Properties Remedial Design Cost Estimate				Current Rates <sup>1</sup>
Category	Description	Unit Rates	Category	Total Cost	Lumped Total Cost	Units	
<b>PRE-REMEDIAL DESIGN SAMPLING</b>							
Sample Labor	Labor for sampling and access agreements. Assumes access agreements needed for all properties.	\$1,134 per property	Sample labor and ODCs <sup>2</sup>	NA	NA	NA	\$2,873/property <sup>2</sup>
ODCs	CLP/TCLP samples and equipment transportation	\$181 per property					
<b>REMEDY CONSTRUCTION</b>							
Preconstruction Activities	Mobilization & Demobilization, preconstruction Plans, Coordination with residents	\$144,000 + \$83/yard	Mobilization	\$292,530	\$313,710	205 yards in 94 properties	\$1,530/yard
			Demobilization	\$21,180			
Site Preparation and Access	Erosion control, utility locates, site prep, and documentation of yard conditions (including agreements with residents)	\$7.5/sq. yd.	Pre-construction Assessment	\$147,470	\$147,470	26,391 sq yd	\$5.59/sq. yd.
Institutional Controls	Institutional Control Monitoring Plan (not dependent on number of ICs)	\$5,000/zone	NA	NA	NA	NA	-
Contaminated Soil Excavation and Backfilling	Excavation of impacted soil, backfill with clean soil, and topsoil	\$115/cu. yd.	Excavation (Mechanical)	\$2,329,558	\$4,883,711	9,621 cu yd mechanical + 741 cy yd manual = 10,362 cu yd	\$471/cu. yd.
			Excavation (Manual)	\$411,098			
			Backfill Placement	\$876,681			
			Topsoil Placement	\$924,889			
			Gravel Placement	\$204,884			
			Geotechnical Testing	\$136,600			
Contaminated Soil Transportation and Disposal	Transportation & Disposal for haz and non-haz	\$79/cu. yd.	Contaminated Soil Transportation and Disposal <sup>2</sup>	NA	NA	NA	\$46/cu. yd. <sup>3</sup>
Soil Cover	Visible barrier for small percentage of properties with impacted soil below 24" (snow fence)	\$4,000/site	High Visibility Barrier	\$7,597	\$7,597	5,627 sq yd	\$1.35/sq. yd.
Property Restoration	Restoration of grass and any removed plantings	\$21/sq. yd.	Mulch Placement	\$15,704	\$402,823	26,391 sq yd	\$15/sq. yd.
			Sod Placement	\$146,639			
			Seed Placement	\$0			
			Watering	\$87,850			
			Trees	\$2,372			
			Shrubs	\$22,650			
			Stumps	\$7,924			
			Miscellaneous Landscaping	\$15,604			
			Property Close-Out	\$104,080			
Contractor's Oversight, Health & Safety, Quality Control	22 mo @ 35000/mo.	\$35,000/mo.	Office rental expense	\$21,600	\$877,850	7 months	\$125,407/mo.
			Field Startup activities	\$16,400			
			Remediation Oversight	\$768,600			
			Air Sampling	\$52,250			
			Soil Sampling	\$19,000			
<b>ENGINEERING &amp; CONSTRUCTION MANAGEMENT</b>	Onsite construction Quality Assurance plus design, procurement, construction management, and reporting	\$35,000/mo. + 10% const subtotal	Procurement	\$33,250	\$132,950	7 months	\$18,993/mo. + 10% const subtotal +
			Plan generation	\$22,500			
			Plan review	\$10,800			
			Community relations	\$7,950			
			Close out activities	\$58,450			
			Remedial Design <sup>2</sup>	NA			
<b>OPERATIONS AND MAINTENANCE</b>	Cost of 3 5-year reviews prorated across the three zones	Flat rates					Flat rates

<sup>1</sup> - Except for the three unit costs highlighted in pale green, the rates in this column are derived from the "Engineer's Estimate of Remediation Costs" attached to SulTRAC's September 2017 Remedial Design Document. The Engineer's Estimate of Remediation Costs is attached to this Technical Memorandum as Appendix A.

<sup>2</sup> - Pre-remedial design sampling costs were prorated based on actual incurred costs of approximately \$2.8 million to sample 966 properties, as described in Section 3.0

**APPENDIX A**

**ENGINEER'S COST ESTIMATE**

**Originally included as Appendix E in**

***SulTRAC 2017. "Draft Remedial Design for 94 Zone 3 Properties, U.S. Smelter and Lead Residential Area Superfund Site East Chicago, Lake County, Indiana" September 29.***

## **DESCRIPTION OF ENGINEER'S ESTIMATE OF REMEDIATION COSTS**

**SUBJECT:** Engineer's Estimate of Remediation Costs for 94 Properties in Zone 3 of Operable Unit 1 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site

**FROM:** Rik Lantz, SulTRAC Project Manager

**TO:** Sarah Rolfes / Tim Drexler  
Remedial Project Managers  
EPA Region 5

**DATE:** 12/4/2017

The attached Engineer's Estimate of Remediation Costs describes SulTRAC's estimate for remediating 94 properties in Zone 3 of Operable Unit 1 of the U.S. Smelter and Lead Refinery, Inc. Superfund Site.

This Engineer's Estimate was prepared by Chris Ore, P.E. in September 2017, and was originally provided to EPA on September 29, 2017 as Appendix E to a set of 94 draft remedial designs for Zone 3 properties. It is the most up-to-date cost estimate we have prepared. It is included separately here because unit rate cost estimates from this Engineer's Estimate have been used in the *Technical Memorandum: Comparison of Original Cost Estimates and Current Cost Estimates for Zones 2 and 3 of OUI*.

The attached Engineer's Estimate was prepared consistent with the Statement of Work for Remedial Design (OU1) dated January 28, 2016.



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Rik Lantz, P.G., LEED-AP  
Project Manager  
SulTRAC

## Engineer's Estimate of Remediation Costs

The costs for remediation of 94 properties (including excavation and transportation, restoration, and oversight) within USS Lead Zone 3 was estimated as \$6,770,000. Based upon discussion with EPA this estimate assumes, oversight of the remediation will be performed by a primary contractor, and the remediation activity will be performed by a subcontractor. Costs were estimated using applicable Davis Bacon wages and SulTRAC's experience with similar remediation projects.

This cost estimate has been prepared in accordance with the Statement of Work for Remedial Design (OU1) dated January 28, 2016. Assumptions have been made regarding the number of remediation crews and site workers, rate of production, and labor costs. Actual costs may vary from this cost estimate due to these or other factors. A detailed breakdown of the estimated costs, including descriptions of assumptions, is attached.



Subcontractor Costs

Bid Item	Unit	Unit Price	Est. Qty	Extended Price
1 Mobilization	each	\$292,530	1	\$292,530
2 Pre-construction Assessment	each	\$1,569	94	\$147,470
3 Excavation (Mechanical)	yds <sup>3</sup>	\$242	9,621	\$2,329,558
4 Excavation (Manual)	yds <sup>3</sup>	\$555	741	\$411,098
5 Backfill Placement	yds <sup>3</sup>	\$304	2,888	\$876,681
6 Topsoil Placement	yds <sup>3</sup>	\$228	4,064	\$924,889
7 Gravel Placement	yds <sup>3</sup>	\$60	3407.4	204884
8 Mulch Placement	yds <sup>3</sup>	\$196	80	\$15,704
9 Geotechnical Testing	each	\$332	266	\$136,600
10 High Visibility Barrier	ft <sup>2</sup>	\$0.15	50645.2	7596.78
11 Sod Placement	ft <sup>2</sup>	\$0.61	242,277	\$146,639
12 Seed Placement	ft <sup>2</sup>	0	0	0
13 Watering	each	\$935	94	\$87,850
14 Trees	each	\$791	12	\$2,372
15 Shrubs	each	\$139	125	\$22,650
16 Stumps	each	\$1,132	17	\$7,924
17 Miscellaneous Landscaping	each	\$166	94	\$15,604
18 Property Close-Out	each	\$1,107	94	\$104,080
19 Demobilization	each	\$21,180	1	\$21,180
Total Subcontractor Cost				\$5,755,311

Oversight Contractor Costs

Procurement	\$33,250
Plan Generation	\$22,500
Plan Review	\$10,800
Community Relations	\$7,950
Office Rental Expense	\$21,600
Field Startup Activities	\$16,400
Remediation Oversight	\$768,600
Air Sampling	\$52,250
Soil Sampling	\$19,000
Close-Out Activities	\$58,450
Total Oversight Costs	\$1,010,800

Subcontractor Costs	\$5,755,311
Contractor Costs	\$1,010,800
Total Costs	\$6,766,111

SubContractor Assumptions and Calculations

Davis Bacon Wages, Lake County, Heavy Category

Personnel	Group	Hourly Base Rate	Fringe	Employee Hourly Rate <sup>1</sup>	Sub. Hourly Rate <sup>2</sup>	Overtime Base Rate	Fringe	Employee Overtime Rate <sup>1</sup>	Sub. Overtime Rate <sup>2</sup>
Operator	1	\$40.50	\$32.00	\$72.50	\$91	\$60.75	\$32.00	\$92.75	\$116
Laborer	1	\$30.24	\$15.63	\$45.87	\$58	\$45.36	\$15.63	\$60.99	\$77
Driver	1	\$32.29	\$24.38	\$56.67	\$71	\$48.44	\$24.38	\$72.82	\$91

Notes:

- 1) DBA wages paid to the employee. General Decision Number: IN170001 09/08/2017 IN1
- 2) Marked up subcontractor hourly rate (Assumed factor of ~1.25)

Non Davis Bacon Personnel                      Hourly Rate (loaded)

Program Manager	\$120.00	Personnel are assumed to be exempt employees and paid straight time for hours over 40/week
Project Manager	\$110.00	
Foreman	\$90.00	
Quality Control Manager (QCM)	\$80.00	
Health & Safety Officer (HSO)	\$80.00	
Agreement Coordinator	\$65.00	
Office Support	\$60.00	

94 Properties to be Remediated

111.4 cubic yards average volume soil per property

740.57 manual excavation cubic yards

5 excavation, 3 backfill crews total

9620.95 mechanical excavation cubic yards

1700 cubic yards per month - approximate excavation rate of Jacobsville remediation contractor utilizing average of 4 excavation crews and five 10 hour days

2200 cubic yards per month assumed USS Lead with shorter transportation time and extra crew

21 assumed weeks to complete remediation of 93 USS Lead Zone 3 properties (5.25 months)

7 months total project duration including mobilization/setup and project close-out, estimated April through October

**1 - Mobilization**

Prepare Plans: Site specific plans include work plan, sampling and analysis plan, health and safety plan, transportation plan, environmental protection plan, and quality control plan

Staff	Hours	Cost
Program Manager	20	\$2,400
Project Manager	60	\$6,600
Foreman	80	\$7,200
Quality Control Manager	40	\$3,200
Health & Safety Officer	40	\$3,200
Office Support	160	\$9,600
<b>Total Labor</b>	<b>400</b>	<b>\$32,200</b>
<b>Plan Reproduction &amp; Shipping Costs</b>		<b>\$1,000</b>
<b>Total Plan Generation Costs</b>		<b>\$33,200</b>

**1 - Mobilization (Continued)**

Rental Items	Unit Price	Units	Total
Office Trailer <sup>1</sup>	\$1,800	7 months	\$12,600
Trailer Delivery	\$4,500	1 lump sum	\$4,500
Utility Connection	\$3,500	1 lump sum	\$3,500
Electric Service	\$400	7 months	\$2,800
Internet Service	\$100	7 months	\$700
Chain Link Fence <sup>2</sup>	\$2,700	7 months	\$18,900
Fence Setup	\$500	1 lump sum	\$500
Conex Box <sup>3</sup>	\$600	7 months	\$4,200
Conex Delivery	\$300	1 lump sum	\$300
Portable Toilets <sup>4</sup>	\$1,600	7 months	\$11,200
Project Signage	\$1,000	1 lump sum	\$1,000
Drinking Water	\$200	7 months	\$1,400
Office Supplies	\$250	7 months	\$1,750
Office Furniture	\$250	7 months	\$1,750
<b>Total Cost</b>			<b>\$65,100</b>

Notes:

No cost is anticipated for usage of lot for trailer placement (McCook and 149th) or material staging area (Chemours). Equipment will be stored at one of these locations with overnight security.

- 1) Assumes 3 office trailers (based on previous setup at McCook & 149th) at \$600/mo each  
Assumes rental of 1,000 ft of chain-link security fence, around trailer & equipment yard. Dimensions: 6 ft
- 2) H x 12 ft L panels and 2 gates
- 3) Assumes 2 Connex boxes at \$300/each/month
- 4) Assumes 6 portable toilets and two hand-wash stations at \$200/each/month

A group of key personnel are anticipated to mobilize to the site one week prior to the start of excavation activity to perform office and staging area setup tasks.

**Office and Staging Area Setup, Equipment Mobilization**

Personnel	#	Hourly Rate	Hours	Total
PM	1	\$110	20	\$2,200
Foreman	1	\$90	40	\$3,600
Operator	1	\$91	40	\$3,640
Laborer	2	\$58	40	\$4,640
Delivery Charges	Delivery		Total	
Excavator	5	\$150	Each	\$750
Skidsteer	4	\$150	Each	\$600
Dump Truck	18	\$150	Each	\$2,700
			<b>Total</b>	<b>\$18,130</b>

**1 - Mobilization (Continued)**

Site Security During Non-Working Hours

Security presence is anticipated during non-working hours for the full duration of temporary office usage (April to October). Security personnel are anticipated to rotate and not be subject to overtime pay. Subcontractor staff are anticipated to work M-F schedule, and will not be present on weekends.

Security Costs	Hourly Rate	Hours Onsite	Days Onsite	Cost
Weekdays	\$50	14	147	\$102,900
Weekends	\$50	24	58	\$69,600
Holidays	\$50	24	3	\$3,600
<b>Total Cost</b>				<b>\$176,100</b>

Total Mobilization Costs	
Plans	\$33,200
Rentals	\$65,100
Delivery / Setup	\$18,130
Security	\$176,100
<b>Total</b>	<b>\$292,530</b>

**2 - Pre-Construction Property Assessment and Property Owner Agreement**

One agreement coordinator will work to complete restoration agreements with property owners and document pre-existing conditions after plan approval beginning two weeks prior to the start of excavation activity. Restoration agreement meetings will continue until all agreements are signed. Agreement coordinator will assist in resolving property owner and resident issues that arise during remediation, and will provide pre-excavation photos to restoration crews. The agreement coordinator will have a company or rental vehicle (14 weeks)

One office support personnel will assist the agreement coordinator with documentation management. Support related to other tasks will also be provided to project manager and/or superintendent, including utility notification, payroll, invoicing, etc. (14 weeks)

Pre-Construction Property Assessment Costs				
Personnel	Hourly Rate	Hours per week	Total Weeks	Cost
Agreement Coordinator	\$65	50	14	\$45,500
Office Support	\$60	50	14	\$42,000
Transportation Expenses	Monthly Rate		Total Months	Cost
Rental Vehicle	\$900	per month	3.5	\$3,150
Fuel for Rental Vehicle	\$120	per month	3.5	\$420
Surveying Expenses	Topographic Survey		Properties	Cost
Pre-Construction Survey	\$600	per prop.	94	\$56,400
<b>Total Cost</b>				<b>\$147,470</b>
Number of Properties				94
Cost per Property				\$1,569

**3 - Excavation (Mechanical) and Transportation & 4 - Excavation (Manual) and Transportation**

Although manual excavation is more time-consuming, and therefore more expensive, manual and mechanical excavation will be performed concurrently. Therefore total excavation costs have been estimated, and a higher proportion of these costs has been assigned to the manual excavation portion

Each Excavation Crew is generally anticipated to consist of 1 operator, 2 laborers, and 2 truck drivers (five crews). Laborers will move between crews if needed at more manual labor-intensive properties.

Labor						
Personnel	#	Hourly Rate	Overtime Rate	Hours per Week	Number of Weeks	Cost
Operator	5	\$91	\$116	50	21	\$504,000
Laborer	10	\$58	\$77	50	21	\$648,900
Driver	10	\$71	\$91	50	21	\$787,500
Project Manager <sup>1</sup>		\$110	\$110	20	21	\$46,200
Superintendant <sup>1</sup>		\$90	\$90	60	21	\$113,400
QCM <sup>1</sup>		\$80	\$80	60	21	\$100,800
HSO <sup>1</sup>		\$80	\$80	55	21	\$92,400
Surveying Expense			Topographic Survey	Properties	Cost	
Post-Excavation Survey			\$300 per prop.	94		\$28,200
<b>Total</b>						<b>\$2,321,400</b>

Notes:

- 1) All time for QCM and HSO has been applied to excavation task.

Equipment				
Type	Equipment Onsite	Cost per month	Duration (months)	Cost
Excavator	5	\$1,800	5.25	\$47,250
Dump Trucks	10	\$1,900	5.25	\$99,750
Pickup Trucks <sup>1</sup>	9	\$1,000	5.25	\$47,250
Trailers	5	\$500	5.25	\$13,125
Materials				
Description	Unit Price	Units	Cost	
Fuel <sup>2</sup>	\$3.00	59,850 gallons	\$179,550	
Plastic Sheeting	\$25	200 rolls	\$5,000	
T-posts	\$3	800 posts	\$2,400	
High-vis fencing <sup>3</sup>	\$0.15	72,874 ft <sup>2</sup>	\$10,931	
Safety signage	\$350	20 signs	\$7,000	
Misc. hand tools	\$3,000	1 lump sum	\$3,000	
Wheelbarrows	\$2,000	1 lump sum	\$2,000	
Safety Supplies	\$2,000	1 lump sum	\$2,000	
<b>Total</b>				<b>\$419,256</b>

Notes:

- 1) Included trucks for PM, foreman, QCM, and HSO
- 2) Estimated fuel consumption of 40 gal/day per dump truck, 25 gal/day for excavator, and 5 gal/day for pickup
- 3) High visibility fencing will also be needed to place around excavation boundaries and prevent unauthorized access, as well as placement at the bottom of some excavations. Upper bound of total; less may be required

**3 - Excavation (Mechanical) and Transportation & 4 - Excavation (Manual) and Transportation (Continued)**

Estimated Excavation Volumes	
Mechanical	9,621.0
Manual	740.6
Total Volume	10,361.5
Mechanical % Vol.	92.9%
Manual % Volume	7.1%
Mechanical % Cost <sup>1</sup>	85.0%
Manual % Cost <sup>1</sup>	15.0%

Excavation Cost	
Labor	\$2,321,400
Equipment and Materials	\$419,256
Total	\$2,740,656
Total % of Cost Mechanical	\$2,329,558
Total % of Cost Manual	\$411,098
Mechanical cu yd excavated \$	\$242.13
Manual cu yd excavated \$	\$555.11

1) As manual excavation is more labor intensive, a higher proportion of cost per cubic yard excavated is attributed to manual excavation than mechanical

**5 - Backfill Placement**

Each backfill crew is generally anticipated to consist of 1 operator, 2 laborers, and 2 truck drivers (three crews). One additional operator and skid-steer are anticipated to be required at the staging area to accept deliveries, load backfill into trucks, and manage the backfill stockpile. Two laborers are anticipated to work as the punch-list crew and uninstall/reinstall fences, repair damages, etc. Half of the project duration is anticipated to be attributable to backfill placement, compaction, and testing (10 weeks)

Labor						
Personnel	#	Hourly Rate	Overtime Rate	Hours per Week	Number of Weeks	Cost
Operator	4	\$91	\$116	50	11	\$211,200
Laborer	6	\$58	\$77	50	11	\$203,940
Driver	6	\$71	\$91	50	11	\$247,500
Surveying Expense			Topographic Survey	Properties	Cost	
Post-Backfill Survey			\$300 per prop.	94	\$28,200	

Equipment				
Type	Equipment Onsite	Cost per month	Duration (months)	Cost
Skidsteer	4	\$1,800	2.5	\$18,000
Dump Trucks	6	\$1,900	2.5	\$28,500
Pickup Trucks	4	\$1,000	2.5	\$10,000
Trailers	5	\$500	2.5	\$6,250
Materials <sup>2</sup>				
Description	Unit Price	Units	Cost	
Backfill	\$20	2,888.3 yd <sup>3</sup>	\$57,766	
Fuel <sup>1</sup>	\$3.00	20,075 gallons	\$60,225	
Plate Compactor	\$800	2 compactor	\$1,600	
Safety signage	\$350	5 signs	\$1,750	
Misc. hand tools	\$1,500	0.5 lump sum	\$750	
Wheelbarrows	\$1,000	0.5 lump sum	\$500	
Safety Supplies	\$1,000	0.5 lump sum	\$500	
Total				\$185,841

Skidsteer will be used for spreading and compaction of backfill. Vibratory plate compactor will be used for compaction of backfill near foundations and where skidsteer cannot access. trailers include dump trailer and equipment trailers

1) estimated fuel consumption = 40/gal day dump truck, 25 gal/day skidsteer, and 5 gal/day pickup (plate compactor negligible)

**5 - Backfill Placement (Continued)**

Estimated Backfill Volume	
Backfill (yd <sup>3</sup> )	2,888
Cost per yd <sup>3</sup>	\$303.53

Backfill Cost	
Labor	\$690,840
Equipment and Materials	\$185,841
<b>Total</b>	<b>\$876,681</b>

**6 - Topsoil Placement**

Topsoil placement will be similar to backfill placement. Total equipment costs have been split 50/50 between backfill and topsoil.

Labor						
Personnel	#	Hourly Rate	Overtime Rate	Hours per Week	Number of Weeks	Cost
Operator	4	\$91	\$116	50	11	\$211,200
Laborer	6	\$58	\$77	50	11	\$167,690
Driver	6	\$71	\$91	50	11	\$247,500
Surveying Expense			Topographic Survey		Properties	Cost
Post-Topsoil Survey			\$300	per prop.	94	\$28,200

subtracted mulch, shrub, landscaping etc. hours from total laborer hours

Equipment				
Type	Equipment Onsite	Cost per month	Duration (months)	Cost
Skidsteer	4	\$1,800	2.5	\$18,000
Dump Trucks	6	\$1,900	2.5	\$28,500
Pickup Trucks	4	\$1,000	2.5	\$10,000
Trailers	5	\$500	2.5	\$6,250
Materials <sup>2</sup>				
Description	Unit Price	Units	Cost	
Topsoil	\$35	4,063.6 yd <sup>3</sup>	\$142,224	
Fuel <sup>1</sup>	\$3.00	20,075 gallons	\$60,225	
Plate Compactor	\$800	2 compactor	\$1,600	
Safety signage	\$350	5 signs	\$1,750	
Misc. hand tools	\$1,500	0.5 lump sum	\$750	
Wheelbarrows	\$1,000	0.5 lump sum	\$500	
Safety Supplies	\$1,000	0.5 lump sum	\$500	
<b>Total</b>				<b>\$270,299</b>

Skidsteer will be used for spreading and compaction of topsoil. Vibratory plate compactor will be used for compaction of backfill near foundations, under trees, and where skidsteer cannot access.

1) estimated fuel consumption = 40/gal day dump truck, 25 gal/day skidsteer, and 5 gal/day pickup (plate compactor negligible)

Estimated Topsoil Volume	
Topsoil (yd <sup>3</sup> )	4,064
Cost per yd <sup>3</sup>	\$228

Topsoil Cost	
Labor	\$654,590
Equipment and Materials	\$270,299
<b>Total</b>	<b>\$924,889</b>

**7 - Gravel Placement**

Very little gravel is anticipated to be placed, based on review of pre-existing conditions. Equipment and personnel are expected to be already be present on-site for backfill placement while gravel is placed.

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Operator	1	\$91	2	\$182
Laborer	1	\$58	2	\$116
Driver	1	\$71	2	\$142
Materials				
	Unit Price	Units	Cost	
Gravel	\$60	3,407 yd <sup>3</sup>	\$204,444	
			Total Cost	\$204,884
			Cost per yd <sup>3</sup>	\$60.13

**8 - Mulch Placement**

Mulch will be agreed with property owner in the Restoration Agreement. Mulch is anticipated to be placed below trees where sod is not expected to survive and in flowerbeds. 80 yd<sup>3</sup> of mulch has been input for estimation purposes. Mulch is expected to be purchased in bulk and placed by laborers using a pickup truck with an associated trailer (this equipment is included in backfill/topsoil)

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	2	\$58	94	\$10,904
Materials				
	Unit Price	Units	Cost	
Geotextile	\$0.10	12,000 ft <sup>2</sup>	\$1,200	
Mulch	\$45	80 yd <sup>3</sup>	\$3,600	
			Total Cost	\$15,704
			Cost per yd <sup>3</sup>	\$196



**9 - Geotechnical Testing**

In-place field density testing requires a representative Proctor test to determine laboratory maximum density, and a minimum of 2 field tests conducted at each lift placed in the 18-24", 12-18", and 6-12" depths. The testing firm usually charges by the hour, with a minimum charge (e.g. 3 hours) rather than by the test, so geotechnical testing costs are highly dependent upon subcontractor work procedures.

A minimum of 266 in-place field density tests will be required based on the designs (65 six-inch-lifts tested). 41 front or back yards have an excavation depth of 24", 39 yards are 18", and 65 yards are 12". Both the front and back yard or full four quads will be remediated at 53 properties. An average of 10 tests (5 lifts) will be performed per testing event. Each testing event is estimated at \$500.

Geotechnical Tests (Subcontracted)			
Type	Units	Unit Price	Cost
Proctor and gradation test	6	\$600	\$3,600
In-place field density	266	\$500	\$133,000
Total Cost			\$136,600
Cost per test			\$332

**10 - High Visibility Barrier**

High visibility barrier will be used at the bottom of excavations with a depth of 24 inches where contamination is present below this depth, and over the roots of trees and shrubs within the excavation area where the full excavation depth was not achieved. Fencing will be used to the extent feasible as excavation perimeter fencing prior to being placed at the bottom of the excavation.

High Visibility Barrier			
Description	Unit Price	Units	Cost
High-vis barrier <sup>2</sup>	\$0.15	50,645 ft <sup>2</sup>	\$7,597

**11 - Sod Placement**

Assumed alternate/subcontracted sod placement crew

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	6	\$58	240	\$83,520
Materials				
	Unit Price	Units	Cost	
Sod <sup>1</sup>	\$0.25	242,277 ft <sup>2</sup>	\$60,569	
Sod staples	\$0.15	1,000 each	\$150	
Sod knife	\$10	20 each	\$200	
Roller	\$200	2 each	\$400	
Equipment				
Type	Cost per day	Days	Cost	
Pickup Truck	\$50	24	\$1,200	
Trailer	\$25	24	\$600	
Total Cost			\$146,639	
Cost per ft <sup>2</sup>			\$0.61	

1) 2% increase to sod square footage applied to account for cutting end pieces to fit yard

**12 - Seed Placement**

No costs are included for seed placement. If seed is applied, a reduction in sod costs is expected.

**13 - Watering**

It is anticipated that the remediation subcontractor will use the water from the residence for most watering activity. Two months of residential water bills will be reimbursed (estimated at \$200). Sod will be maintained for 30 days after placement. 1 laborer will work full-time for **20** weeks to travel to residences, setup hoses, and perform watering. For vacant lots, it is assumed that these will be scheduled in the same time period to minimize the need for rental of a water truck. One water truck driver will work full time for 4 weeks to water the lots and other properties as needed.

Labor						
Personnel	#	Hourly Rate	Overtime Rate	Hours per Week	Number of Weeks	Cost
Laborer	1	\$58	\$77	40	20	\$46,400
Driver	1	\$71	\$91	40	4	\$11,360

Materials			
	Unit Price	Units	Cost
Water	\$200	94 properties	\$18,800
Hoses	\$60	4 each	\$240
Fuel	\$3.00	750 gallons	\$2,250
Equipment			
Type	Cost per month	Months	Cost
Pickup Truck	\$1,000	6	\$6,000
Water Truck	\$2,800	1	\$2,800

Watering Cost	
Labor	\$57,760
Equipment and Materials	\$30,090
<b>Total</b>	<b>\$87,850</b>
Number of properties	94
<b>Total</b>	<b>\$935</b>

SubContractor Assumptions and Calculations

14 - Trees

Most trees present in Zone 3 (202 trees) are expected to remain in place, and manual excavation of soil within the drip zone will be performed. 11 trees have a diameter of less than 4 inches and are expected to be removed and replaced. Watering will be performed concurrent with sod, under the watering line item.

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	2	\$58	4.5	\$522
Materials				
	Unit Price	Units	Cost	
Tree	\$150	12 each	\$1,800	
Stakes/ Lines	\$50.00	1 lump sum	\$50	
			Total Cost	\$2,372
			Cost per tree	\$791

15 - Shrubs

All shrubs have conservatively been estimated to be removed and replaced. Some property owners are expected to request the shrub(s) stay in place. Shrub removal is expected to take place during the excavation. Watering will be performed concurrent with sod, under the watering line item.

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	2	\$58	125	\$14,500
Materials				
	Unit Price	Units	Cost	
Shrub	\$50	163 each	\$8,150	
			Total Cost	\$22,650
			Cost per shrub	\$138.96

16 - Stump Removal

36 stumps and associated roots will be cleared and grubbed. Removal may or may not occur on different days.

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	2	\$58	14	\$1,624
Equipment				
	Unit Price	Units	Cost	
Chainsaw	\$25	36 days	\$900	
Grinder	\$150	36 days	\$5,400	
			Total Cost	\$7,924
			Cost per stump	\$1,132

SubContractor Assumptions and Calculations

17 - Miscellaneous Landcaping

Miscellaneous perennial flowers/bulbs, garden edging, etc.

Labor				
Personnel	#	Hourly Rate	Hours	Cost
Laborer	2	\$58	94	\$10,904
Materials				
	Unit Price	Units	Cost	
Misc	\$50	94 properties	\$4,700	
			Total Cost	\$15,604
			Cost per property	\$166

18 - Property Closeout

The agreement coordinator will document post-restoration conditions and meet with property owners to sign completion agreements after the sod maintenance period is complete. Coordinator will work with punch list crew to resolve issues.

One office support personnel will assist the agreement coordinator with documentation management and the QCM with As-Built preparation. (QCM is anticipated to generate draft As Built as part of normal duties accounted for in excavation line item). Support related to other tasks will also be provided to project manager and/or superintendent, including utility notification, payroll, invoicing, etc. (16 weeks)

Property Close-Out Costs				
Personnel	Hourly Rate	Hours per week	Total Weeks	Cost
Agreement Coordinator	\$65	50	16	\$52,000
Office Support	\$60	50	16	\$48,000
Transportation Expenses	Monthly Rate		Total Months	Cost
Rental Vehicle	\$900	per month	4	\$3,600
Fuel for Rental Vehicle	\$120	per month	4	\$480
			Total Cost	\$104,080
			Number of Properties	94
			Cost per Property	\$1,107

19 - Demobilization

SubContractor Assumptions and Calculations

The office area and associated rental items will be returned to the rental companies. A small group of key personnel will remain on-site to facilitate removal of items and return of the office/staging area to pre-existing conditions.

Rental Items	Unit Price	Units	Total
Trailer Removal	\$3,000	1 lump sum	\$3,000
Fence Removal	\$500	1 lump sum	\$500
Conex Removal	\$300	1 lump sum	\$300
Excavator Removal	\$150	4 each	\$600
Skidsteer Removal	\$150	4 each	\$600
Dump Truck	\$150	14 each	\$2,100

Labor				
Personnel	#	Hourly Rate	Hours	Total
PM	1	\$110	20	\$2,200
Foreman	1	\$90	40	\$3,600
Operator	1	\$91	40	\$3,640
Laborer	2	\$58	40	\$4,640

Total Demobilization Costs	
Removal	\$7,100
Labor	\$14,080
Total	\$21,180

Contractor Oversight Assumptions and Calculations

<u>Contractor Personnel</u>	<u>Hourly Rate (loaded)</u>
Program Manager	\$120
Project Manager	\$110
Field Team Leader	\$80
Oversight Personnel	\$60
Office/Clerical Support	\$45

**Procurement**

Contractor will prepare RFP, conduct pre-bid meeting, review bids, and award subcontract.

Staff	Staff	Hourly Rate	Hours	Cost
Prepare RFP				
Program Manager	1	\$120	5	\$600
Project Manager	1	\$110	40	\$4,400
Office/Clerical Support	1	\$45	10	\$450
Conduct Pre-Bid Meeting				
Project Manager	1	\$110	20	\$2,200
Office/Clerical Support	1	\$45	10	\$450
Review Bids				
Program Manager	1	\$120	5	\$600
Project Manager	3	\$110	60	\$19,800
Office/Clerical Support	1	\$45	10	\$450
Award Subcontract				
Program Manager	1	\$120	10	\$1,200
Project Manager	1	\$110	20	\$2,200
Office/Clerical Support	1	\$45	20	\$900
Total Labor				\$33,250

**Plan Generation**

Contractor will need to prepare Work Plan, Sampling and Analysis Plan, Health and Safety Plan, and Quality Assurance Plan

Staff	Hourly Rate	Hours	Cost
Program Manager	\$120	10	\$1,200
Project Manager	\$110	40	\$4,400
Field Team Leader	\$80	80	\$6,400
Oversight Personnel	\$60	160	\$9,600
Office/Clerical Support	\$45	20	\$900
Total Labor			\$22,500

Contractor Oversight Assumptions and Calculations

**Plan Review**

Contractor will review plans generated by the Subcontractor

Staff	Hourly Rate	Hours	Cost
Program Manager	\$120	5	\$600
Project Manager	\$110	20	\$2,200
Field Team Leader	\$80	40	\$3,200
Oversight Personnel	\$60	80	\$4,800
Total Labor			\$10,800

**Community Relations**

Three community meetings with 30 hours for preparation and attendance per meeting are assumed

Staff	Hourly Rate	Hours	Cost
Program Manager	\$110	60	\$6,600
Office/Clerical Support	\$45	30	\$1,350
Total Labor			\$7,950

**Office Rental Expense**

Rental of a local office space for oversight personnel is anticipated for a period of 7 months.

	Unit Price	Units	Total
Office Rental	\$1,600	7 months	\$11,200
Office Utilities	\$500	7 months	\$3,500
Internet Service	\$100	7 months	\$700
Office Supplies	\$250	7 months	\$1,750
Office Furniture	\$250	7 months	\$1,750
Shipping Expenses	\$150	7 months	\$1,050
Field Logbooks	\$20	30 each	\$600
Digital Cameras	\$150	7 each	\$1,050
Total			\$21,600

**Contractor Oversight Assumptions and Calculations**

Contractor is anticipated to have 2 personnel onsite for two weeks when plans are approved for office setup and property owner agreements (FTL and agreement oversight). 10 oversight field staff are anticipated for 5.25 months during remediation (FTL, oversight for agreements, documentation, one oversight per excavation crew and one oversight per 2 backfill crews). Two oversight personnel are anticipated for 1 month during project close-out (FTL and one agreement oversight). Staff are anticipated to be staffed from CH2M Chicago office. Rental cars will be provided, but not lodging/per-diem. Staff are anticipated to work 55 hours/week.

**Field Startup Activities**

Staff	Staff	Hourly Rate	Hours per week	Duration (weeks)	Cost
Field Team Leader	1	\$80	55	2	\$8,800
Oversight Personnel	1	\$60	55	2	\$6,600
Total Labor					\$15,400

Travel Expenses	Units	Cost (per week)	Duration (weeks)	Cost
Rental Car	2	\$200	2	\$800
Fuel	2	\$50	2	\$200
Travel Costs				\$1,000

Total Field Startup Costs	\$16,400
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**Remediation Oversight**

Staff	Staff	Hourly Rate	Hours per week	Duration (weeks)	Cost
Project Manager	1	\$110	20	21	\$46,200
Field Team Leader	1	\$80	55	21	\$92,400
Oversight Personnel	9	\$60	55	21	\$623,700
Total Labor					\$716,100

Travel Expenses	Units	Cost (per week)	Duration (weeks)	Cost
Rental Car	10	\$200	21	\$42,000
Fuel	10	\$50	21	\$10,500
Travel Costs				\$52,500

Total Remediation Oversight Costs	\$768,600
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Contractor Oversight Assumptions and Calculations

**Air Sampling**

Oversight personnel will collect air samples, manage sampling data, and prepare for shipment to the laboratory during the course of normal remediation oversight responsibilities.

Equipment	Unit Price	Units	Duration	Total
Particulate Monitor	\$1,000	5	5.25 months	\$26,250
GilAir Plus	\$300	12	5.25 months	\$18,900
Calibrator	\$250	4	5.25 months	\$5,250
Total				\$50,400

	Unit Price	Units	Total
Air Sample Cassettes	\$60	10 boxes	\$600
Air Sample Analysis	\$25	50 samples	\$1,250
Total			\$1,850

Total Air Sampling Costs	\$52,250
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**Soil Sampling**

Oversight personnel will collect backfill and topsoil samples for laboratory analysis (est. 20 samples). Hours have been assumed to be in addition to the normal oversight responsibilities.

Staff	Staff	Hourly Rate	Hours / Sample	Samples Collected	Cost
Project Manager	1	\$110	1	20	\$2,200
Field Team Leader	1	\$80	1	20	\$1,600
Oversight Personnel	1	\$60	2	20	\$2,400
Total Labor					\$4,000

	Unit Price	Units	Total
Soil Sample Analysis	\$650	20 samples	\$13,000
Sampling supplies	\$25	20 lump sum	\$500
Shipment supplies	\$25	20 lump sum	\$500
Overnight delivery	\$50	20 each	\$1,000
Total			\$15,000

Total Soil Sampling Costs	\$19,000
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Contractor Oversight Assumptions and Calculations

**Close-Out Activities**

Staff	Staff	Hourly Rate	Hours per week	Duration (weeks)	Cost
Field Activities					
Field Team Leader	1	\$80	55	4	\$17,600
Oversight Personnel	1	\$60	55	4	\$13,200
Total Labor					\$30,800

Travel Expenses	Units	Cost (per week)	Duration (weeks)	Cost
Rental Car	2	\$200	4	\$1,600
Fuel	2	\$50	4	\$400
Travel Costs				\$2,000

Staff	Hourly Rate	Hours	Cost
Remedial Action Report			
Program Manager	\$120	5	\$600
Project Manager	\$110	20	\$2,200
Field Team Leader	\$80	40	\$3,200
Oversight Personnel	\$60	80	\$4,800
Office/Clerical Support	\$45	10	\$450
Remediation Complete Letter Preparation and Delivery			
Oversight Personnel	\$60	240	\$14,400
Total Labor			\$25,650

Total Closeout Costs	\$58,450
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# **APPENDIX F**

**TO  
Z2 SOIL UAO**

**COPY OF EPA'S ACCESS AGREEMENT  
FOR SOIL SAMPLING AND CLEANUP**



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590**

**CONSENT FOR ACCESS TO PROPERTY  
FOR SAMPLING AND TO TAKE RESPONSE ACTION**

Name: \_\_\_\_\_ Daytime Phone Number: \_\_\_\_\_  
(Print)

Evening Phone Number: \_\_\_\_\_

Owner     Tenant \_\_\_\_\_

Address(es) of Property(ies): \_\_\_\_\_

I consent to officers, employees, contractors and authorized representatives of U.S. Environmental Protection Agency entering and having continued access to the property described about (the Property) to perform the following response actions: (1) collecting soil samples; (2) excavating Property soils; (3) backfilling the excavated area(s) of the Property with clean soil and/or backfill; and (4) restoring to their pre-excavation condition grass, other vegetation or structures altered during sampling or excavation activities.

I realize that these actions taken by EPA are undertaken pursuant to its response and enforcement responsibilities under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. Section 9601 et seq. These activities are necessary to identify and clean up contaminated soils.

I give this written permission voluntarily on behalf of myself and all other co-owners of the Property, with knowledge of my right to refuse and without threats or promises of any kind. I understand that EPA or authorized representatives of EPA will contact me before the removal of soil begins to discuss the steps involved in the excavation and removal program, and to review all measures EPA will take to restore my Property.

This document can only be signed by the property owner.

\_\_\_\_\_  
Date

PLEASE CHECK ONLY ONE BOX AND SIGN BELOW

I grant access to my property for sampling and removal.

I grant access to my property for sampling only.

I do not grant access to my property.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

The following option information will help us interpret the sampling results:

There are children under the age of six years living at this residence.

There are pregnant women living at this residence.