



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

US EPA RECORDS CENTER REGION 5



495079

OCT 24 2016

REPLY TO THE ATTENTION OF:

MEMORANDUM

SUBJECT: **ACTION MEMORANDUM – 4th AMENDMENT:** Request for a Change in Scope and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site, East Chicago, Lake County, Indiana (Site ID # 053J)

FROM: Douglas Ballotti, Acting Director
Superfund Division

THRU: Reggie Cheatham, Office Director
Office of Emergency Management (OEM)

TO: Mathy Stanislaus, Assistant Administrator
Office of Land and Emergency Management

I. PURPOSE

The purpose of this Action Memorandum Amendment is to request and document your approval, consistent with Section 104(c)(1)(A) of CERCLA, 42 U.S.C. Section 9604 (c)(1)(A), to Change the Scope of the Response and for a Ceiling Increase for the time-critical removal action at portions of the U.S. Smelter and Lead Refinery Site (the Site) residential area defined as Zone 2 of Operable Unit 1 (OU1), in East Chicago, Lake County, Indiana (see Figure 2). The sought increase of \$13,870,506 would raise the project ceiling for the time-critical removal action from \$26,397,542 to \$40,268,048.

The Change of Scope of the Response and Ceiling Increase is necessary as the previous Action Memoranda approved on January 22, 2008, August 13, 2008, September 12, 2011, and October 13, 2016 (Attachments IX, X, XI, XII), were for the excavation and proper disposal of lead-contaminated soils from residential parcels in OU1, Zones 1, 2 and 3, indoor cleanup of lead contaminated dust inside of residences in Zone 1, and temporary relocation of residents in the West Calumet Housing Complex (WCHC) in Zone 1. Subsequent soil data collected in Zone 2 during the remedial design (RD) phase in order to implement EPA's Remedial Action as set forth in the Record of Decision (November 2012), found lead and arsenic concentrations in surface soils (0-6") in a number of residential yards above EPA screening criteria.

Response actions are necessary in Zone 2 of OU1 to mitigate threats to public health, welfare, and the environment posed by the release and/or threatened release of uncontrolled hazardous substances at the Site. This removal involves (1) the excavation and proper disposal of lead

and/or arsenic contaminated soils from residential parcels in Zone 2, and (2) testing for lead and/or arsenic contaminated dust in residential homes if requested by the home owner and, if necessary, removal of the contaminated dust.

Conditions existing at the Site present a threat to public health and the environment and meet the criteria for initiating a removal action under 40 CFR § 300.415(b) of the National Contingency Plan (NCP). The U.S. Environmental Protection Agency (EPA or the Agency) documented elevated levels of lead and arsenic in surface soil in residential parcels at the Site. Lead and arsenic are hazardous substances as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

There are no nationally significant or precedent setting issues associated with the Change of Scope sought in this Action Memorandum to the extent it seeks approval for the excavation of soils. Testing at the owner's request and the removal of lead and/or arsenic contaminated dust in residential homes may set a precedent. The Site is on the National Priorities List (NPL).

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID: IND047030226
RCRA ID: IND047030226
STATE ID: None
Category: Time-Critical Removal

A. Site Description

1. Removal Site Evaluation

The Indiana Department of Environmental Management (IDEM) sampled some of the residential parcels to the north of the U.S. Smelter and Lead Refinery, Inc. (U.S.S. Lead) facility in 1985. This area is now known as Operable Unit 1 of the Site. IDEM found elevated lead levels in these residential yards. In September of 1985, the Indiana State Board of Health found the U.S.S. Lead facility in violation of state law and stated that the lead-contaminated soils within the facility boundaries may pose a risk to human health and the environment. IDEM referred the U.S.S. Lead facility, but not the area now known as Operable Unit 1, to EPA for cleanup.

From 1993 through 2006, EPA's Resource Conservation and Recovery Act (RCRA) Corrective Action program oversaw the remediation and management of lead-contaminated soils within the boundaries of the U.S.S. Lead facility, currently referred to as Operable Unit 2 (OU2). On November 18, 1993, EPA and U.S.S. Lead entered into an Administrative Order on Consent (AOC) pursuant to Section 3008(h) of RCRA. The AOC required U.S.S. Lead to implement interim measures, including site stabilization and construction of a corrective action management unit (CAMU) to contain contaminated soils and slag and to conduct a Modified RCRA Facility Investigation at the U.S.S. Lead facility, OU2. The CAMU covers approximately 10 acres and is surrounded by a subsurface slurry wall. Excavation and construction of the CAMU was conducted in two phases and completed between August and September 2002. Slag generated from the blast-furnace operations was routinely placed by U.S.S. Lead in piles on the southern

portion of the property near the banks of the Grand Calumet River. The cleanup of slag was described in the Interim Stabilization Measures Work Plan prepared by ENTACT, LLC and was completed during the third quarter of 2002.

As part of a RCRA Corrective Action in 2003 and 2006, EPA conducted soil sampling in the residential neighborhood to the north located in OU1 of the U.S.S. Lead Site. In the investigation of late July and early August 2003, 83 residential parcels within OU1 were sampled and analyzed for lead using a Niton X-ray fluorescence (XRF) instrument. Soils from 43 locations (52 percent) exceeded the 400 milligrams per kilogram (mg/kg) residential soil screening criterion for lead. In 2006, EPA's Field Environmental Decision Support (FIELDS) team supplemented the work performed in 2003 by collecting additional data from 14 parcels sampled in 2003 to (1) assess whether the top-most soils (zero to one inch below ground surface (bgs)) had elevated lead concentrations relative to deeper soils (one to six inches bgs), (2) collect and compare composite samples to individual samples to assess whether composite samples accurately represented the concentrations in residential yards and parks, and (3) compare lead concentrations in the fine and coarse fractions of sieved samples to evaluate whether lead was preferentially distributed in the fine-grain sizes. These sampling results showed some yards in OU1 to have high levels of lead contamination with the highest sample containing lead at 3,000 mg/kg. The RCRA Corrective Action program looked at the possible source of the lead contamination and determined it was from various industrial sources. The RCRA Corrective Action program referred OU1—the off-site contamination from the U.S.S. Lead facility—and other industrial sources to the Superfund Program in 2004; the remainder of OU2—the on-site contamination—was referred in 2006.

Consistent with the OSWER Publication 9285.7-50 *Superfund Lead-Contaminated Residential Sites Handbook* (Handbook) (2003), the Superfund Program used a tiered approach to prioritize which homes needed to be cleaned up first. Residential parcels with lead concentrations in surface soil at or greater than 1,200 mg/kg were the highest priority for immediate action under a time-critical removal action. Residential parcels with lead concentrations in surface soil below 1,200 mg/kg, but above 400 mg/kg would be addressed through remedial actions. EPA does not consider the 1,200 mg/kg concentration as an action level for removal actions, but this level does provide an alternative to running the Integrated Exposure Uptake Biokinetic (IEUBK) model with limited data to determine if the site poses an urgent threat. On January 22, 2008, EPA signed the original action memorandum to conduct a time-critical removal action in OU1 to address known parcels with lead levels in surface soil exceeding 1,200 mg/kg. These parcels had been identified as part of the RCRA Corrective Action residential investigation. The EPA identified 15 private parcels that contained soil with lead concentrations exceeding 1,200 mg/kg in the top six inches of soil. On June 9, 2008, the EPA initiated the time-critical removal action to address the 15 residential parcels with lead levels exceeding 1,200 mg/kg. On August 13, 2008, the EPA amended the original action memorandum to increase the project ceiling by \$511,950 for a total of \$984,060. The EPA was able to obtain access agreements and remediate only 13 of the 15 parcels. The removal action was completed on November 18, 2008. In total, 1,838 tons of lead-contaminated soil were removed and disposed of at an approved landfill.

A Remedial Investigation (RI) was conducted from 2009 through 2010 to collect additional soil data in OU 1 which consists of Zone 1, Zone 2, and Zone 3. As a result of the sampling, EPA

discovered an additional 14 areas within OU1 with lead levels exceeding the removal action level of 1,200 mg/kg. On September 11, 2011, EPA signed the second amendment to the original action memorandum which increased the total project ceiling to \$1,928,460. On October 11, 2011, EPA started the time-critical removal action involving lead-contaminated soil removals at five West Calumet Housing Complex (WCHC) addresses (located in Zone 1) and nine other residential parcels outside the WCHC. In addition, two parcels that were not remediated during the previous removal action in 2008 because of access issues were remediated during this removal action. The removal action was completed on December 9, 2011. In total, 1,913 additional tons of lead-contaminated soil were removed and disposed of at an approved landfill as a result of the 2011 removal activities.

In November 2012, EPA issued a Record of Decision (ROD) for Operable Unit 1 (OU1) of the Site. OU1 has been divided into 3 separate zones for implementation of the remedy (Zones 1, 2, and 3). OU1 contains residential yards contaminated with lead and arsenic at levels that pose a threat to human health through 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 lead or arsenic contaminated soils. The remedial action levels (RALs) for OU1 are 400 mg/kg for lead at residential parcels, 800 mg/kg for lead at industrial/commercial parcels, and 26 mg/kg for arsenic at both residential and industrial/commercial parcels.

From November 2014 through April 2015, EPA conducted more extensive soil sampling within Zone 1 as part of the remedial design process for OU1 and completed remedial designs for Zone 1 in October 2015. Zone 1 includes approximately 118 separate "parcels," including 111 parcels in the WCHC, three right-of-way parcels, and a school, park, recreation center, and maintenance facilities. EPA sampled all parcels in Zone 1 except a narrow strip of land on the east bank of the Indiana Harbor Canal. In May 2016, EPA received validated sampling results which revealed lead concentrations in soil up to 24 inches in depth ranged from non-detect (ND) to 91,100 mg/kg for lead. Arsenic concentrations ranged from ND to 3,530 mg/kg (See Attachment V – Summary of OU1 RD Soil Sampling Results). Within Zone 1, a total of 117 parcels exceeded the removal management level (RML) for lead of 400 mg/kg for residential soil and 61 parcels exceeded the RML for arsenic of 68 mg/kg. Each of the parcels that exceeded the RML for arsenic also exceeded the RML for lead. Sample results from surface soils (0-6") indicated that lead concentrations at 13 parcels in the WCHC exceed 5,000 mg/kg with concentrations up to 45,000 mg/kg.

Beginning in July 2016, EPA began conducting more extensive soil sampling within Zone 2 as part of the RD process for OU1. Zone 2 includes approximately 590 separate "parcels." Most of these parcels are residential parcels, though there are some commercial/industrial parcels. In September 2016, EPA received validated sampling results from 48 parcels which revealed lead concentrations in surface soil (0-6 inches below ground surface) at values ranging from 38.3 to 2,120 mg/kg. Arsenic concentrations ranged from 4.3 to 111 mg/kg (See Attachment V – Summary of OU1 RD Soil Sampling Results). Ten sampled parcels had surface soil lead concentrations above 1,200 mg/kg and 40 of 48 parcels exceed the RML for lead of 400 mg/kg for residential surface soil. Two parcels exceeded the 68 mg/kg RML for arsenic (111 and 78.1 mg/kg in surface soil). One parcel that exceeded the RML for arsenic also exceeded the RML for lead in soil.

On July 29, 2016, EPA initiated in-house sampling for dust collection in Zone 1 to determine lead concentrations in homes given the elevated levels of lead in surface soils within the WCHC and the likelihood that lead contaminated soil/dust was being tracked or blown into the housing units. EPA prioritized homes for sampling based on the likelihood that they would have elevated lead levels in indoor dust, based on elevated lead concentrations in yards and elevated blood lead level (BLL) records associated with those residences. As of September 28, 2016, EPA has received validated results from 154 residences. Concentrations ranged from 3.9 to 32,000 mg/kg for lead fines and 0.12J (J means the associated value is the approximate concentration) to 880 mg/kg for arsenic fines. Results from indoor dust from the first 154 homes indicate 69 parcels exceed the EPA screening level of 316 mg/kg for lead for indoor living spaces (See Attachment VII – Indoor Dust Screening Criteria for Lead).

On August 12, 2016, EPA began cleaning the inside of residences in the WCHC to remove lead contaminated dust. A combination of HEPA vacuums and wet cleaning are used to remove lead dust from ceilings, floors, carpets, walls, drapes, accessible ductwork, furnace, and furniture. As of October 3, 2016, EPA has cleaned approximately 113 out of 334 occupied units. Residents were temporarily relocated during the cleaning process and clearance sampling conducted as necessary to document efficacy of cleaning.

The Indiana State Department of Health (ISDH) accompanied EPA into 14 of the initial 42 residences in Zone 1 and conducted a separate inspection for compliance with lead paint abatement policies. Wipe samples were collected from floors, interior window sills, and window troughs and compared to HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012 Edition)(40 $\mu\text{g}/\text{ft}^2$ -floors, 250 $\mu\text{g}/\text{ft}^2$ - window sills, and 400 $\mu\text{g}/\text{ft}^2$ - window trough). Wipe samples from six of the 14 units sampled were above the respective lead dust clearance standards (see Attachment VIII - Indiana State Department of Health Wipe Sample Results). Lead based paint was not found by ISDH in any of the inspected units.

The Agency for Toxic Substances and Disease Registry (ATSDR) is working with the East Chicago Health Department (ECHD), which is conducting an ongoing exposure investigation of blood lead in the WCHC. The following is a summary of the findings from screenings of children living in the WCHC, which is derived both from historical data and from the on-going blood lead testing campaign being conducted by ECHD:

- From the most recent ECHD testing in summer 2016, 18 out of 94 (19%) tested children from the WCHC under age six were identified with elevated blood lead (EBL) levels ($> 5 \mu\text{g}/\text{dL}$) based on capillary (finger stick) measurements.
- From 2014 through 2015, 26% of children under age seven tested at the WCHC were identified with EBL levels, with the highest measurement at 33 $\mu\text{g}/\text{dL}$ in a one-year-old child. Within the same period, the census tract that includes all of the children from the WCHC (Zone 1) and part of Zone 2 had an EBL incidence rate of 22%. By comparison, the EBL rates for the two adjacent census tracts were 9% and 11%.
- The ATSDR Exposure Investigation conducted in the West Calumet neighborhood in 1997 showed a 35% EBL incidence rate, which was defined at that time as greater than 10 $\mu\text{g}/\text{dL}$.

These observations by ATSDR across almost 20 years demonstrate a consistent pattern of elevated blood lead levels in young children living in OU1. Given that the ISDH Lead Inspectors found no lead-based paint in recently sampled units within the WCHC, it is likely that exposure to soil-based lead contamination in the WCHC and portions of Zone 2 is a primary cause of elevated blood lead levels in children there.

2. Physical Location

The U.S.S. Lead Site lies approximately 18 miles southeast of Chicago, Illinois, in East Chicago, Indiana (Figure 1). The Site consists of the former U.S.S. Lead facility located at 5300 Kennedy Avenue, East Chicago, Indiana (designated as Operable Unit 2 (OU2)) and the residential area to the north and northeast (defined as OU1). OU1 is bound by East Chicago Avenue on the north, East 151st Street/149th Place on the south, the Indiana Harbor Canal on the west, and Parrish Avenue on the east. OU1 includes about 1200 homes, a small number of parks, open space as a part of the railroad right-of-way, schools, and public buildings. For the purpose of implementing the remedial action (RA) in OU1, EPA has divided OU1 into three distinct geographic areas (Zones 1, 2, and 3). This removal action is taking place in OU1 Zone 2. Zone 2 is adjacent to and directly east of Zone 1 and is generally bordered: (1) on the north by East Chicago Avenue; (2) on the east by Joliet, Elgin Railroad; (3) on the south by East 151st Street; and (4) on the west by the East Chicago Public Housing Complex, the Carrie Gosch Elementary School, and the Harbor Canal.

The EPA conducted an EJ analysis for the Site (see Attachment I). Screening of the surrounding area was conducted using Region 5's EJ Screen Tool. Region 5 has reviewed environmental and demographic data for the area surrounding the U.S.S. Lead Site and has determined there is high potential for EJ concerns at this location.

3. Site Characteristics

OU1 includes about 1,200 homes, a small number of parks, open space as a part of the railroad right-of-way, schools, and public buildings. OU1 is primarily a residential area, which includes commercial and light industrial areas. Some parcels in the residential area in Zones 1, 2 and 3 have levels of lead above EPA's RML of 400 mg/kg and arsenic above the RML of 68 mg/kg.

United States Geological Survey (USGS) historical aerial photographs from 1939, 1951, 1959, and 2005 show OU1 over time. Review of these aerial photographs indicates that most of the residential neighborhoods within the Site west of the railroad tracks were built before 1939. By 1951, approximately 75 to 80 percent of the homes were built; by 1959, most of the homes east of the railroad tracks had also been built. These photographs also show that the International Smelting and Refining Company, a subsidiary of the Anaconda Copper Company (whose successor in interest is now the Atlantic Richfield Company [ARC]) occupied the area where the WCHC is currently located (Zone 1 in the southwest portion of OU1) prior to 1946. Title records indicate that the East Chicago Housing Authority constructed the WCHC on the former Anaconda Copper Mining Company/International Smelting and Refining Company site between 1970 and 1973.

The U.S.S. Lead facility was a primary and secondary smelter of lead in the East Chicago, Indiana area. It began operations around 1906 and ended operations in 1985. From about 1920 until 1973, the facility was a primary smelter of lead. This included a refining process to create high quality lead free of bismuth. From 1973 until its closure in 1985, the facility was a secondary smelter and a reprocessor of car batteries. The secondary refinery operations included: battery breaking with tank treatment of spent battery acid at a rate of 16,000 gallons per day; baghouse dust collection with storage in on-site waste piles of up to 8,000 tons of flue dust; and blast furnace slag disposal, which was deposited in the wetland adjacent to and along the southern boundary of the facility. 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. Secondary lead recovery operations ceased in 1985.

In addition to the U.S.S. Lead facility operation, other industrial operations have managed or processed lead and other metals and are sources of contamination in OU1. Immediately east of the U.S.S. Lead facility and south of Zone 3 is the former DuPont site (currently leased and operated by W.R. Grace & Co., Grace Davison). One of the processes that historically took place at the DuPont site was the manufacturing of a lead arsenate pesticide. In 2015, DuPont spun off certain assets and liabilities to a newly created company, The Chemours Company FC, LLC (Chemours). Chemours is now the owner of the former DuPont facility.

North of the former U.S.S. Lead facility stood two smelter operations, which processed lead and other metals. A 1930 Sanborn map identifies the operations as Anaconda Lead Products and International Lead Refining Company (referred to as the former Anaconda 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 consisted of 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. The International Lead Refining Company was a subsidiary of the Anaconda Copper Mining Company. Title to the property in Zone 1 was held between 1934 and 1946 by International Lead Smelting and Refinery Company. International Lead Smelting and Refinery Company acquired title to the property in Zone 1 in 1934 from International Lead Refining Company, which had acquired title in 1912.

The residential area that comprises Zone 2 has been contaminated by aerial deposition of windblown contaminants from the U.S.S. Lead facility, the Anaconda Copper Mining Company/International Lead Smelting and Refinery Company facility, and the DuPont/Chemours facility. The focus of this time-critical removal action is Zone 2, which has approximately 590 residential parcels.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

The threat is presented by the presence of lead and arsenic-contaminated soil in residential yards and potential lead and arsenic contaminated dust within the residences in Zone 2. The presence of lead and arsenic in outdoor soils and potentially in indoor dust at concentrations above health

screening values provides a constant source of exposure for individuals both outside and while in the home. Lead and arsenic are hazardous substances as defined by section 101(14) of CERCLA. *See* 40 C.F.R. § 302.4. Nearby lead processing operations caused extensive lead and arsenic contamination in soils throughout the Site. The removal is responding to actual and potential outdoor lead and arsenic contamination, as well as potential indoor contamination caused by the migration of lead and arsenic contaminated soil from outdoors to indoors (like the source of contamination found in Zone 1). The presence of elevated lead and arsenic levels in surface soils and potential presence of lead and arsenic in indoor dust in Zone 2 makes this a time-critical removal action.

Exposure may occur from direct ingestion of soil in yards, soil tracked indoors, or house dust; and inhalation of fugitive dust. Potential human receptors include residents, including children six years of age and under, and pregnant or nursing women.

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, or 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, including 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.

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).

5. NPL status

The U.S.S. Lead Site consisting of both the former U.S.S. Lead facility (OU2) and the West Calumet neighborhood to the north (OU1) was listed as a Superfund site on the national priorities list (NPL) on April 8, 2009. EPA began the RI for OU1 on June 26, 2009. During December 2009 and August 2010, EPA contractors sampled yards in residential areas and background locations. In June 2012, EPA completed a preliminary investigation and study to determine the level and extent of lead and arsenic contamination within OU1 and proposed a remedy. In November 2012, after considering comments received from the City and IDEM,

EPA outlined the long-term permanent cleanup plan in a Record of Decision for OU1. The EPA has completed the remedial designs for work in Zone 1 and Zone 3 and is in the process of completing the remedial design for Zone 2.

6. Maps, pictures and other graphic representations

Maps include:

Figure 1 – USS Lead and Lead Refinery, E. Chicago, IN. Location Map

Figure 2 – OU1 Zones 1, 2, and 3– Location Map

B. Other Actions to Date

1. Previous actions

On January 22, 2008, EPA signed the original action memorandum to conduct a time-critical removal action in OU1 to address known parcels with lead levels exceeding the removal action limit of 1,200 mg/kg. These parcels were identified based on sampling data collected during the RCRA Corrective Action investigation. That removal action began on June 9, 2008, and involved the excavation and off-site disposal of lead contaminated soil from 13 residential parcels. On August 13, 2008, EPA amended the original action memorandum to increase the project ceiling in order to complete the ongoing, time-critical removal action. In total, 1,838 tons of lead-contaminated soil were removed and disposed of at an approved landfill. Excavated areas were backfilled with clean fill and seeded. This removal action was completed on September 25, 2008, and the final Pollution Report was issued on November 18, 2008.

On September 12, 2011, EPA signed an action memorandum to conduct a time-critical removal action in Zones 1, 2, and 3 of OU1 to address 16 parcels (including the 2 that were missed in 2008) with lead levels exceeding the removal action limit of 1,200 mg/kg. These parcels were identified based on sampling data collected during the RI. This removal action began on October 24, 2011, and involved the excavation and off-site disposal of lead contaminated soil from 16 residential parcels. In total, 1,913 tons of lead-contaminated soil were removed and disposed of at an approved landfill. Excavated areas were backfilled with clean fill and seeded. This removal action was completed on December 9, 2011, and the final Pollution Report was issued on December 15, 2011.

2. Current actions

On July 11, 2016, EPA started remedial action activities to cover bare soils with wood mulch within the WCHC to minimize fugitive dust, direct contact and potential migration of soil with elevated lead levels. The mulching work was completed on July 22, 2016, although maintenance of the mulch cover is ongoing as part of the remedial work associated with the implementation of the ROD for OU1.

On July 29, 2016, EPA initiated in-house sampling for dust collection in Zone 1 to determine lead concentrations in homes. As of September 28, 2016, EPA has received validated results

from 154 residences. Concentrations ranged from 3.9 to 32,000 mg/kg for lead fines and 0.12J (J means value is estimate) to 880 mg/kg for arsenic fines (See Attachment VI – Summary of Indoor Dust Sampling Results). Data results from indoor dust from the first 154 homes indicate 69 parcels exceed the EPA screening level of 316 mg/kg for lead for indoor living spaces (See Attachment VII – Indoor Dust Screening Criteria).

ISDH conducted a separate inspection of fourteen of the identified residential units for compliance with lead paint abatement policies. Lead-based paint was not found in any of the inspected units. On August 12, 2016, EPA began cleaning (under October 13, 2016 USS Lead action memo for Zone 1) the inside of all occupied (approximately 334) units within the WCHC, all of which are or have the potential to be contaminated with lead contaminated dust above the risk-based screening criteria for indoor dust from industrial activities. A combination of HEPA vacuums and wet cleaning are used to remove lead dust from ceilings, floors, carpets, walls, drapes, accessible ductwork, furnace, and furniture. As of October 3, 2016, approximately 113 out of 334 occupied units have been cleaned. Residents were temporarily relocated during the indoor cleaning period.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

On August 24, 2016, Rex Osborn, Federal Programs Section Chief with IDEM, sent an email indicating the State of Indiana does not have the financial resources to eliminate the threat posed by lead-contaminated soil in yards and dust within the residences or to fund temporary relocations. Neither the State of Indiana nor the City of East Chicago have taken or have the capacity to take action to abate the immediate threat.

2. Potential for Continued State/Local Response

The EPA is working with ATSDR, the East Chicago Health Department, the Indiana State Department of Health, and City of East Chicago elected officials to provide information to the public. EPA is coordinating discussions with stakeholders regarding the elevated levels of lead and arsenic in soil and EPA's plans to address this issue. Neither the state nor local officials have the resources to conduct the necessary cleanup of the indoor dust contamination or to provide for the temporary relocation of residents.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions at Zone 2 of the U.S.S. Lead Site present a threat to the public health or welfare and the environment and meet the criteria for a time-critical removal action as provided for in the NCP, 40 C.F.R. § 300.415(b)(1), based on the factors in 40 C.F.R. § 300.415(b)(2). These factors include, but are not limited to, the following:

§ 300.415(b)(2)(i) - Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

Beginning in July 2016, EPA began conducting more extensive soil sampling within Zone 2 as part of the RD process for OU1. Zone 2 includes approximately 590 separate parcels. Most of these parcels are residential parcels, though there are some commercial/industrial parcels. In September 2016, EPA received validated sampling results from 48 parcels in Zone 2 which revealed lead concentrations in surface soil (0-6 inches below ground surface) at values ranging from 38.3 to 2,120 mg/kg. Arsenic concentrations ranged from 4.3 to 111 mg/kg (See Attachment V – Summary of OU1 RD Soil Sampling Results). Ten sampled parcels had surface soil lead concentrations above 1,200 mg/kg and 40 of 48 parcels exceed the RML for lead of 400 mg/kg for residential surface soil. Two parcels exceeded the 68 mg/kg RML for arsenic (111 and 78.1 mg/kg in surface soil). One parcel that exceeded the RML for arsenic also exceeded the RML for lead in soil.

Data results from indoor dust from the first 154 homes sampled in Zone 1 indicate 69 properties exceed the EPA screening level of 316 mg/kg for lead for indoor living spaces. EPA is currently addressing exposure to lead contaminated soil in yards and indoor dust in Zone 1. High lead concentrations in indoor dust are a risk to human health, particularly for children under the age of six (i.e., inhalation, ingestion). A recent blood lead study conducted by ECHD found that children in the WCHC and part of Zone 2 are at an increased risk for lead exposure (22% at or above 5 µg/dL compared to the national average of 2.5%).

Lead is a hazardous substance, as defined by Section 101(14) of CERCLA. The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in the body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

Arsenic is a hazardous substance under CERCLA and may be ingested or inhaled by residents living at the Site. Acute (short-term) high-level inhalation exposure to arsenic dust or fumes has resulted in gastrointestinal effects (nausea, diarrhea, abdominal pain); central and peripheral nervous system disorders have occurred in workers acutely exposed to inorganic arsenic. Chronic (long-term) inhalation exposure to inorganic arsenic in humans is associated with irritation of the skin and mucous membranes and effects in the brain and nervous system. Chronic oral exposure to elevated levels of inorganic arsenic has resulted in gastrointestinal effects, anemia, peripheral neuropathy, in humans. Chronic exposure by the inhalation route, has been shown to cause a form of skin cancer and also to cause bladder, liver, and lung cancer. EPA has classified inorganic arsenic as a human carcinogen.

§ 300.415(b)(2)(iv) - High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

As stated in the previous paragraphs, surface soils in Zone 2 were found to be contaminated with lead and arsenic above the EPA screening levels.

Residents living in Zone 2 may cause the high levels of lead and arsenic to migrate into other areas including inside the home by walking through and tracking in, gardening, play, and other residential activities, especially in areas where the soil does not have any cover. Other means of migration may include routine construction activities.

§ 300.415(b)(2)(v) - Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

There is a threat of release from high winds dispersing surface particulate matter containing lead, resulting in exposure to children and adults who reside within the Site. Grass cover is generally lighter in the early spring and fall, allowing more potential of tracking contaminated soil into the home. Rain or thundershowers may cause the outdoor lead to migrate via surface runoff. The use of an air conditioner during the hot summer months or the running of a furnace during the winter would also result in the migration of indoor dust.

§ 300.415(b)(2)(vii) - The availability of other appropriate federal or state response mechanisms to respond to the release;

At this time, no local or state agency has the resources to respond to the immediate threat.

IV. EXEMPTION FROM STATUTORY LIMITS

Section 104(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), limits a Federal response action to 12 months and \$2 million unless response actions meet emergency and/or consistency exemptions. Documentation for the aforementioned exemptions are provided in the U.S.S. Lead Action Memorandum-Third Amendment approved on October 13, 2016.

V. ENDANGERMENT DETERMINATION

Given the Site conditions, the nature of the known and suspected hazardous substances on-site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VI. PROPOSED ACTIONS

The response actions described in this memorandum directly address actual or potential releases of hazardous substances on Site, which may pose an imminent and substantial endangerment to public health, or welfare, or the environment.

The proposed action involves excavation and removal of lead and arsenic-contaminated soil at residential parcels within Zone 2 with surficial soil concentrations at or above 1,200 mg/kg for lead and/or the removal management level (RML) of 68 mg/kg for arsenic, and indoor dust sampling and cleaning upon the request of residents and owners. The response actions are consistent with the (OSWER) Publication 9285.7-50 *Superfund Lead-Contaminated Residential Sites Handbook* (Handbook) (2003), where the Superfund Program uses a tiered approach to prioritize which homes needed to be cleaned up first. Residential parcels with lead concentrations in surface soil at or greater than 1,200 mg/kg would be the highest priority for immediate action under a time-critical removal action. Excavated areas will be backfilled to original grade with clean soil and the yards restored as closely as practicable to its pre-removal condition.

Approximately 590 Zone 2 parcels will be sampled during the remedial design process. For cost accounting purposes, EPA anticipates the scope of this removal action in Zone 2 to include approximately 132 residential parcels that are at or greater than 1,200 mg/kg for lead and/or 68 mg/kg for arsenic based on historical and the latest remedial design validated data from Zone 2.

Removal activities associated with the excavation of lead and arsenic contaminated soil from residential yards in Zone 2 will include:

1. Development of site plans, including a Work Plan, Sampling Plan/QAPP, site-specific HASP, and Emergency Contingency Plan;
2. Development of an air monitoring plan and conduct dust control measures to ensure worker and public health protection;
3. Provision for site security measures as necessary;
4. Excavation of soil at residential parcels where lead is equal to or exceeds 1,200 mg/kg and/or arsenic exceeds 68 mg/kg as determined by EPA's RD sampling. Soil will be excavated to a depth of approximately two feet bgs, to eliminate any direct contact and inhalation threats. Excavated material that fails toxicity characteristic leaching procedure (TCLP) for lead may be treated with a fixation agent prior to disposal. Excavation will cease if lead and/or average arsenic concentrations are less than 400 mg/kg for lead and 26 mg/kg for arsenic.
5. Collection and analysis of confirmation samples from the bottom of each excavation. If lead levels below 400 mg/kg or arsenic levels below 26 mg/kg cannot be achieved at an excavation depth of approximately two feet bgs, excavation will cease and a visible barrier will be placed at the bottom of the excavation to alert the property owner of the existence of high levels of lead and/or arsenic. In such instances and consistent with the record of

decision, institutional controls (ICs) will be implemented as part of the remedial action to ensure the users of the property are not exposed to the contaminants of concern in soil;

6. Replacement of excavated soil 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-removal condition. Once the parcels are sodded or seeded, removal site control 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. The aforementioned work shall be documented in a Work Plan;
7. Transportation and disposal off-site of any hazardous substances, pollutants and contaminants at a CERCLA-approved disposal facility in accordance with EPA's Off-Site Rule (40 CFR § 300.440);
8. Performance of any other response actions to address any release or threatened release of a hazardous substance, pollutant or contaminant that the EPA On-Scene Coordinator (OSC) determines may pose an imminent and substantial endangerment to the public health or the environment; and
9. Conduct an evaluation to determine if soil excavation activities result in a release of lead scale particles from lead service lines into the drinking water supply. This sampling will be conducted from parcels being excavated in the fall of 2016. Data will be evaluated prior to the 2017 construction season to determine if construction activities impact drinking water quality. Bottled water and water filters will be provided during and after the soil excavation activities as necessary during the evaluation period. Based on findings from the 2016 evaluation, a determination will be made on whether the provision of bottled water and water filters should continue beyond the evaluation period. (Note: This evaluation is being conducted at the request of the Agency for Toxic Substances and Disease Registry, see memo from Mark Johnson to Doug Ballotti dated October 24, 2016.)

Data results in Zone 1 from indoor dust from the first 154 homes sampled indicate 69 parcels exceed the EPA screening level of 316 mg/kg for lead for indoor living spaces. Given the significant number of indoor samples that indicated action is needed and the threat posed by high concentrations of lead in soil in adjacent outdoor areas, and the consistent pattern of EBL levels in children less than 6 years of age living in WCHC and portions of Zone 2, EPA, at the request of the residents and homeowners, will vacuum sample indoor dust for lead and arsenic. EPA will clean the inside of residences that are above the risk-based screening criteria of 316 mg/kg for lead and 100 mg/kg arsenic for indoor dust from industrial-related activities. In general, the indoor cleanup process will involve four basic steps: (1) collection of indoor dust vacuum samples (in homes previously not sampled), (2) possible temporary relocation of residents, (3) removal of contaminated indoor dust from floors and carpeting, and cleaning of accessible HVAC systems and filter replacement (4) Post cleaning clearance sampling; and (5) the return of occupants to their residence if temporarily relocated. A combination of HEPA vacuums and/or wet cleaning will be used to remove contaminated dust from floors, carpeting and HVAC systems. Replacement of carpets/mats may be considered on a case by case basis if cleaning mechanisms fail to remove lead and arsenic dust below cleanup criteria.

Removal activities associated with indoor sampling, evaluation, and removal of contaminated dust in homes in Zone 2 will include:

1. Development of a Work Plan and Site Specific Health and Safety Plan;
2. Development and implementation of an air monitoring/sampling plan for the work zone and Site;
3. Continuation of indoor dust and other sampling as determined necessary;
4. Provision for Site security, as directed by the OSC;
5. Development of a relocation plan to address, if necessary, the temporary relocation of residents during the cleaning process;
6. Performance of interior dust cleanup activities as specified in the Site Work Plan;
7. Transportation and disposal off-site of any hazardous substances, pollutants and contaminants at a CERCLA-approved disposal facility in accordance with EPA's Off-Site Rule (40 CFR § 300.440); and
8. Performance of any other response actions to address any release or threatened release of a hazardous substance, pollutant or contaminant that the EPA On-Scene Coordinator (OSC) determines may pose an imminent and substantial endangerment to the public health or the environment.

The Action Memorandum and supporting documentation follow the April 2002 Superfund Response Actions: Temporary Relocations Implementation Guidance, particularly in considering residents' needs, property security, dealing with resident's stress and disruptions, and explaining benefits. Consistent with EPA's guidance on temporary relocations (2002), Sec. IV.A ("Making the Relocation Decision"), temporary relocation at the Site is justified during the cleaning process by the following factor:

- Efficiency of response action: temporary relocation minimizes concerns about noise, property access, and other restrictions on the hours or types of response activities that may be conducted at the Site.

The removal actions will be conducted in a manner not inconsistent with the NCP.

The threats posed by uncontrolled substances considered hazardous meet the NCP criteria listed at § 300.415(b), and the response actions proposed herein are consistent with any long-term remedial actions which may be required.

Off-Site Rule

All hazardous substances, pollutants, or contaminants removed off-site pursuant to this removal action for treatment, storage, and disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R. § 300.440.

1. Contribution to remedial performance

The proposed action should not impede future remedial performance.

2. Engineering Evaluation/Cost Analysis (EE/CA)

Not Applicable

3. Applicable or relevant and appropriate requirements (ARARs)

All applicable or relevant and appropriate requirements (ARARs) will be complied with to the extent practicable. On August 18, 2016, EPA sent an e-mail to Rex Osborn of IDEM asking for any State of Indiana ARARs that may apply. IDEM provided both Action and Chemical specific state ARARs in a letter dated August 26, 2016. EPA will consider and implement the submitted ARARs as appropriate.

Project Schedule

The time-critical removal actions will require approximately 528 working days to complete.

B. Removal Project Ceiling Estimate – Extramural Costs:

The detailed cleanup contractor cost is presented in Attachment 1 and the Independent Government Cost Estimate is presented in Attachment IV. Estimated project costs are summarized below:

REMOVAL ACTION PROJECT CEILING ESTIMATE

<u>Extramural Costs</u>	<u>Current Ceiling</u>	<u>Proposed Increase</u>	<u>Proposed Ceiling</u>
<u>Regional Removal Allowance</u>			
<u>Costs:</u>			
Total Cleanup Contractor Costs (This cost category includes estimates for ERRS, subcontractors, Notices to Proceed, and Interagency Agreements with Other Federal Agencies and 20% Contingency)	\$18,875,702	\$10,133,755	\$29,009,457
<u>Other Extramural Costs Not Funded from the Regional Allowance:</u>			
Total START, including multiplier costs	\$3,122,250	\$1,425,000	\$4,547,250
<u>Subtotal</u>			
Subtotal Extramural Costs	\$21,997,952	\$11,558,755	\$33,556,707
Extramural Costs Contingency (20% of Subtotal, Extramural Costs rounded to nearest thousand for Proposed Increase)	<u>\$4,399,590</u>	\$2,311,751	
TOTAL REMOVAL ACTION PROJECT CEILING	\$26,397,542	\$13,870,506	\$40,268,048

The response actions described in this memorandum directly address the actual or threatened release of hazardous substances, pollutants, or contaminants at the Site which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the Site conditions, the nature of the hazardous substances and pollutants or contaminants documented in Zone 2 of OU1, and the potential exposure pathways to nearby populations described in Section II and Section III, above, actual or threatened releases of hazardous substances and pollutants or contaminants from this Site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VIII. OUTSTANDING POLICY ISSUES

None

IX. ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for this Site is contained in the Confidential Enforcement Addendum.

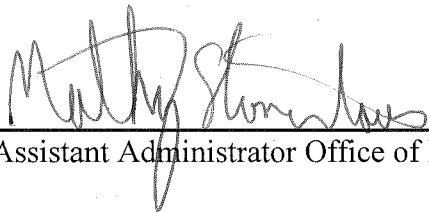
The total EPA costs of this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be \$68,457,330¹.

$$(\$40,268,048 + \$2,000,000) + (61.96\% \times \$42,268,048) = \$68,457,330$$

¹ Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States right to cost recovery.

X. RECOMMENDATION

This decision document, along with the Action Memorandum signed on January 22, 2008, and the Action Memorandum Amendments signed on August 13, 2008, September 12, 2011, and October 13, 2016 represents the selected removal action for the U.S. Smelter and Lead Refinery Site, Zone 2, OU1, East Chicago, Lake County, Indiana. It was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for the Site (Attachment II). Conditions at OU1, Zone 2 meet the NCP Section 300.415(b) criteria for a removal action and the CERCLA Section 104(c) emergency exemption from the \$2 million and 12-month limitation. The total removal action project ceiling, if approved, will be \$40,268,048 of which as much as \$33,770,398 may be used from the removal allowance. I recommend your approval of the proposed removal action. You may indicate your decision by signing below.

APPROVE  DATE: 10/28/16
Assistant Administrator Office of Land and Emergency Management

DISAPPROVE _____ DATE: _____
Assistant Administrator Office of Office of Land and Emergency Management

Enforcement Addendum

Figures:

- Figure 1 – USS Lead and Lead Refinery, E. Chicago, IN. Location Map
- Figure 2 – OU1 Zones 1, 2, and 3– Location Map

Attachments:

- I. Environmental Justice Analysis
- II. Administrative Record Index
- III. Detailed Cleanup Contractor Estimate
- IV. Independent Government Cost Estimate
- V. Summary of OU1 RD Soil Sampling Results
- VI. Indoor Dust Screening Criteria for Lead
- VII. Indoor Dust Screening Criteria for Arsenic
- VIII. Third Amended Action Memorandum dated October 13, 2016

cc: Brian Schlieger, U.S. EPA, 5104A/B517F (**Schlieger.Brian@epa.gov**)
Lindy Nelson, U.S. DOI, **w/o Enf. Addendum** (**Lindy_Nelson@ios.doi.gov**)
Rex Osborn, IDEM **w/o Enf. Addendum** (**rosborn@idem.in.gov**)

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**NOT RELEVANT TO SELECTION
OF REMOVAL ACTION**

ENFORCEMENT ADDENDUM

HAS BEEN REDACTED – TWO PAGES

ENFORCEMENT CONFIDENTIAL

NOT SUBJECT TO DISCOVERY

FOIA EXEMPT

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

Figure 1
Site Location
USS Smelter and Lead Refinery , East Chicago, IN

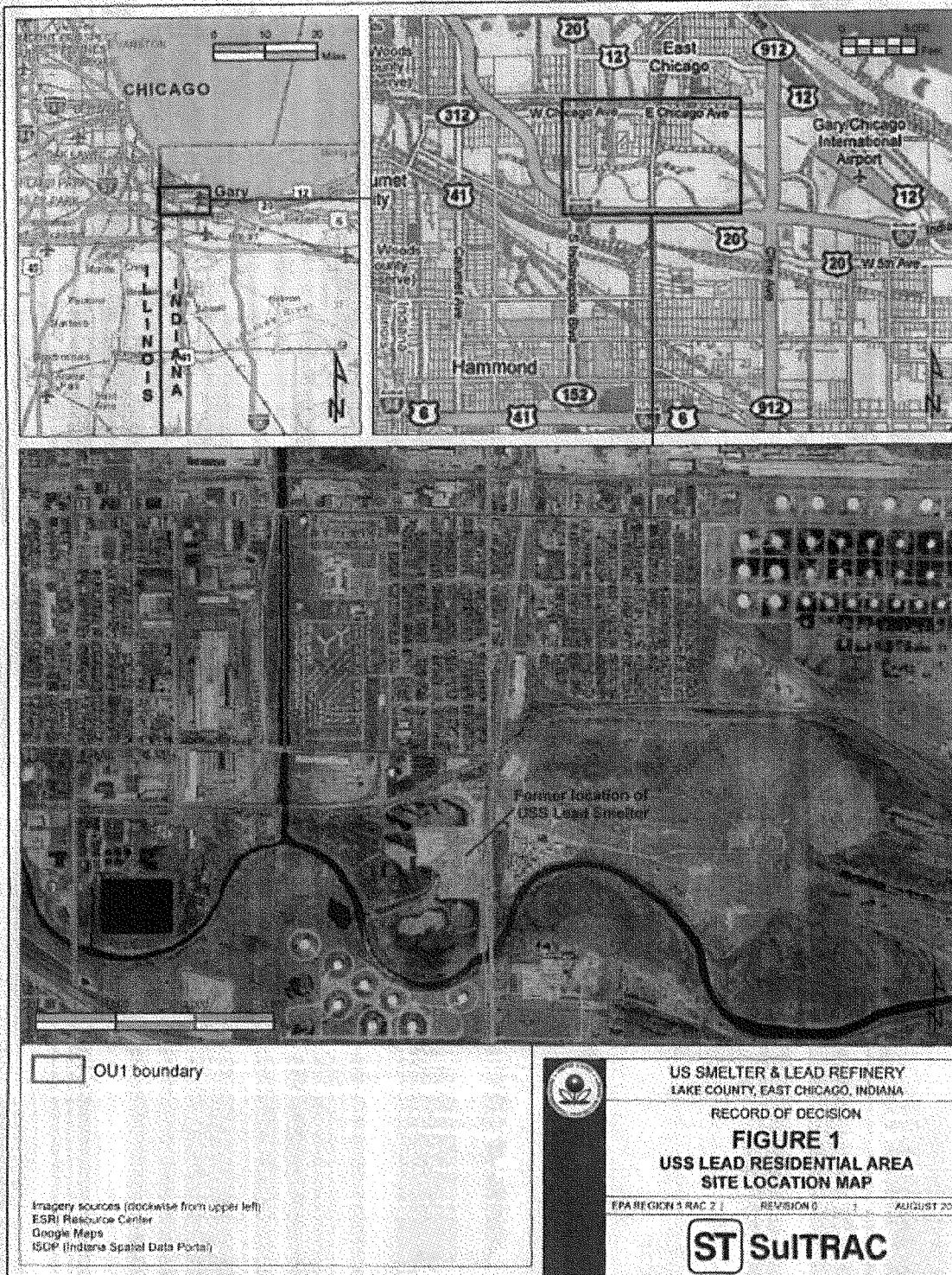


FIGURE 2
Zone 2/OU1 MAP
U.S. Smelter and Lead Refinery Site, East Chicago, Lake County, Indiana



ATTACHMENT I

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION**

**ENVIRONMENTAL JUSTICE ANALYSIS
FOR
U.S. SMELTER AND LEAD REFINERY SITE, EAST CHICAGO, LAKE COUNTY,
INDIANA**

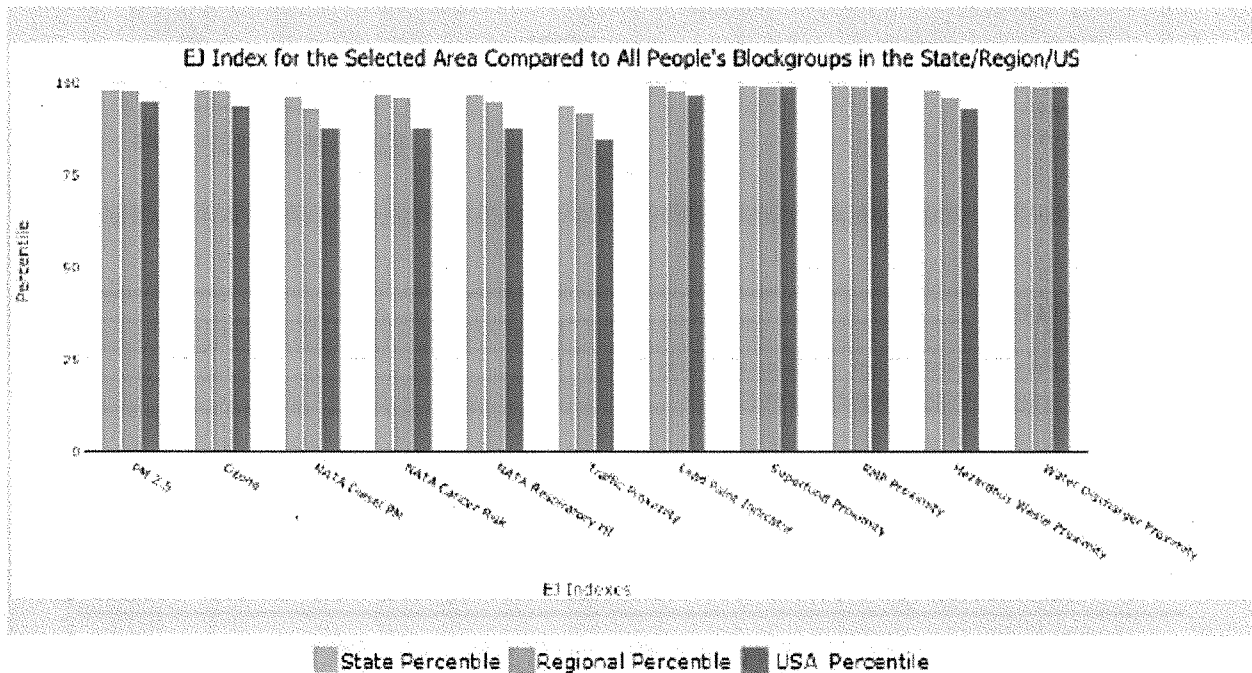


0.5 mile Ring Centered at 41.623974,-87.469228, INDIANA, EPA Region 5

Approximate Population: 2,455

Input Area (sq. miles): 0.79

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	98	98	95
EJ Index for Ozone	98	98	94
EJ Index for NATA* Diesel PM	96	93	88
EJ Index for NATA* Air Toxics Cancer Risk	97	96	88
EJ Index for NATA* Respiratory Hazard Index	97	95	88
EJ Index for Traffic Proximity and Volume	94	92	85
EJ Index for Lead Paint Indicator	99	98	97
EJ Index for Superfund Proximity	99	99	99
EJ Index for RMP Proximity	99	99	99
EJ Index for Hazardous Waste Proximity	98	96	93
EJ Index for Water Discharger Proximity	99	99	99

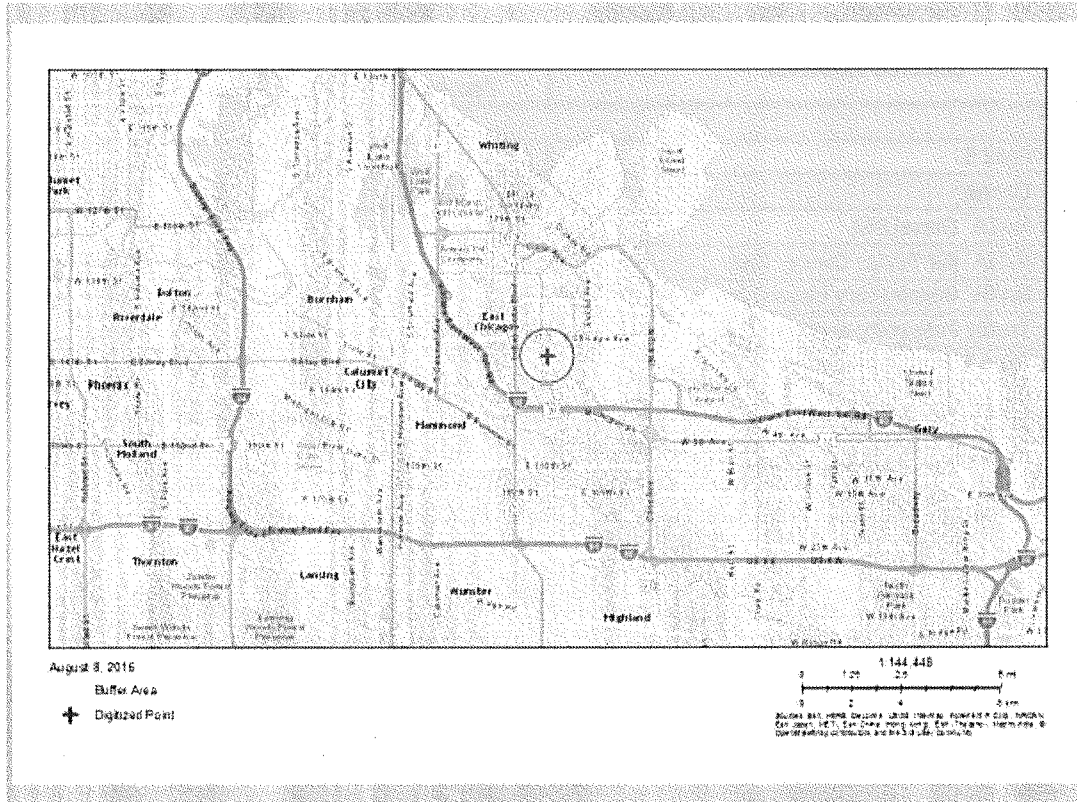


This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.



0.5 mile Ring Centered at 41.623974, -87.469228, INDIANA, EPA Region 5

Approximate Population: 2,455
Input Area (sq. miles): 0.79



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0



EJSCREEN Report (Version 2016)

0.5 mile Ring Centered at 41.623974, -87.469228, INDIANA, EPA Region 5

Approximate Population: 2,455

Input Area (sq. miles): 0.79



Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in $\mu\text{g}/\text{m}^3$)	11.7	11	98	10.6	86	9.32	93
Ozone (ppb)	48.8	51.2	11	50.3	21	47.4	52
NATA* Diesel PM ($\mu\text{g}/\text{m}^3$)	0.86	0.835	57	0.931	50-60th	0.937	50-60th
NATA* Cancer Risk (lifetime risk per million)	32	34	38	34	<50th	40	<50th
NATA* Respiratory Hazard Index	1.5	1.4	61	1.7	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	240	250	73	370	70	590	65
Lead Paint Indicator (% Pre-1960 Housing)	0.65	0.38	82	0.39	77	0.3	84
Superfund Proximity (site count/km distance)	1.5	0.16	99	0.12	99	0.13	99
RMP Proximity (facility count/km distance)	4.3	0.52	99	0.51	99	0.43	99
Hazardous Waste Proximity (facility count/km distance)	0.09	0.044	91	0.069	78	0.072	77
Water Discharger Proximity (facility count/km distance)	2.9	0.34	99	0.31	99	0.31	99
Demographic Indicators							
Demographic Index	84%	27%	99	29%	97	36%	96
Minority Population	92%	19%	98	24%	94	37%	91
Low Income Population	77%	35%	95	33%	95	35%	95
Linguistically Isolated Population	5%	2%	87	2%	83	5%	70
Population With Less Than High School Education	22%	12%	84	11%	87	14%	78
Population Under 5 years of age	10%	6%	81	6%	83	6%	81
Population over 64 years of age	8%	14%	23	14%	23	14%	27

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: <https://www.epa.gov/national-air-toxics-assessment>.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

ATTACHMENT II

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION**

**ADMINISTRATIVE RECORD
FOR THE
U.S. SMELTER AND LEAD SITE
EAST CHICAGO, LAKE COUNTY, INDIANA**

**UPDATE 4
OCTOBER 2016
SEMS ID:**

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
1	424362	8/1/03	U.S. EPA	File	Superfund Lead Contaminated Residential Sites Handbook	124
2	424349	3/1/04	Geochemical Solutions	USS Lead	Final USS Lead Modified RCRA Facility Investigation (MRFI) Report (Draft: Text Only)	46
3	308202	3/1/04	Geochemical Solutions	USS Lead	Final USS Lead Modified RCRA Facility Investigation (MRFI) Report (Draft)	878
4	315595	11/18/08	Micke, F., U.S. EPA	Distribution List	Pollution Report (POLREP) #3 - Final	3
5	424390	8/31/09	Weston Solutions	U.S. EPA	Federal OSC Report, Revision 1, CERCLA Removal Action	44
6	413853	11/1/11	Micke, F., U.S. EPA	Distribution List	Pollution Report (POLREP) #1 - Initial - USS Lead-2	5
7	418177	11/16/11	Micke, F., U.S. EPA	Distribution List	Pollution Report (POLREP) #2 - USS Lead-2	6
8	418526	12/15/11	Micke, F., U.S. EPA	Distribution List	Pollution Report (POLREP) #3 - USS Lead-2	6

9	424434-424435	6/1/12	SulTRAC	U.S. EPA	Remedial Investigation Report (Final) for the U.S. Smelter and Lead Refinery Superfund Site w/ Appendices A-D (<i>Portions of this document have been redacted</i>)	9086
10	928966	7/1/12	U.S. Dept. of Housing and Urban Development	File	Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing	874
11	929468	7/23/13	Del Toral, M., Porter, A., and Schock, M., U.S. EPA	File	Journal Article: "Detection and Evaluation of Elevated Lead Release from ServiceLines: A Field Study"	8
12	928964	7/1/16	SulTRAC	U.S. EPA	Data Evaluation Report for Sampling Conducted During 2014-2015 - USS Lead Residential Area (Text, Figures, and Tables)	101
13	928955	8/8/16	Johnston, M., U.S. EPA	Ribordy, M., U.S. EPA	Email re: Blood Lead Level Summary for Action Memo	2
14	928958	8/10/16	Vickers, J., Tetra Tech	Behnke, K., U.S. EPA	Data Validation Report - USS Lead Indoor Dust Samples from July 29 - August 4, 2016	35
15	928957	8/11/16	Vickers, J., Tetra Tech	Behnke, K., U.S. EPA	Data Validation Report - USS Lead Indoor Dust Samples from August 5, 2016	11
16	928959	8/12/16	Vickers, J., Tetra Tech	Behnke, K., U.S. EPA	Data Validation Report - USS Lead Indoor Dust Samples from August 8, 2016	10
17	928960	8/16/16	Vickers, J., Tetra Tech	Behnke, K., U.S. EPA	Data Validation Report - USS Lead Indoor Dust Samples from August 9, 2016	9
18	928969	8/16/16	King, J., Indiana State Department of Health	File	Lead Risk Assessment Reports for 14 Properties (<i>Portions of this document have been redacted</i>)	382
19	928968	8/18/16	Johnson, M., ATSDR	Ribordy, M., U.S. EPA	Email re: USS Lead - Updated Summary Table (<i>Portions of this document have been redacted</i>)	4
20	928961	8/24/16	Osborn, R., IDEM	Ribordy, M., U.S. EPA	Email re: Lack of State Resources to Conduct Removal	2

21	928962	8/26/16	Petroff, D., IDEM	Ribordy, M., U.S. EPA	Letter re: Applicable or Relevant and Appropriate Requirements (ARARs)	3
22	929439	9/14/16	Caudill, M., ATSDR	Ribordy, M., U.S. EPA	Email re: Blood Lead Level Statements for Your Records	1
23	929469	10/7/16	Johnson, M., ATSDR	Ballotti, D., U.S. EPA	Memo re: Evaluation of Release of Lead from Water Service Lines and Temporary Use of Water Filters	2
24	-	-	Ballotti, D., U.S. EPA	Stanislaus, M., U.S. EPA	Action Memorandum re: Request for an Exemption from the \$2 Million and 12-month Statutory Limits, Change in Scope of the Response and Ceiling Increase for the Time-Critical Removal Action at the U.S. Smelter and Lead Refinery Site (<i>PENDING</i>)	-

ATTACHMENT III

DETAILED CLEANUP CONTRACTOR ESTIMATE

HAS BEEN REDACTED – TWO PAGES

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

ATTACHMENT IV

INDEPENDENT GOVERNMENT COST ESTIMATE

HAS BEEN REDACTED – FOUR PAGES

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

ATTACHMENT V

SUMMARY OF OU1 RD SOIL SAMPLING RESULTS FOR ZONE 2

HAS BEEN REDACTED – TWELVE PAGES

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

ATTACHMENT VI

US Smelter and Lead Refinery Site Dust Screening Level for Lead



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
9311 GROH ROAD
GROSSE ILE, MI 48138

MEMORANDUM

SUBJECT: Development of an Indoor Dust Screening Criteria for the USS Lead Site

FROM: Keith Fusinski, PhD Toxicologist US EPA
Superfund Division, Remedial Response Branch #1, Remedial Response Section #1

TO: Jim Mitchell, On-Scene Coordinator US EPA
Superfund Division, Emergency Response Branch #2, Emergency Response Section #4

AND

Kristina Behnke, On-Scene Coordinator US EPA
Superfund Division, Emergency Response Branch #2, Emergency Response Section #3

DATE: 8/10/2016

The Integrated Exposure Uptake Biokinetic (IEUBK) model used by the US Environmental Protection Agency (USEPA) uses the concentration of indoor dust as a key parameter to evaluate risks to children from lead in soil. EPA separates dust into fine ($\leq 150 \mu\text{m}$) and coarse ($> 150 \mu\text{m}$) fractions. It has been shown that the fine particle size is the fraction that is most likely to adhere to children's hands and be ingested. In addition, more recent information also indicates that there is a potential for enrichment of lead in smaller sized particles and increased bioavailability (USEPA 2016). Using only the fine particle size concentration for screening can improve the accuracy of exposure and risk calculations in lead risk assessments.

The IEUBK model (version 1.1 Build 11) was used to determine an indoor dust screening level for lead. The default assumption in the model is that the concentration of lead in indoor dust is 70% of the concentration of lead in outdoor soil (Brattin and Griffin - 2011). US EPA recommends that lead concentrations in residential soil do not exceed 400 parts per million (ppm) in soil.

The modeling was performed using default inputs from the IEUBK model for diet, drinking water, air concentration and bioavailability. The IEUBK model was run using 400 ppm for lead in soil and modeled children 0 to 84 months of age. The calculated screening level to protect this population from a current US EPA acceptable blood lead level of $10 \mu\text{g/dL}$ is 316 ppm of lead in

dust. This concentration should be used when evaluating the fine particle size fraction of lead dust contamination.

REFERENCES

Brattin and Griffin - 2011 - William Brattin, Susan Griffin. Evaluation of the Contribution of Lead in Soil to Lead in Dust at Superfund Sites. *Human and Ecological Risk Assessment: An International journal* Vol. 17, Iss. 1, 2011.

USEPA 2016 - OLEM Directive 9200.1-128. Recommendations for Sieving Soil and Dust Samples at Lead Sites for Assessment of Incidental Ingestion.

Attachment VII

US Smelter and Lead Refinery Site Dust Screening Level for Arsenic



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
9311 GROH ROAD
GROSSE ILE, MI 48138

MEMORANDUM

SUBJECT: Development of an Indoor Dust Arsenic Screening Criteria for the USS Lead Site

FROM: Keith Fusinski, PhD Toxicologist US EPA
Superfund Division, Remedial Response Branch #1, Remedial Response Section #1

TO: Jim Mitchell, On-Scene Coordinator US EPA
Superfund Division, Emergency Response Branch #2, Emergency Response Section #4

AND

Kristina Behnke, On-Scene Coordinator US EPA
Superfund Division, Emergency Response Branch #2, Emergency Response Section #3

DATE: 9/20/2016

The US EPA determines probability of a non-cancer detrimental health effect to occur by calculating a hazard quotient (HQ). The HQ is a ratio of a single substance exposure level over a specified period of time to a reference dose of the same substance derived from a similar exposure period. It is recommended that the HQ of an exposure to a chemical of concern be below or equal to 1 which is the level at which no adverse human health effects are expected to occur. For cancer risk, the U.S. EPA recommends a screening level that would equate to a one in a million (1×10^{-6}) or greater lifetime risk of developing cancer from exposure to a contaminated site. However, rates up to 1 in 10,000 (1×10^{-4}) can be considered acceptable. The Office of Land and Emergency Management (OLEM) recommends removal management levels (RMLs) be set at an excess lifetime cancer risk (ELCR) of 1 in 10,000 or a non-cancer HQ of 3, whichever is most protective.

Per the direction of the EPA Lead Technical Review Workgroup, the Regional Screening Level (RSL) calculator was used to determine the "clearance" level for arsenic in dust at the USS Lead site. The calculator was set to determine arsenic concentrations based upon RMLs over a lifetime exposure of 24 hours a day, for 350 days per year, for 26 years (6 as child/20 as adult). With the ingestion rate of 100 mg/day of dust for all receptors (General Population Upper Percentile -EPA Exposure Factors Handbook 2011).

This results in a "clearance" level of **100 mg of arsenic/kg of dust**. Any concentrations of arsenic below this level is within our acceptable risk range or below it.

ATTACHMENT VIII

**THIRD AMENDED ACTION MEMORANDUM
DATED OCTOBER 13, 2016**