ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

U.S. SMELTER AND LEAD REFINERY, INC. (USS LEAD)
EAST CHICAGO, INDIANA
EPA FACILITY ID: IND047030226
JANUARY 29, 2010

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

Comment Period Ends:

MARCH 2, 2010

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment-Public Comment Release was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate. This document represents the agency's best efforts, based on currently available information, to fulfill the statutory criteria set out in CERCLA section 104 (i)(6) within a limited time frame. To the extent possible, it presents an assessment of potential risks to human health. Actions authorized by CERCLA section 104 (i)(11), or otherwise authorized by CERCLA, may be undertaken to prevent or mitigate human exposure or risks to human health. In addition, ATSDR will utilize this document to determine if follow-up health actions are appropriate at this time.

This document has previously been provided to EPA and the affected state in an initial release, as required by CERCLA section 104 (i) (6) (H) for their information and review. Where necessary, it has been revised in response to comments or additional relevant information provided by them to ATSDR. This revised document has now been released for a 30-day public comment period. Subsequent to the public comment period, ATSDR will address all public comments and revise or append the document as appropriate. The public health assessment will then be reissued. This will conclude the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

Please address comments regarding this report to:

Agency for Toxic Substances and Disease Registry
Attn: Records Center
1600 Clifton Road, N.E., MS F-09
Atlanta, Georgia 30333

You May Contact ATSDR Toll Free at
1-800-CDC-INFO or
Visit our Home Page at: http://www.atsdr.cdc.gov

PUBLIC HEALTH ASSESSMENT

U.S. SMELTER AND LEAD REFINERY, INC. (USS LEAD)

EAST CHICAGO, INDIANA

EPA FACILITY ID: IND047030226

Prepared by:

Site and Radiological Assessment Branch
Division of Health Assessment and Consultation
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

I. Foreword

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as the Superfund law. This law set up a fund to identify and clean up hazardous waste sites. The Environmental Protection Agency (EPA) and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment process allows ATSDR scientists and public health assessment cooperative agreement partners flexibility in document format when presenting findings about the public health impact of hazardous waste sites. The flexible format allows health assessors to convey to affected populations important public health messages in a clear and expeditious way.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high-risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to evaluate possible the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals, and community groups. To ensure that the report responds to the community's health concerns, an

early version is also distributed to the public for their comments. All the public comments that related to the document are addressed in the final version of the report.

Conclusions: The report presents conclusions about the public health threat posed by a site. Ways to stop or reduce exposure will then be recommended in the public health action plan. ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA or other responsible parties. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also recommend health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Rolanda Morrison
ATSDR Records Center (MS F-09)
4770 Buford Hwy, NE
Building 106, Room 2108
Atlanta, GA 30341

Table of Contents

II. Summary

SUMMARY

INTRODUCTION

ATSDR's top priority is to ensure that people living in East Chicago have the best information possible to safeguard their health.

ATSDR revisited this health assessment in response to EPA reproposing the site to the Superfund. The U.S. Smelter and Lead Refinery, Inc. (USS Lead), in East Chicago, Indiana, had operated as a primary and secondary smelting facility from 1906 until 1985. Since 1920, the primary product of USS Lead had been lead. Wastes which were produced during smelting operations are calcium sulfate sludge, blast furnace flue-dust, bag-house bags, rubber and plastic battery casings, and waste slag. Much of these wastes were stored on-site for recycling or disposal. All of the wastes, as well as on-site surface soils, are heavily contaminated with lead and other metals. The plant ceased operations in 1985. Clean-up efforts were overseen by the Indiana Department of Environmental Management. The site was proposed to the National Priorities List in February 1992, when USS Lead's parent company, Sharon Steel, filed for bankruptcy, but was never actually listed. EPA again proposed listing the site on the NPL in September 2008 and it was listed "Final" on April 9, 2009[1].

The limited sampling information that is available indicates that prior to the on-site removal action in the mid-1990s, on-site soils and wastes were contaminated with lead and other metals. The on-site buildings were demolished and along with the on-site waste, were buried on-site and capped. There is no data available to confirm that the on-site waste was contained and is not still accessible. There is also no current data on contamination levels in the wetlands or river bank that are down gradient from the former facility.

Additional sampling of surface soil from residential yards found substantial lead contamination had spread off-site as far as one-half mile to the north and northeast of the site. Ambient air monitoring, available for 1985 through 1989, indicated that elevated levels of lead were present in ambient air, both on- and off-site in 1985 when the smelter was in operation, but not since. Homes and yards to the North and Northeast of the site are safe and do not pose a health hazard from lead.

CONCLUSIONS

ATSDR reached 4 important conclusions in the health assessment:

Conclusion 1	U.S. Smelter and Lead Refinery site posed a hazard to public health in the past from breathing in lead contaminated air prior to 1985.
Basis for conclusion	When the smelter was in full operation, prior to 1985, the active smelter released significant quantities of lead contamination that was deposited on neighboring yards to the North and Northeast of the site.
Conclusion 2	Prior to 2006, lead contamination in yards downwind of the USS Lead site posed a public health hazard in the past for young children eating contaminated soil.
Basis for conclusion	EPA found substantial lead in surface soil in neighboring yards to the North and Northeast of the site, prior to removing the remaining contaminated soil in 2006.
Conclusion 3	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.
Basis for conclusion	The declining blood lead levels in small children appear to confirm that they are no longer exposed to lead from any source.
Conclusion 4	There is a lack of environmental data from the USS Lead Site, specifically in the area near the Grand Calumet River and around the landfill.
Basis for conclusion	The EPA Hazard Ranking relied on data taken prior to closure of the facility.
Next Steps	EPA needs to perform a comprehensive Remedial Investigation and Feasibility Study (RI/FS) for the US Smelter and Lead Refinery.

FOR MORE INFORMATION

For further information about this public health assessment, please call ATSDR at 1-800-CDC-INFO and ask for information about the "US Smelter and Lead Refinery" site. If you have concerns about your health, you should contact your health care provider.

III. Background

III.A. Site Description and History

The U.S. Smelter and Lead Refinery, Inc. (USS Lead) formerly operated on a 79-acre tract of property at 5300 Kennedy Avenue in East Chicago, Lake County, Indiana. The Indiana Harbor Belt Railroad is to the north of the site, the east-west toll road, and the east branch of the Grand Calumet River to the south, Kennedy Avenue to the east and Indiana Harbor Canal to the west. It lies within the flood plain of the Grand Calumet River.

From about 1906 to 1920 a copper smelter operated on the property. An additional facility to produce arsenic may have also existed on-site. All of the buildings were demolished and removed in the mid-1990s including; the Tank House (bag-house dust), Store Building, Club Building, Main Office and Laboratory Building, Sulfuric Acid Building (renamed the Battery Breaker Building), Tellurium Building, and the Byproducts Building. There was also an Old Silver Refinery Building, which was demolished in the late 1960s. Starting in 1920, among other activities, USS Lead operated a primary lead smelter on 25 acres of the property. In 1973, USS Lead converted to secondary smelting, recovering lead from scrap metal and old automobile batteries. Batteries were dismantled on-site, littering the area with rubber and plastic battery casings, and contaminating area soils with battery acids. Two waste materials were generated during smelting. The blast furnace slag was piled up south of the plant building. The pile was leveled off once a year into what was originally a nearby 21-acre wetland, according to the Army Corps of Engineers. Tests conducted in 1986 by the Indiana Department of Environmental Management (IDEM) detected elevated levels of lead in the slag. The second waste material, lead-containing flue-dust emitted by the blast furnace stack was originally trapped in bag filters and stockpiled on-site for possible recycling or sale. A larger blast furnace installed in 1973 was intended to recycle both new and stockpiled dust. The stockpiled dust covered a three to five-acre area. In 1982, the dust was brought under cover in the Tank House building to prevent dispersion by wind and rain. The dust was removed from the site in June 1992.

In 1975, USS lead received a permit under the National Pollutant Discharge Elimination system (NPDES) to discharge furnace cooling water and storm water runoff collected from the site to the Grand Calumet River. A second permit was issued in April 1985. Over the years, the permit levels for lead, cadmium, copper, arsenic, and zinc were frequently exceeded according to IDEM. In the 1980s, several state and federal enforcement actions were taken against USS Lead for permit violations. These violations, plus the dumping of slag water into the wetland contributed to past contamination of surface water in the area.

USS Lead ceased operation in December 1985. The site was proposed by the US Environmental Protection Agency (US EPA) to the National Priorities List (NPL) in February 1992, after USS Lead's parent company, Sharon Steel Corp, filed for bankruptcy. USS Lead's new parent company, Mueller Industries, Inc. had agreed to financially support the clean-up activities at the

site. The RCRA Administrative Order with USS Lead was entered into in 1993. Since 1999 all structures on the site have been demolished and removed. Contaminated materials have since been buried on-site and are no longer accessible. The Corrective Action Management Unit (CAMU) was built in 1999. The CAMU is a capped landfill constructed on-site. The demolished buildings and lead-contaminated soil were buried in the CAMU. Nothing was transported off-site for disposal. No post remediation sampling data is available to confirm that the contamination is contained or no longer accessible.

RCRA referred the residential areas to Superfund in 2004, which only relates to residential properties immediately to the north and northeast and within half a mile from the site. 14 residential properties were identified and had their yards remediated, but several hundred other residential yards may still be contaminated. RCRA referred the USS Lead Site (the facility property footprint) to Superfund in 2006. Contaminated wetlands and contaminated soil remain on-site.

In ATSDR's Public Health Assessment for the U.S. Smelter and Lead Refinery[2], Inc. dated August 4, 1994, the agency concluded that contamination from the site was a public health hazard. The agency also concluded there was insufficient sampling data to fully characterize the extent of the contamination, and recommended the need for further characterization of residential soil to determine the risk to human health. In February 1997, the Indiana State Department of Health (ISDH) requested that ATSDR perform an Exposure Investigation (EI), which is discussed in full on page 7. The EI was designed to address the data gaps identified in the 1994 public health assessment. More details on ATSDR's 1998 EI are provided in the Health Outcome Data section on page 8. In September 2008, the US EPA again proposed to list the USS Lead site on the NPL, due to lapse of RCRA authority. On April 9, 2009 the site was listed as "Final" on the Superfund[1].

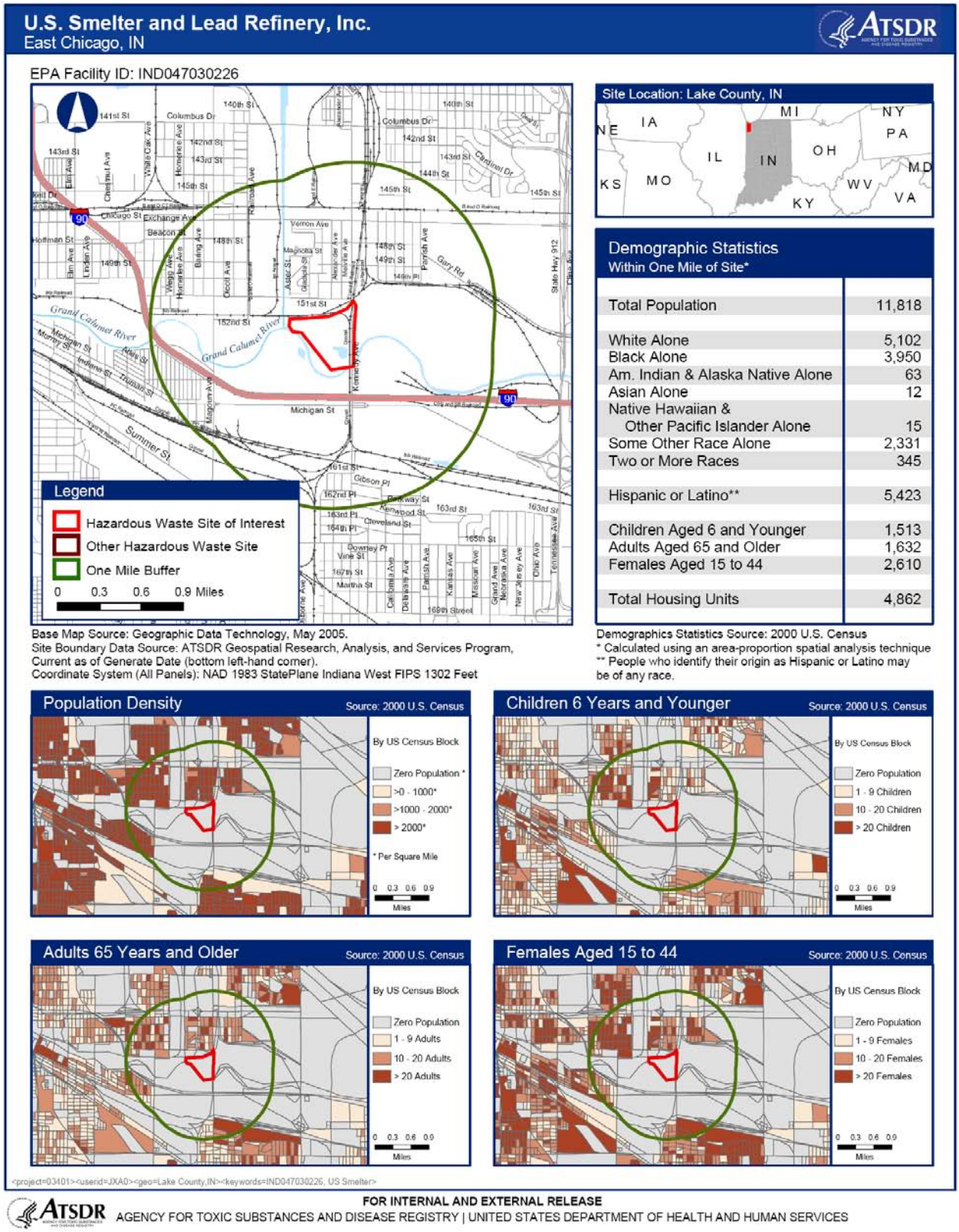
III.B. Demographics, Land Use, and Natural Resource Use

III.B.1. Demographics

The U.S. Census Bureau estimated that the population of East Chicago had declined to 30,594 by 2006, which was down 5.6% from 32,414 reported in the 2000 Census. In 1980, when the USS Lead facility was still in operation, the population of East Chicago was 39,786. ATSDR estimates that there are currently 11,818 persons living within one mile of the former facility. The closest household is within one-quarter mile from the site.

Figure 1 Aerial View of Former USS Lead Site*

*(dated March 2005 from Google Earth)



FOR INTERNAL AND EXTERNAL RELEASE

ATSDR AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY | UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES

Figure 2 Demographics within One Mile of USS Lead Site

III.B.2. Land Use

Land use in the immediate area is predominantly industrial; a DuPont Plant is located to the west, across Kennedy Avenue, and a tank farm is to the south, across the Grand Calumet River. Much of the southern part of the site adjacent to the Grand Calumet River is swamp. The nearest residences are within one-quarter mile north of the site. The site boundary is fully fenced to keep out trespassers.

III.B.3. Natural Resource Use

All water for drinking, commercial, and industrial uses is obtained from Lake Michigan. No private wells are in use near the site. A total of 4.1 million people obtain drinking water from intakes primarily into Lake Michigan within 15 miles downstream of where hazardous waste substances from the site enter into surface water. Lake Michigan, 3 miles south of the site, is used for fishing. The Grand Calumet River and Indiana Harbor, into which the river drains, are not fished. Hammond Beach Marina, which is used for recreation, is 4 miles west from where the canal enters Lake Michigan. Wabala Beach and several other major recreation areas are within 15 miles of the site.

III.B.4. Health Outcome Data

In May 1998, ATSDR completed an Exposure Investigation[3] which tested the blood-lead concentration of children in the West Calumet and Calumet communities to the North of the USS Lead site. Out of 98 participants, ten children had slightly elevated blood-lead concentrations between 10-20 µg/dL and 30% of children 6 years of age and under had blood lead levels greater than 10 µg/dL. Prior to 1992 more than 40% of the tested children under 6 years old in the West Calumet and Calumet communities exceeded blood-lead concentrations of 10 µg/dL. The Indiana State Department of Health (ISDH) has continued to collect blood lead data for this critical age group. The results can be seen in Table 1 and is also displayed in graphical form. A graph of historic blood lead levels for children under 6 years of age in the surrounding community can be seen in Figure 3.

Excess blood lead levels (EBBL) in the critical age group of children ages 0 to 6 years old appear to have fallen and are now consistent with the national average. The excellent work of the ISDH (nearly 100% testing of children in East Chicago and the abatement of lead paint in homes) and the removal of lead in gasoline are probably the reasons for the significant reduction in blood lead levels since the mid-90s.

Table 1 Historic Exceedances of Blood Lead Level (EBBL) for Children 6 and Younger in E. Chicago*

Year	*Children Tested*	*EBLL*	*% EBLL*
1998	164	12	7.3%
1999	133	6	4.5%
2000	110	14	13%
2001	121	9	7.4%
2002	479	21	4.4%
2003	670	31	4.6%
2004	939	40	4.3%
2005	977	54	5.5%
2006	960	31	3.2%
2007	905	29	2.3%
2008	1019	28	2.7%

*Data provided by ISDH

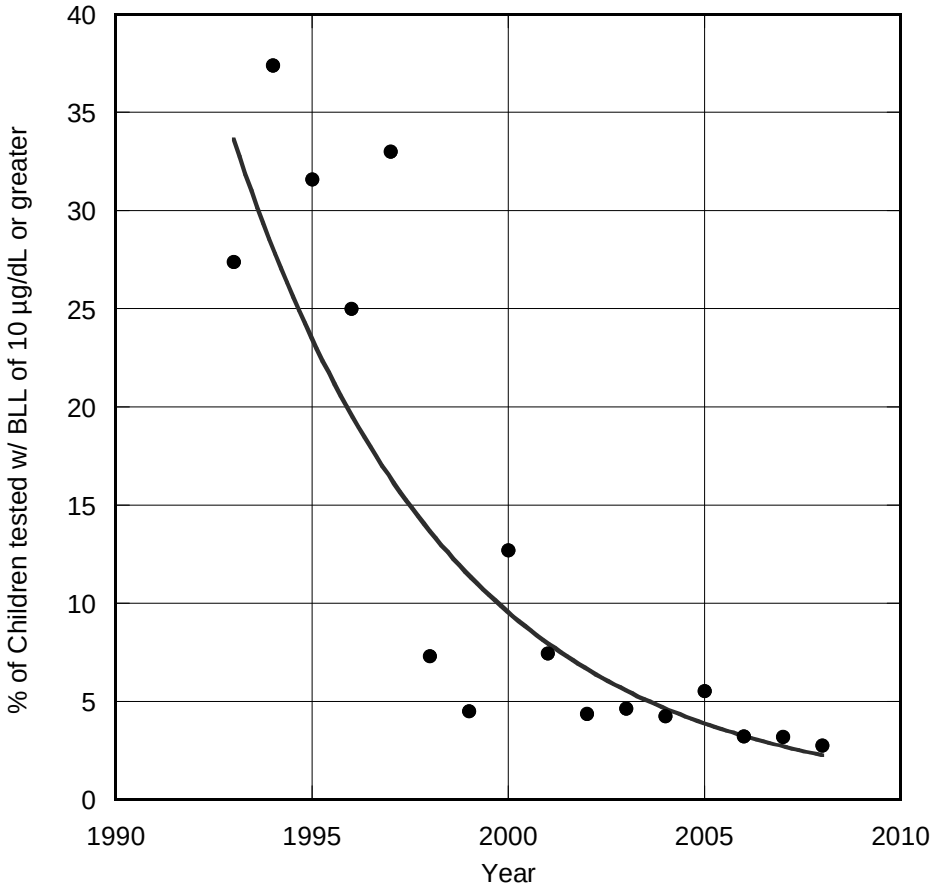


Figure 3 East Chicago Historic Lead Screening Data

IV. COMMUNITY HEALTH CONCERNS

No community health concerns were identified through questioning of representatives of the Lake County Health Department, the US EPA, and the Indiana Department of Environmental Management.

The ISDH in coordination with ATSDR released a public health assessment for public comment on May 20, 1993. The public comment period lasted until June 21, 1993. No comments were received by the ISDH in this period.

V. ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The U.S. Environmental Protection Agency (EPA) has conducted site remediation and community removal actions under the authority of the Resource Conservation and Recovery Act (RCRA). There has never been a Remedial Investigation or Feasibility Study (RI/FS) in the nearly 20 years since the site was originally proposed to the NPL. The only environmental sampling data is from neighborhood yards prior to a removal action and their remediation with clean fill.

The community to the north of the site has had several sampling events and a removal action in 2006. In May 2006, the On Scene Coordinator (OSC) from EPA oversaw a removal action of contaminated yard soil and backfill with clean soil at 14 properties in the downwind neighborhood. Prior to remediation, surface soil (0–1 inch) average lead concentrations ranged from 2,800 to 120 mg/kg prior to remediation. The arithmetic mean (i.e., average) concentration from those yards was 870 mg/kg in dry soil. The vast majority (>80%) of those 14 yards had concentrations that threatened the health of young children, 6 years of age and younger. The US EPA reported that the yards with the worst lead contamination have all been remediated and that the remaining yards have soil concentrations of lead below 120 mg/kg.

There are apparently no data available for lead concentrations on the former site of the U.S. Smelter and Lead Refinery, Inc. since it was partially remediated. The Hazard Ranking System (HRS) document[4] for USS Lead discusses pre-remediation soil, water and air samples that are no longer relevant. There does not appear to have been any coordinated post-remediation confirmatory sampling of the landfill, or any sampling of the wetlands down-gradient from the former site's facilities. EPA has not yet begun a remedial investigation of the site.

Table 2 Lead Concentration in Neighborhood Yards (0-1 inch depth) Prior to Removal Action

Property ID	Location	Lead Concentration (mg/kg)
X03	Backyard	2300
X13	Frontyard	1500
X42	Backyard	1400
X10	Backyard	1300
X07	Backyard	1200
X07	Frontyard	1200
X49	Backyard	1100
X19	Frontyard	1000
X24	Backyard	1000
X49	Frontyard	980
X13	Backyard	940
X50	Backyard	910
X46	Backyard	900
X26	Frontyard	880
X10	Frontyard	840
X50	Frontyard	830
X19	Backyard	810
X42	Frontyard	740
X15	Backyard	700
X46	Frontyard	690
X03	Frontyard	680
X26	Backyard	630
X24	Frontyard	620
X15	Frontyard	460
X48	Backyard	290
X48	Frontyard	150
X35	Backyard	120
X35	Frontyard	92

[5]Data from EPA Reg. V. May 2006 Removal Action

Table 3 Lead Concentration in Neighborhood Yards (1-6 inch depth)
Prior to Removal Action

Property ID	*Location*	*Lead Concentration (mg/kg)*
X49	*Backyard*	*2800*
X07	*Backyard*	*1800*
X50	*Backyard*	*1500*
X03	*Backyard*	*1400*
X26	*Backyard*	*1400*
X46	*Backyard*	*1300*
X10	*Backyard*	*1100*
X19	*Frontyard*	*1100*
X19	*Backyard*	*1000*
X49	*Frontyard*	*1000*
X07	*Frontyard*	*980*
X10	*Frontyard*	*870*
X03	*Frontyard*	*780*
X15	*Backyard*	*780*
X42	*Backyard*	*760*
X10	*Frontyard*	*750*
X13	*Backyard*	*690*
X26	*Frontyard*	*690*
X46	*Frontyard*	*680*
X46	*Frontyard*	*670*
X26	*Frontyard*	*630*
X24	*Frontyard*	*560*
X42	*Frontyard*	*560*
X13	*Frontyard*	*530*
X50	*Frontyard*	*520*
X15	*Frontyard*	*510*
X24	*Backyard*	*430*
X48	*Backyard*	*360*
X48	*Frontyard*	*290*
X35	*Frontyard*	*130*
X35	*Backyard*	*120*

Data from EPA Reg. V. May 2006 Removal Action

VI. Discussion

The facility has been shut down since December of 1985. Sampling data taken during a limited past removal action indicate that residential yards within half a mile to the north and northeast of the site appeared to have significant levels of lead in the top several inches of soil, prior to remediation. The site buildings and above ground contamination have been buried and capped on-site, leaving a large paved area where the facility once stood. The site has been fenced and intrusion is kept to a minimum.

VI.A. Toxicological Implications

Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil.

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. EPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973, which called for a gradual reduction of lead to one tenth of a gram per gallon by 1986. The average lead content in gasoline in 1973 was 2-3 grams per gallon or about 200,000 tons of lead a year. In 1975, passenger cars and light trucks were manufactured with a more elaborate emission control system which included a catalytic converter that required lead-free fuel. In 1995 leaded fuel accounted for only 0.6 percent of total gasoline sales and less than 2,000 tons of lead per year. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles[6].

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 your 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.

VI.B. Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults; this means they breathe dust, soil, and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health. ATSDR is committed to evaluating children's sensitivities at areas such as the USS Lead Site.

ATSDR has attempted to identify populations of children in the vicinity of the USS Lead Site and any public health hazards threatening these children. Some 1500 children aged 6 and younger live within a 1-mile radius of the USS Lead Site. All calculations, health guidelines, and comparison values consider the sensitivities of children.

14 remaining down wind yards were sampled prior to a removal action. The average surface soil concentration in those yards was 870 mg/kg prior to remediation. These concentrations were probably representative of the soil concentrations in the downwind neighborhoods, prior to remediation. ATSDR concludes that children who contact lead-contaminated soil in the past, while playing in lead-contaminated soil on unremediated yards within half a mile to the north and northeast of the USS Lead Site were at risk of health problems in the past.

Children can also be exposed to lead from paint by eating sweet-tasting lead paint chips or, through hand-to-mouth behavior, by eating lead paint dust. ATSDR recommends that parents concerned about their children's exposure to lead have their children's blood lead levels tested by their health care provider.

Different investigators have found widely varying relationships between soil and dust lead levels and children's blood lead levels. Based on a review of other investigators, the Centers for Disease Control and Prevention (CDC) reports that blood lead levels generally rise 3 to 7 micrograms per deciliter (µg/dL) for each increase of 1,000 ppm of lead in soil or dust[7,8,9,10]. The CDC has established a blood lead level of 10 µg/dL (10 micrograms of lead per deciliter of blood) as a level of concern for case management. It should be noted, though, that lead levels below 10 µg/dL also cause harmful effects in children.

CDC established their case management level of 10 µg/dL after evaluating a large number of rigorous epidemiologic and experimental studies. In particular, recent human studies have

provided new evidence about the association between low-level lead exposure and harmful development effects in children[11]. Low level lead exposure is associated with decreased intelligence and impaired neurobehavioral development. Many other effects begin at low blood lead levels, including decreased stature or growth, decreased hearing, and decreased ability to maintain a steady posture, and become more pronounced at higher blood lead levels.

In the past, elevated levels of lead in soil of properties downwind from the USS Lead site along with lead from other sources increases the risk in some preschool children for having increased levels of lead in their blood. Low-level exposure to lead is expected to cause the following health effects in some children:

- neurobehavioral effects, such as decreased intelligence or delays in development,
- impaired growth (decreased stature),
- endocrine effects, most commonly altered vitamin D metabolism,
- blood effects, such as changes in blood enzyme levels, and
- decreased performance on hearing tests.

These lead-related effects are documented in several population studies that investigated the harmful effects of lead.

In evaluating public health issues concerning children and lead, it is important to remember that children get exposed to lead from many sources. In addition to lead coming from soil, children also get exposed to lead from other sources. Here are a few examples:

- lead in a child's diet,
- lead in drinking water,
- lead from leaded paint,
- lead from lead-glazed pottery,
- other unidentified sources.

VII. Conclusions

1. ATSDR concludes that the U.S. Smelter and Lead Refinery site posed a hazard to public health in the past from breathing in lead contaminated air prior to 1985.
2. ATSDR concludes that prior to 2006, lead contamination in yards downwind of the USS Lead site posed a public health hazard in the past for young children eating contaminated soil.
3. ATSDR concludes that breathing the air, drinking tap water or playing in soil around the USS Lead Site is not expected to harm people's health, as indicated by the declining blood lead levels in small children.
4. ATSDR concludes that there is a lack of current environmental data from the USS Lead Site, specifically in the area near the Grand Calumet River.

VIII. Recommendations

1. ATSDR recommends that EPA perform confirmatory sampling to ensure the on-site landfill is preventing access to contamination and that it is not leaking.
2. ATSDR recommends that EPA systematically sample for lead and heavy metals on-site in the wetlands and river bank.
3. ATSDR recommends deed restrictions for the former USS Lead site to preclude residential development in the future.

IX. Public Health Action Plan

1. ATSDR completed a final public health assessment for the U.S. Smelter and Lead Refinery site in 1994, which concluded that lead contamination was a public health hazard from contaminated soil both on-site and in the neighborhood to the north and northeast within half a mile.
2. As a follow-up to data gaps identified in the 1994 public health assessment, NCEH in coordination with the Indiana State Department of Health performed blood lead testing of local residents.
3. The Indiana State Department of Health has continued blood lead testing of children in East Chicago annually since 1991.

Authors, Technical Advisors

Michael Brooks, MSHP, CHP
Senior Health Physicist, Lead Health Assessor
Site and Radiological Assessment Branch
Division of Health Assessment and Consultation
ATSDR

David Mellard, Ph.D.
Senior Toxicologist
Site and Radiological Assessment Branch
Division of Health Assessment and Consultation
ATSDR

References

1 EPA Federal Register Notice (FR Doc. E9-7825 Filed 4-8-09).

2 Agency for Toxic Substances and Disease Registry. 1994. Public Health Assessment for the U.S. Smelter and Lead Refinery in East Chicago, IN. Atlanta: US Department of Health and Human Services.

3 Agency for Toxic Substances and Disease Registry. 1998. Environmental Investigation for the U.S. Smelter and Lead Refinery in East Chicago, IN. Atlanta: US Department of Health and Human Services.

4 Jaworski, M. Indiana Department of Environmental Management. EPA HRS Documentation Record. September 2008.

5 EPA. Data from EPA Reg. V. May 2006 Removal Action

6 EPA Federal Register Notice (FR Doc. 96-2231 Filed 2-1-96).

7 CDC. Preventing lead poisoning in young children. Atlanta: GA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, October 1991.

8 Environmental Protection Agency. Air quality criteria for lead. Research Triangle Park (NC): Office of Health and Environmental Assessment, EPA, 1986; EPA report no. EPA/600/8083/028aF

9 Bornschein RL, Succop PA, Drafft KM, Clark SC, Peace B, Hammond PB. Exterior surface dust lead interior house dust lead and childhood lead exposure in an urban environment. In: Hemphill D, ed. Trace substances in environmental health. Columbia. (MO): University of Missouri, 1986;322-32.

10 Agency for Toxic Substances and Disease Registry. The nature and extent of lead poisoning in children in the United States: a report to congress. Atlanta: US Department of Health and Human Services, Public Health Service, 1988.

11 Agency for Toxic Substances and Disease Registry. Summary report for the ATSDR soil-pica workshop. Atlanta: US Department of Health and Human Services, Public Health Service, 2001, March.