HRS DOCUMENTATION RECORD--REVIEW COVER SHEET

Name of Site: U.S. Smelter and Lead Refinery, Inc. (USS Lead)

Contact Persons

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Pathways, Components, or Threats Not Scored

The ground water migration pathway, the soil exposure pathway, and the drinking water threat and human food chain threat of the surface water pathway were not scored as part of this Hazard Ranking System (HRS) evaluation. These pathways/components were not included because a release to these media does not significantly affect the overall site score and because the environmental threat component of the surface water migration pathway and the air pathway produce an overall site score well above the minimum required for the site to qualify for inclusion on the National Priorities List (NPL). These pathways are of concern to EPA and may be evaluated during future investigations.

Note: The air pathway documents an observed release of lead at USS Lead (See Section 6.1.1 of this HRS documentation record). This is further supported by evidence of soil contamination, both on and off the property in the vicinity of USS Lead. Levels of lead which may pose a threat to nearby individuals have been documented on the USS Lead property, as well as on nearby residential areas. Residential soil lead levels ranged from as low as 62.6 mg/kg (background level) to as high as 1680 mg/kg [Refs. 64, pp. 3-3, 4-5 to 4-6, 4-9 to 4-11, Appendix D; 81, Table 3, Figures 4a, 4b, 8a,8b & 9, Appendix E Tables E-1, E-2 & E-3; 82, pp. 7, 8, 9, Table 1 (p. 58); 94, pp 003 to 018, 044, 048, 049, 050, 052 to 055, 057 to 060, 063, 065 to 070, 072, 073, 075 to 079, 086, 087, 090, 092, 093, 110].Until a more comprehensive study can be done, however, elevated lead levels in the residential soils will not be used in the overall site score.

HRS DOCUMENTATION RECORD

Name of Site:	U.S. Smelter and Lead Refinery, Inc.
EPA Identification No.:	IND047030226
EPA Region:	5 Date Prepared: September 2008
Street Address of Site:	5300 Kennedy Avenue* (Refs. 67, p. 004; 68, p. 1)
County/State/Zip Code:	Lake County, Indiana, 46312
General Location in the State:	Northwestern Indiana (Refs. 17; 18; 19; 20)
Topographic Map:	Highland, Indiana Quad (7.5') (Ref. 18)
Latitude:	N41^{o} 37'0.33"Longitude: W87^{o}27'50.57" (Ref. 106)
Site Reference Point:	Approximate center of the source area
Congressional District:	01

* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, placed, or otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

SITE SCORING SUMMARY

Pathway Scores:

Air Pathway	*100.00*
Ground Water Pathway	*NS*
Soil Exposure Pathway	*NS*
Surface Water Pathway	*60.00*
HRS SITE SCORE	*58.31*

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw})	NS	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	60.00	3600.00
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	60.00	3600.00
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	100.00	10000.00
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		13600.00
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root		58.31

TABLE 4-1
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

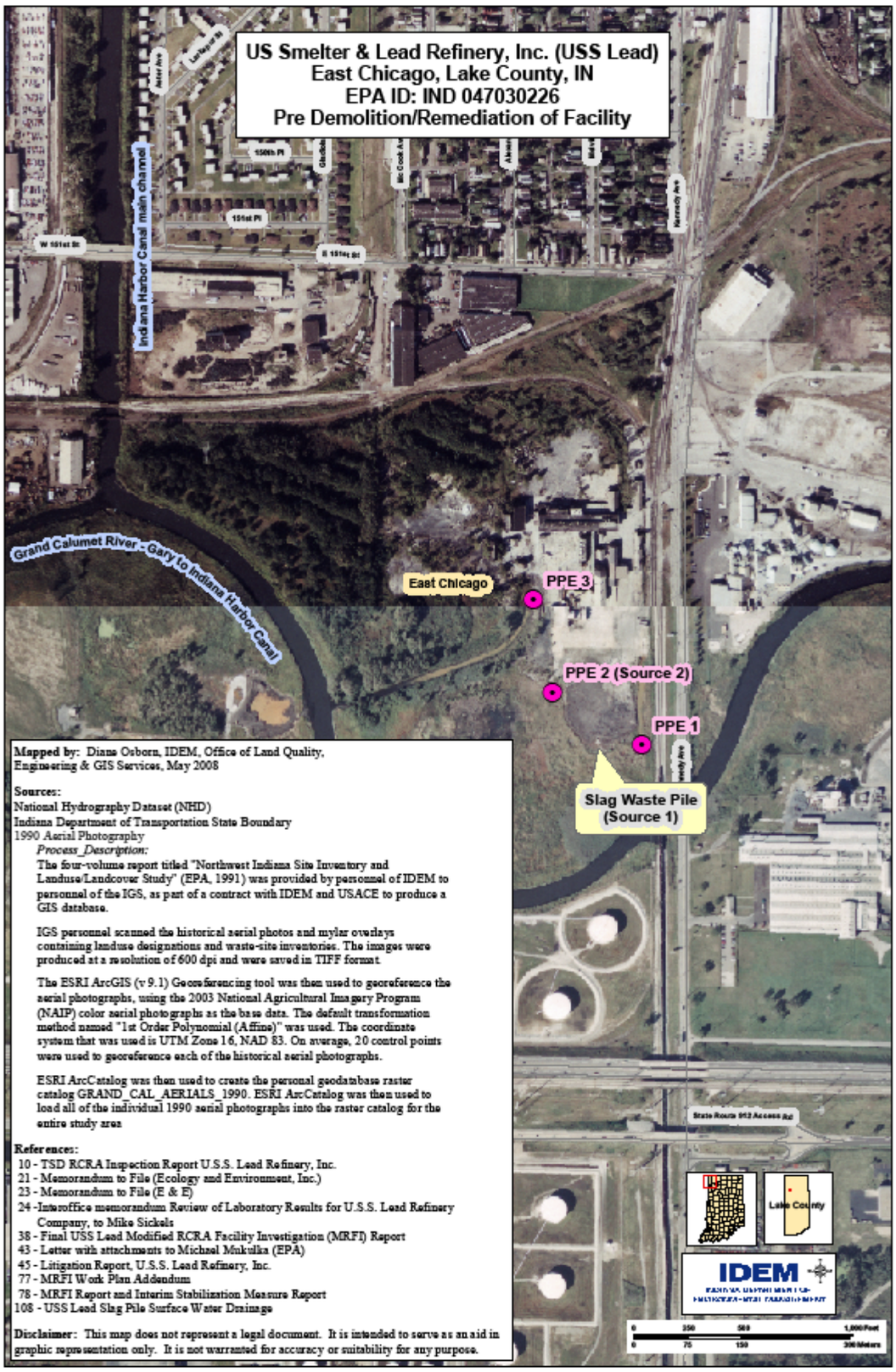
Factor Categories and Factors		Maximum Value	Value Assigned
DRINKING WATER THREAT			
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow		
	2a. Containment	10	
	2b. Runoff	25	
	2c. Distance to Surface Water	25	
	2d. Potential to Release by Overland Flow (lines 2a x (2b + 2c))	500	
3.	Potential to Release by Flood		
	3a. Containment (Flood)	10	
	3b. Flood Frequency	50	
	3c. Potential to Release by Flood (lines 3a x 3b)	500	
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	
5.	Likelihood of Release (higher of lines 1 and 4)	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	NS
7.	Hazardous Waste Quantity	a	NS
8.	Waste Characteristics	100	NS
	Targets		
9.	Nearest Intake	50	NS
10.	Population		
	10a. Level I Concentrations	b	NS
	10b. Level II Concentrations	b	NS
	10c. Potential Contamination	b	NS
	10d. Population (lines 10a + 10b + 10c)	b	NS
11.	Resources	5	NS
12.	Targets (lines 9 + 10d + 11)	b	NS
Factor Categories and Factors		Maximum Value	
DRINKING WATER THREAT (Concluded)			
	Drinking Water Threat Score		
13.	Drinking Water Threat Score ((lines 5 x 8 x 12)/82,500, subject to a maximum of 100)	100	NS
HUMAN FOOD CHAIN THREAT			
	Likelihood of Release		
14.	Likelihood of Release (same value as line 5)	550	550

	Waste Characteristics		
15.	Toxicity/Persistence/Bioaccumulation	a	NS
16.	Hazardous Waste Quantity	a	NS
17.	Waste Characteristics	1,000	NS
	Targets		
18.	Food Chain Individual	50	NS
19.	Population		
	19a. Level I Concentrations	b	NS
	19b. Level II Concentrations	b	NS
	19c. Potential Human Food Chain Contamination	b	NS
	19d. Population (lines 19a + 19b + 19c)	b	NS
20.	Targets (lines 18 + 19d)	b	NS
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score ((lines 14 x 17 x 20)/82,500, subject to a maximum of 100)	100	NS
Factor Categories and Factors		Maximum Value	Value Assigned
	ENVIRONMENTAL THREAT		
	Likelihood of Release		
22.	Likelihood of Release (same value as line 5)	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence/ Bioaccumulation	a	500,000,000
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	150
	26c. Potential Contamination	b	0
	26d. Sensitive Environments (lines 26a + 26b + 26c)	b	
27.	Targets (value from 26d)	b	150
	Environmental Threat Score		
28.	Environmental Threat Score ((lines 22 x 25 x 27)/82,500, subject to a maximum of 60)	60	60.00
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED			
29.	Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)	100	60.00
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30.	Component Score (S_{of})[c], (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100	60.00

[a]Maximum= value applies to waste characteristics category.
[b]Maximum value not applicable.
[c]Do not round to nearest integer.

Table 6-1 --Air Migration Pathway Scoresheet			
	Factor categories and factors	Maximum Value	Value Assigned
Likelihood of Release:			
	1. Observed Release	550	550
	2. Potential to Release:		
	2a. Gas Potential to Release	500	
	2b. Particulate Potential to Release	500	
	2c. Potential to Release (higher of lines 2a and 2b)	500	
	3. Likelihood of Release (higher of lines 1 and 2c)	550	550
Waste Characteristics:			
	4. Toxicity/Mobility	(a)	200
	5. Hazardous Waste Quantity	(a)	100
	6. Waste Characteristics	100	10
Targets:			
	7. Nearest Individual	50	50
	8. Population:		
	8a. Level I Concentrations	(b)	2810
	8b. Level II Concentrations	(b)	NA
	8c. Potential Contamination	(c)	63
	8d. Population (lines 8a + 8b + 8c)	(b)	2873
	9. Resources	5	
	10. Sensitive Environments:		
	10a. Actual Contamination	(c)	200
	10b. Potential Contamination	(c)	
	10c. Sensitive Environments (lines 10a + 10b)	(c)	200
	11. Targets (lines 7 + 8d + 9 + 10c)	(b)	3123
Air Migration Pathway Score:			
	12. Pathway Score (S_a) [(lines 3 x 6 x 11)/82,500][d]	100	100.00
	[a] Maximum value applies to waste characteristics category [b] Maximum value not applicable [c]No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to a maximum of 60. [d] Do not round to nearest integer		

Figure 2-1 USS Refinery
1990 Aerial Photograph



Aerial view of facility in March of 1986

Figure 2-2 Facility Features (as of 1986) (Ref. 65, Figure 2-2)

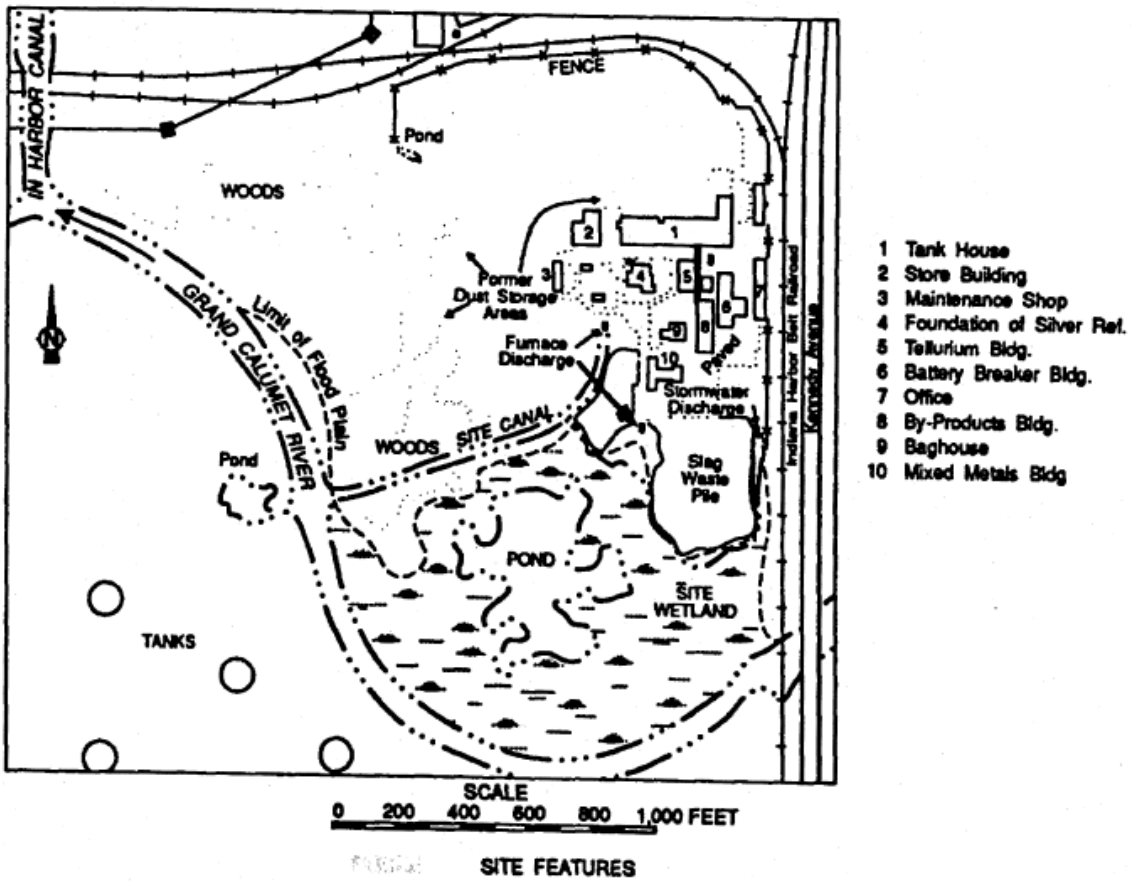


Figure 2-3 Source Map (as of 1991) (Ref. 65, Figure 2-3)

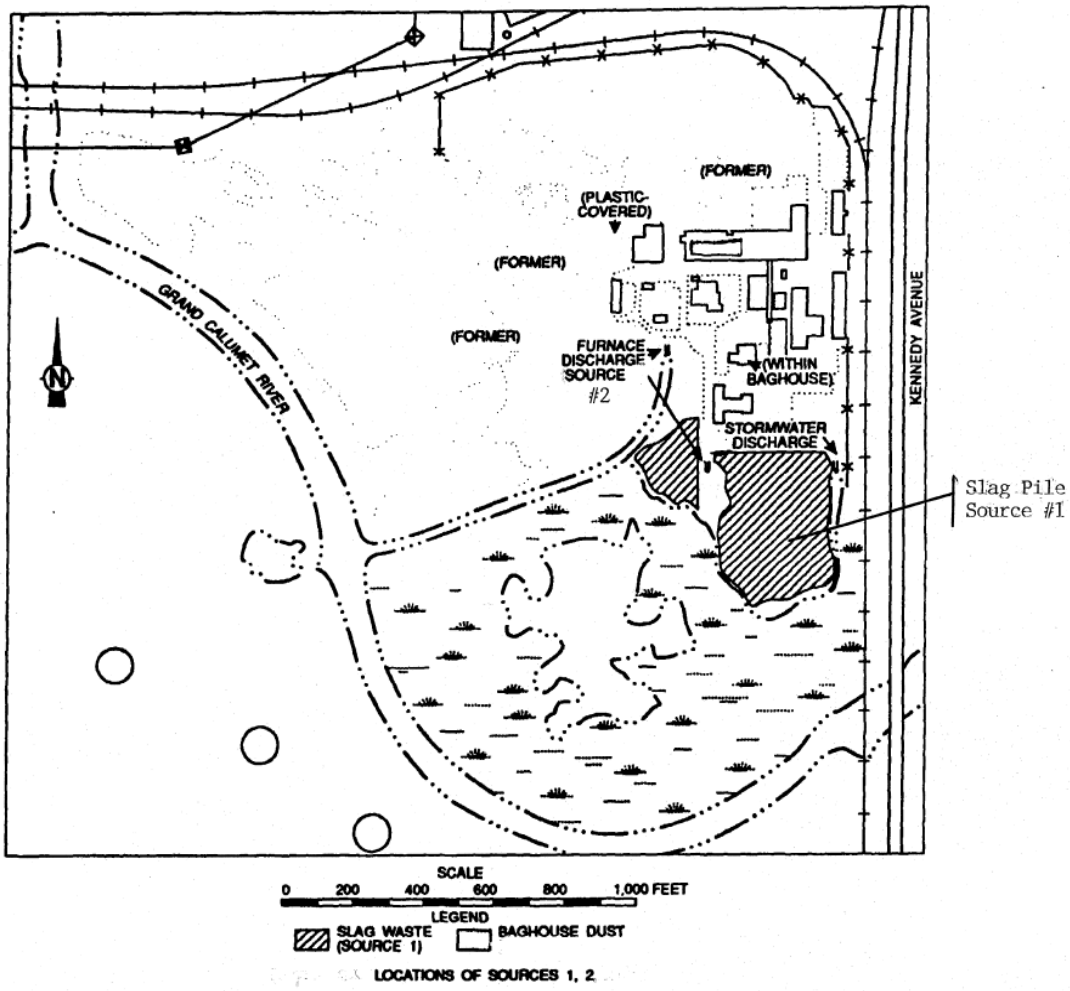
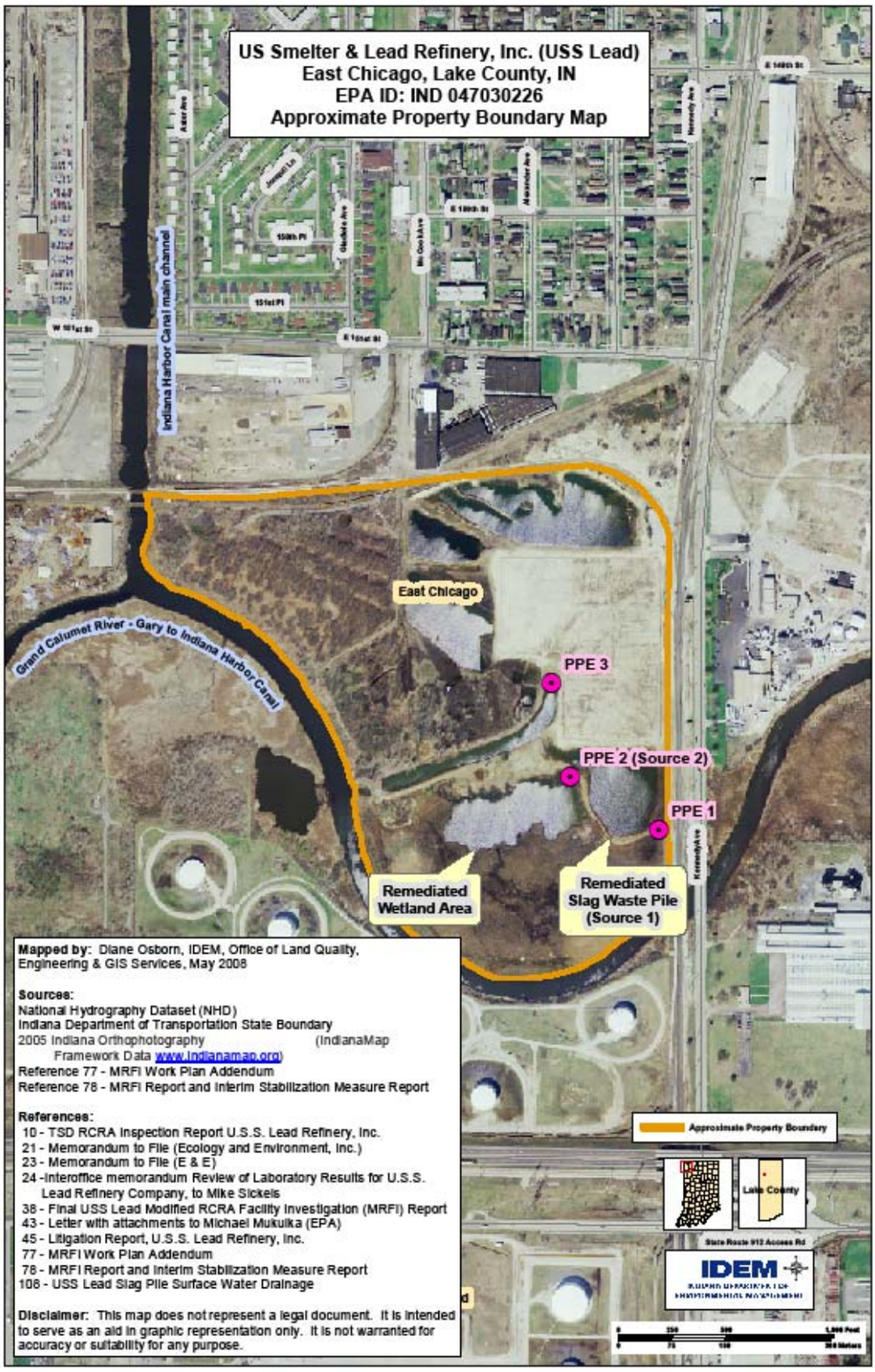


Figure 2-4 USS Refinery
2005 Aerial Photograph



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106. IDEM, Site Location Map, Arc GIS 9.2, May 2008, 1 page.

107. Maupin, Marty, IDEM. Electronic Mail Message to Sickels, Mike et al, IDEM. Field Notes for USS Lead Sampling, Sample descriptions of SD1 through SD7. November 16, 2007. 2 pages.

108. Sickels, Mike, IDEM. Electronic Mail Message to Mark Jaworski, IDEM. USS Lead Slag Pile Surface Water Drainage. May 22, 2008. 1 page.

109. Andrews & Kurth, Letter to Mr. Larry G. Reed, EPA. NPL for Uncontrolled Hazardous Waste Sites – Proposed Rule No. 12 U.S.S. Lead Refinery, Inc. March 19, 1993. 2 pages.

110. IDEM, Office Memorandum from Smith, Jim to Jaworski, Mark. HRS Wetlands near USS Lead Site, East Chicago, Lake County, Indiana. May 29, 2008. 2 pages.

111. IDEM. Office Memorandum from Smith, Jim to Jaworski, Mark. USS Lead Site HRS-Sensitive Environment: Habitat Known to be Used by a State Designated Endangered or Threatened Species. June 3, 2008. 2 pages.

112. IDEM. Office Memorandum from Smith, Jim to Jaworski, Mark. USS Lead Site HRS-Particular Areas, Relatively Small in Size, Important to Maintenance of Unique Biotic Communities. June 3, 2008. 11 pages.

113. Jaworski, Mark, IDEM. Electronic Mail Message to Laura Ripley, EPA. Sanborn Map Review. June 9, 2008. 9 pages.

114. Jaworski, Mark, IDEM. Electronic Mail Message to Laura Ripley, EPA. Sanborn Maps, Glidden Co. June 10, 2008. 3 pages.

115. IDEM. Sample Field Sheets for the USS Lead ESI sampling event, November 2007. 60 pages.

Site Summary

The U.S. Smelter and Lead Refinery, Inc. (USS Lead) site (CERCLIS ID No. IND047030226) consists of releases of lead from sources resulting from facility operations. All operations associated with the facility were terminated in December 1985 (Refs. 22, p. 017; 64, p. 11; 65, p. 019; 66, p. 3; 68, p. 5; 81, p. 007; 84, p. 003). Prior to cessation of operations, USS Lead consisted of a primary lead smelting and refinery facility from the early 1900s to 1973, and was subsequently converted to a secondary lead refinery, which began recovering lead from scrap metal and used automotive batteries (Refs. 22, pp. 007, 014, 016; 45, p. 5; 64, p. 11; 65, p. 019; 68, p. 5; 81, p. 1; 84, p. 003).

The EPA Superfund program prepared an HRS documentation record for the USS Lead site, dated August 30, 1991, as part of the February 7, 1992 proposal to the NPL (Refs. 65; 84, p. 003; 93, pp. 1, 16; 109). A request was subsequently made on behalf of USS Lead to defer consideration of the proposed listing of USS Lead (Ref. 109, p. 2).

A 39+/- acre wetland, is present on the southern portion of the facility property. This area meets the criteria for a wetland as defined in 40 CFR Section 230.3 (Refs. 1, p. 51625; 91, pp. 3, 4, 6, 7, 8, 49, 51, 53, 55, 57, 59, 61, 62, 63; 88; 110). This area is inundated and/or saturated by surface water at frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. This portion of the property contains hydrophytes in both hydric and non-hydric soils (Refs. 88; 91, pp. 47 through 61). National Wetland Inventory Maps published by the U. S. Fish and Wildlife Service indicate that this wetland is designated as freshwater emergent wetland (Ref. 87). This wetland meets the definition of a wetland as defined in 40 CFR 230.3, and is considered eligible as a sensitive environment for HRS scoring (Refs. 1, Table 4-24, p. 51625; 87, 88; 110).

The southern portion of the facility property, mainly the wetland area, is within a habitat known to be used by State designated endangered or threatened species. The Marsh Wren and Bebb's Sedge are endangered/threatened species in this area that have been identified within the past five years (Refs. 91, pp. 9, 10; 105, 111, p. 1). The Blandings Turtle, another endangered species is also found in this area (Ref. 91, pp. 9, 10). The Blandings Turtle and the Franklin Ground Squirrel were last observed in 1999 and 1992 respectively (Ref. 91, pp. 9, 10). Also, the wetland area, a particular area, relatively small in size, is important to the maintenance of unique biotic communities. It is part of the Grand Calumet River Corridor (Refs. 91, pp. 3, 4, 6, 7, 8, 18, 24; 112, pp. 1-6).

The sources include a slag waste pile and wastewater discharges from an NPDES outfall at the USS Lead facility resulting from former smelter and lead refining operations (See Sections 2.2 and 2.2.1 of this HRS Documentation Record). The primary hazardous substance of concern in the sources is lead (See Section 2.2.2 of this HRS Documentation Record). A release of lead to the surface water and air pathways has been documented (See Sections 4.1.2.1.1, 4.1.4.3.1.2, and 6.1.1 of this HRS Documentation Record). Elevated levels of lead have been detected in the wetland area (See Section 4.1.2.1.1 and 4.1.4.3.1.2 of this HRS Documentation Record).

Source 1, a waste pile (lead slag pile), one of the waste sources identified at USS Lead, is an area that was located to the south of the plant buildings which was used for disposal of blast furnace slag (Refs. 7; 9; 25, p. 1; 27, p. 2; 65, p. 019; 68, p. 7). Between 1980 and 1986, 8 samples of the waste slag material were collected as part of facility sampling inspections (Refs. 5, p. 4; 24, pp. 8-12, 14, 15, 31; 29, p.4; 68, p. 13). In the analyses of the seven samples collected in 1986, the slag was shown to contain lead at concentrations ranging from 12,000 to 53,000 mg/kg (Refs. 24, pp. 2, 4, 8 to 12, 14, 15, 31). Some of the lead bearing waste was deposited directly into part of a wetland, which covers the southern part of the USS Lead property (Refs. 7; 9; 25, p. 1; 27, p. 2; 36, pp. 8A, 9, 10, 11, 13, 14; 65, p. 12; 68, p. 7). This is the same wetland as discussed above. Blast furnace lead bearing slag generated on the facility was dumped on plant property and once a year

was leveled off into the property wetland (Ref. 9). Overland flow (surface water drainage) came in contact with the lead bearing slag and drained into the regularly inundated facility wetland from the southeast sector of the slag pile probable point of entry (PPE #1)(Ref. 108, Figure 2-4 of this HRS Documentation Record).

Source 2, outfall 001 at USS Lead was permitted under a National Pollutant Discharge Elimination System (NPDES) permit for the discharge of blast furnace non-contact process cooling water and water from in-plant storm drains into the Grand Calumet River. The first NPDES permit was issued to the facility in June 1975, with an expiration date of March 1980 (Refs. 4, p. 006; 39, p. 1; 40, p. 2; 45, p. 16A).

It needs to be noted that there were two (2) NPDES outfall locations for waste water discharge that existed at the USS Lead facility during its period of operation. At the time the original NPDES permit was issued in 1975, the outfall (PPE #2) was located between the main slag disposal area (south of the Battery Breaker Building and the By-products Building) and the smaller slag disposal area (southwest of the Mixed Metals Building) (Refs. 13, p. 5; 46, p. 020, 027; 65, p. 031). The outfall flowed through a discharge channel, and back-flow, leaching from the slag pile area, and channel sediments could potentially interfere with weekly monitoring samples (Refs. 13, p. 2; 65, p. 031). The drainage from this outfall (PPE#2) was allowed to discharge directly into the facility's wetland area located on the southern portion of the property (Ref. 45, p. 114, Figure 2-4 of this HRS Documentation Record).

Discharge Monitoring Reports (DMRs) available from 1982 through 1984, revealed numerous exceedances of permit allowable levels for lead from PPE #2 (Refs. 45, pp. 06, 15, 16A, 17, 18, 66, 68, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 98, 99, 101, 104, 105, 109-114, 115-120, 126, 127, 130; 65, p. 20).

In November 1984, a new outfall (PPE #3) was constructed and the former one (PPE #2) was sealed with cement (Refs. 43, p. 2; 46, pp. 002, 003). The rerouted waste water flowed into a well southeast of the Store Building and from there directly into the onsite canal on the property (Ref. 46, p.002, 003, 020, 027). The onsite canal drains into the Grand Calumet River. DMRs of samples collected from this outfall between 5/1985 to 12/1986 revealed numerous instances when permit limitations were exceeded for arsenic, cadmium copper, and lead (Refs. 3, pp. 1-9; 44, pp. 2, 3, 04 to 08 11-13, 16, 19, 20, 22, 25, 28, 29, 31, 34, 35, 37; 65, p. 20).

In addition to the impact to the surface water pathway, a release of lead to the air by direct observation and chemical analysis was also noted (See Section 6.1.1 of this HRS Documentation Record).

The site is scored based on releases from the facility that have resulted in Level I targets, including former facility employees, and actual contamination targets, including sensitive environments, via the air migration pathway; as well as releases that have resulted in Level II environmental threat targets, via the surface water pathway (See Sections 4.1.4.3 and 6.3 of this HRS Documentation Record).

Facility and Site Description

The USS Lead facility is located on a 79-acre tract of land at 5300 Kennedy Avenue in East Chicago, Indiana (Refs. 22, p. 009; 23, p. 3; 38, Section 2.1; 33; 64, pp. 08, 11; 65, p. 12; 68, p. 004; 84, p. 003; 91, p. 3). In 1906, the Delamar Copper Refinery operated at the facility as a copper smelter (Refs. 22, p. 011; 65, p. 12; 68, p. 5; 81, p. 1; 84, p. 003). In 1920, the property was purchased by U.S. Smelting Refining and Mining and the facility became a lead refining facility (Refs. 22, p. 014; 68, p. 5; 81, p. 1; 84, p. 003). The property was later purchased by U.S. Smelter and Lead Refinery (USS Lead). Between 1972 and 1973, USS Lead was converted to a secondary lead smelter, recovering lead from automobile batteries (Refs. 22, p. 016; 45, p. 5; 64, p. 011; 68, p. 5; 81, p. 1; 84, p. 003). All operations ceased in 1985 (Refs. 22, pp. 007, 017; 64, p. 011; 65, p. 019; 66, p. 3; 68, p. 5; 81, p. 1; 84, p. 003). The facility's hazardous waste management units included calcium sulfate sludge waste piles and baghouse dust waste piles (Refs. 22, p. 018; 26, pp. 1-3; 50, p. 1; 68, pp. 4, 7; 84, p. 003). Other sources of contamination at the facility have included baghouse dust piles, plastic chip waste piles, rubber chip piles, and a slag pile located in the wetlands on the property (Refs. 22, p. 026; 68, pp. 3, 4, 7, 8, 11; 100; 84, p. 003). Wetland areas are present on the southern portion of the property (Refs. 68, p. 4; 87; Figures 2-1, 2-2, 2-3, and 2-4 of this HRS Documentation Record; 91, pp.4, 6, 7, 8, 47, 62, 63, 72, 76, 80, 82). These wetland areas have become contaminated with lead (Refs. 64, pp. 18-20, 25, 26, 29, Appendices E, F; 68, pp. 7, 8, 11-13, 15; 94, pp.112 to 117, 119, 122, 124 to 126, 135, 136, 141; Section 4.1.2.1.1 of this HRS

Documentation Record). Habitats used by State endangered/threatened species are also present in the impacted areas of the wetland (Ref. 91, pp. 9, 10, 35, 43, 76, 82, 90; and Section 4.1.4.3.1.2 of this HRS Documentation Record).

Facility Enforcement History

In June 1986, USS Lead was found not to be in compliance with a majority of the original findings of IDEM vs USS Lead, Cause no. N-296, which required the clean up of some materials on the property (Ref. 26). In 1990, IDEM issued an Interim Agreed Order to USS Lead requiring closure of the hazardous waste piles under the Resource Conservation and Recovery Act (RCRA) (Refs. 34, p. 04; 67, pp. 016, 017; 84, p. 003). The EPA Superfund program completed a HRS Documentation Record dated August 30, 1991, as part of the February 7, 1992 proposal to the National Priorities List (NPL) (Refs. 65; 84, p. 003; 93, pp. 1, 16; 109). The HRS documentation record indicated elevated lead levels in soils on the USS Lead property could be attributed to USS Lead (Ref. 65, p. 059). Also, the HRS documentation record evaluated the surface water and air migration pathways and the potential threat to wetlands and USS Lead employees as the basis for the proposal of USS Lead to the NPL (Refs. 65; 84, p. 003). In 1993, a request was made on behalf of USS Lead to defer consideration of the proposed listing of USS Lead (Ref. 109, p. 2). On November 18, 1993, EPA RCRA issued an Administrative Order of Consent (AOC) to USS Lead under RCRA 3008(h) authority (Refs. 66, p. 3; 68; 81, p. 1; 84, p. 003). The AOC required implementation of interim measures on the property and off the facility investigations (Refs. 68, p. 17; 81, p. 1; 84, p. 003). The off facility investigations conducted by USS Lead were limited to the "railroad perimeter area" and "Triangle area" (Refs. 38, Sections 3.6, 3.14; 81, p. 007, Figure 2b; 84, p. 003). The "railroad perimeter area" extends from Kennedy Avenue to the facility's property boundary on the east, across from the former DuPont facility. The "triangle area" extends from 151st Street to the facility's property boundary on the north (Refs. 38, Figures 15, 18, Appendices 3, 4, 5; 81, Figure 2b; 84, p. 003). The results from USS Lead's off facility investigations can be found in the "Final USS Lead Modified RCRA Facility Investigation (MRFI) Report" (Refs. 38, Sections 3.6, 3.14, Tables 5, 6, 8 to 10, 13; 78; 81, Figure 2; 84, p. 004).

On November 13, 1996, EPA issued a Corrective Action Management Unit (CAMU) designation for the USS Lead facility (Refs. 70; 84, p. 004). On July 29, 1998, EPA approved the Final Design Plan and Specification for the CAMU (Refs. 71; 84, p. 004). In an August 31, 2004 letter to USS Lead, EPA informed USS Lead that EPA will evaluate information from the MRFI report related to migration from the USS Lead facility to off-site areas of residential, commercial or industrial land use. In addition, EPA identified some remaining concerns based on a human health and ecological risk screening for the USS Lead facility (Ref. 78). The EPA letter indicated that current property conditions do not meet the Environmental Indicator (EI) CA750 of migration of contaminated ground water under control. Specifically, the letter stated that available data indicate that concentrations of antimony, arsenic and cadmium in ground water may be causing exceedances of State Water Quality Standards for those parameters in the surface water from the on-site wetlands and riparian areas on the USS Lead property (Ref. 84, p. 005). USS Lead has achieved control of current human exposures based on the worker scenario and limited access to trespassers as documented in a September 30, 2004, EI determination CA725. Also, this EI determination indicated that soil contamination outside of the USS Lead property boundaries, including residential properties, was beyond the scope of the EI as it was referred to EPA's Superfund program (Refs. 78, p. 6; 79). As described in the June 24, 2004 referral of USS Lead to CERCLA, EPA conducted soil sampling in the residential areas to the north of 151st Street subsequent to the USS Lead's limited off facility investigation (Refs. 66, p. 3; 81, pp. 007-015, Figures 4a, 4b, 8a, 8b, 9, Table 3; 82; 83, pp. 1-7). The soil sampling conducted by EPA uncovered elevated lead concentrations exceeding 400 ppm to above 1,000 ppm which was the basis for recommending appropriate CERCLA action (Refs. 81, pp. 007-015, Figures 4a, 4b, 8a, 8b, 9, Table 3; 82; 83, pp. 002-007).

2.2 SOURCE CHARACTERIZATION

Two (2) sources are used to score USS Lead. The two (2) sources are: 1) a slag waste pile, and 2) waste water discharges. Another possible source that was present on USS Lead was baghouse dust that was found throughout portions of the property and a soil area contaminated with lead (Refs. 22, pp. 019, 021, 035, Figure 2; 34, pp. 08, 09, 11, 12; 65, pp. 21, 27-30; 68, pp. 5 to 8; Figures 2-1; 2-2 and 2-3 of this HRS Documentation Record). The pathways that are evaluated for this documentation record are the surface water pathway and the air migration pathway.

Figures 2-1, 2-2, 2-3, and 2-4 depict site location, source area locations, site features, and a copy of an aerial photo of USS Lead. These figures and the aerial photo show conditions at USS Lead in 1986 and in 2005. Since 1990, many parts of the facility have been addressed by the RCRA Program (See the Site Summary of this HRS Documentation Record).

2.2.1 SOURCE IDENTIFICATION

Number of the source: 1

Name: Slag Waste Pile

HRS Source Type: Waste Pile

Description and Location of the source:

Waste pile (lead slag pile), one (1) of the waste sources identified at USS Lead, is an area that was located to the south of the plant buildings which was used for disposal of blast furnace slag (Refs. 7; 9; 25, p. 1; 27, p. 2; 68, p. 7). Some of the waste was deposited in part of a wetland, which covers the southern part of the USS Lead property (Refs. 7; 9; 25, p. 1; 27, p. 2; 36, pp. 9, 10, 11, 13, 14; 68, p. 7). The first blast furnace was installed on the facility in 1926 but it only operated on an intermittent basis. In 1973, when the plant was converted from a primary to a secondary lead smelting facility, a larger blast furnace was installed that operated continuously, averaging about 315 days per year (Ref. 22, pp. 016, 020). The blast furnace slag generated on the facility was dumped on plant property and once a year was leveled off into the property wetland (Ref. 9).

Between 1980 and 1986, 8 samples of the waste slag material were collected as part of facility sampling inspections (Refs. 5, p. 4; 24, pp. 8-12, 14, 15, 31; 68, p. 13). In the analyses of the seven samples collected in 1986, the slag was shown to contain lead at concentrations ranging from 12,000 to 53,000 mg/kg (Ref. 24, pp. 2, 4, 8 to 12, 14, 15, 31).

The slag pile was never capped and was subject to dispersion. Therefore, there were possible airborne releases of contaminants prior to the remediation of this area (Refs. 36, pp. 11-12; 67, p. 008; 78, p. 005; 100).

A Modified Resource Conservation and Recovery Act (RCRA) Facility Investigation (MRFI) Report was prepared for USS Lead, 5300 Kennedy Avenue, East Chicago, Indiana by Geochemical Solutions, L.L.C. (Ref. 38). This MRFI Report describes the conceptual site model, describes the work completed for the site characterization at the USS Lead facility, and presents the data collected under the MRFI work plans. The MRFI illustrates and depicts the lead concentrations found in the soils throughout the USS Lead property before and after remediation activities that were conducted. The MRFI Report was prepared in partial fulfillment of the EPA Administrative Order on Consent (AOC), Docket number V-W-001-94 (Refs. 38, Sections Executive Summary, 1.0, 1.1, 1.2; 68, p. 001, 003). The MRFI Report presents data to fulfill requirements by EPA in project letters (Refs. 38, Sections Executive Summary and 1.0; 77; 78).

The MRFI states that most soils that were identified as contaminated were removed and consolidated in the on-site CAMU. Continued sampling in the wetlands, identified elevated contaminated levels that cannot be removed from the wetlands due to physical constraints and therefore remain in place (Ref. 38, Executive Summary).

The MRFI noted that off site air dispersion was modeled by LAW and TechLaw and then substantiated using soil samples as proposed in the MRFI Work Plan Addendum and as described in the MRFI Addendum Off-

Site Sampling and Analysis Report. Sample results initiated off-site remediation (Ref. 38, Executive Summary, Appendices 3, 4, and 5).

According to the MRFI report, the slag pile was removed and disposed into the on-facility CAMU. The clean up of the slag began with the approved ISM workplan (9/17/96) and was completed in the third quarter of 2002 (Refs. 38, Section 2.4, p. 015; 72, p. 5; 84, p. 005). Prior to the remediation of Area A, a clay berm was constructed around the limits of the slag pile located to the south of the plant buildings. The berm was constructed to prevent recontamination of the area by the river after remediation. The slag pile was then excavated and placed inside the CAMU (Refs. 38, Section 3.5; 72, p. 5; 84, pp. 004, 005). Confirmation samples were taken and all confirmation lead levels reported were below 100 mg/kg except for confirmation sample SP2 which was at 529 mg/kg (Refs. 38, Section 3.5, Table 4, and Figure 18).

Surface water runoff from the slag disposal area had contaminated the wetlands to the south and southwest (Refs. 65, pp. 12 to 15, 27, 28; 67, p.008; 68, pp. 7, 8, 11 to 13, 15). The slag pile was never covered to protect from dispersal by wind (Refs. 27, p. 2; 67, p. 008; 78, p. 005; 100). Although remedial activities were conducted in the wetland area, they were never completed as shown by the analytical results from the ESI sampling event. Extensive contamination that resulted from sources #1 and #2 still remains in this wetland area (Refs. 64, pp. 18-20, 25, 26, 29, Appendix E, F; 94, pp.112 to 117, 119, 120, 122, 124 to 126, 135, 136, 141; Section 4.1.2.1.1 of this HRS documentation record).

Location of the source, with reference to map of the site:
The main portion of the slag waste pile was located to the south of three (3) facility buildings, the Mixed Metals Building, the By-products Building, and the Battery Breaker Building (Figure 2-3 of this HRS Documentation Record).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Source Samples:

Below is the concentration of lead detected in blast furnace slag samples collected from USS Lead. Sampling was performed in 1984 by Ecology and Environment (E & E) and 1986 by IDEM (Refs. 24, pp. 2, 14, 15; 29, pp. 04-08; 68, pp. 006, 007, 008). The sample collected by IDEM in 1986 is listed below. The media of the sample was the actual slag waste from Source 1(Refs. 24, pp. 2, 14, 15; 68, p. 008).

Also, according to a 1977 letter written by the plant engineer at USS Lead, the lead content of the slag disposed of on-site was typically 1%. If it was greater, it would have been recycled (Ref. 30, p.1).

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Detection Limit	Reference
C-1486 E-2	Slag	12/1986	Lead	53,000 mg/kg	500 mg/kg	24, pp. 2, 15
C-1485 E-2	Slag	12/1986	Lead	33,000 mg/kg	500 mg/kg	24, pp. 2, 14, 15

Key
mg/kg milligram per kilogram

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air:	NS	
Particulate release to air: The slag pile was not capped, covered, or protected by a windbreak. In 1985, an inspection of the facility noted wind-blown emissions crossing the property line that may have come from storage piles of furnace slag, flue dust, and battery casings on the plant property. Analysis of the air that was sampled down wind in 1985 showed that the lead concentration in that sample was 96 micrograms per cubic meter greater than background and exceeded an air benchmark of 50 micrograms per cubic meter.	10	1, Table 6-9, p. 51653; 14, p. 02; 15; 31, pp. 02, 14; 36, pp. 11, 12; 67, p. 008; 100; Figure 2-1 of this HRS Documentation Record.
Release of hazardous substances via overland migration and/or flood: The waste slag pile was deposited directly into the on-facility wetland. Thus the source was in direct contact with the wetland. Also, runoff/storm drainage may have come into contact with the contaminated slag pile releasing lead into the on-facility wetland.	10	1, Table 4-2, p. 51609; 7; 9; 24, pp. 2, 4, 8 to 12, 14, 15, 31; 25, p. 1; 27, p. 2; 36, pp. 8A, 9, 10, 11, 13, 14; 67, p. 6; 68, pp. 007, 011, 012

Notes: NS Not Scored

2.4.2. HAZARDOUS WASTE QUANTITY

The area of the slag pile, Source #1, is demonstrated in Figures 2-2 and 2-3 of this HRS Documentation Record. Figure 2-4 of this HRS Documentation Record shows the small pond area created by the removal of the slag pile. Constituent quantity information that is available gives a percentage breakdown of the components in a “typical” analysis of slag. The chemical breakdown of the slag, which was obtained from a 1977 letter written by the plant engineer at the USS Lead facility, stated that the lead content of the slag disposed of on the facility was typically 1%. If it was greater, it would have been recycled (Ref. 30, p. 1). However, it is unknown how much slag was deposited.

2.4.2.1.1. Hazardous Constituent Quantity

Sufficient information is not available to document a hazardous constituent quantity (Ref. 1, Section 2.4.2.1.1, p. 51590).

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2. Hazardous Wastestream Quantity

Sufficient information is not available to document a hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2, p. 51591).

Hazardous Wastestream Quantity Value (W): NS

2.4.2.1.3. Volume

The slag pile is no longer present at the site. The total volume of the pile is not known, and the amount of waste slag released at the facility is not known.

Volume Assigned Value: 0
(Ref. 1, Table 2-5, p. 51591)

2.4.2.1.4 Area

Prior to 1973, the amount of waste slag generated during this period is unknown (Ref. 22, p. 020). In 1973, a new 100-ton blast furnace was installed, and was continuously in operation, averaging about 315 days per year (Ref. 22, p. 020). Waste slag, generated while the plant was in operation, was disposed of on the property south of the plant buildings (Refs. 7; 9; 27, p. 2; 36, pp. 10, 11, 12, 13, 14; 68, p. 7; Figure 2-3 of this HRS Documentation Record).

As noted in the Source 1 narrative and the Site Summary, the majority of the slag pile has been removed from the area and disposed into the CAMU on the facility, but detectable levels of lead remain. Since it is unknown as to how much lead from the waste slag remains in the wetland area, a value of >0 but amount is unknown is entered. Note: Currently a pond is present in the area where the slag pile was located (See Figures 2-3 and 2-4 of this HRS Documentation Record).

Area Assigned Value: >0 (amount is unknown)
(Ref. 1, Table 2-5, p. 51591)

2.4.2.1.5 Source Hazardous Waste Quantity Value

Highest assigned value from Ref. 1, Table 2-6, p. 51591: >0

2.2.1 SOURCE IDENTIFICATION

Number of the source: 2

Name: NPDES Outfall – Wastewater Discharge

HRS Source Type: Other

Description and Location of the source:

Outfall 001 at USS Lead was permitted under a NPDES permit for the discharge of blast furnace non-contact process cooling water and water from in-plant storm drains into the Grand Calumet River. It is not known when the facility first began discharging waste water. Records indicate that the first NPDES permit was issued to the facility in June 1975, with an expiration date of March 1980 (Refs. 4, p. 006; 39, p. 1; 40, p. 2; 45, pp. 15, 16A). A renewal application was filed in September 1982 (Refs. 4, p. 007; 40, p. 2; 45, p. 16A; 49, p. 1). After the plant was closed in December 1985, storm water run-off collected from the facility processes continued to be discharged through the outfall (Ref. 43).

Between the expiration of the first permit in 1980 and the issuance of the second permit in 1985, the facility continued to discharge waste water to the Grand Calumet River (Refs. 40, p. 2; 42). Effluent samples continued to be collected after the plant closed in December 1985, until July, 1987, when electrical power to the facility was disconnected (Ref. 43, p. 2).

Discharge Monitoring Reports (DMRs) available from September 1982 through June 1984 document numerous exceedances of permit allowable levels for cadmium, copper, and lead (Refs. 45, pp. 06, 15, 16A, 17, 18, 66, 68, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 98, 99, 101, 104, 105, 109-114, 115-120, 126, 127, 130). Several enforcement actions were initiated against USS Lead in the 1980s. In April 1984, the Indiana Stream Pollution Control Board issued an administrative complaint against USS Lead for alleged violations of the effluent lead limitations (Ref. 4, p. 008). In May, 1985, the United States filed a civil action to address its longstanding violations of the Clean Water Act (Ref. 4, p. 008). The facility was also cited at this time for failing to submit noncompliance notification reports and for operating with an expired permit (Ref. 4, pp. 004, 007,008). In 1986, a civil action was initiated against USS Lead for 24 excursions from the lead effluent limitation during the period May 6, 1985 through February 25, 1986 (Ref. 44, p. 2). At least some of these suits were settled out of court (Ref. 50).

As stated in the Site Summary of this HRS Documentation Record, state and federal enforcement action required the investigation and remediation of the impacted facility areas. Based on elevated analytical results for heavy metals, remediation was conducted in the wetland area (Ref. 38, Section 3.15). Contaminated sediments were excavated from the wetland area and placed into the CAMU (Ref. 38, Section 3.15). The completion of the remedial activities was not based on the achievement of IDEM RISC clean up levels (Ref. 38, Section 3.15). The excavated areas can be seen as the open water area located southwest of area A (Refer to Figure 2-4 of this HRS Documentation Record). Post excavation levels of contamination in the area that was remediated can be found in Figure 18 of the MRFI (Ref. 38, Figure 18).

Location of the source: Two (2) outfall locations for the waste water discharge comprising Source 2 existed at the USS Lead facility during its period of operation. At the time the original NPDES permit was issued in 1975, the outfall was located between the main slag disposal area (south of the Battery Breaker Building and the By-products Building) and the smaller slag disposal area (southwest of the Mixed Metals Building) (Refs. 13, pp. 2, 5; 46, p. 020, 027). The outfall flowed through a discharge channel, and back-flow, leaching from the slag pile area, and channel sediments could potentially interfere with weekly monitoring samples (Refs. 13, p. 2; 45, p. 119; 46, p. 003).

In November 1984, a new outfall was constructed and the former one (1) was sealed with cement (Refs. 43, p. 2; 46, pp. 002, 003). The rerouted waste water flowed in to a well southeast of the Store Building and from there directly into the canal on the property (Ref. 46, pp. 002, 003, 020, 027). DMRs of samples collected from this outfall between May 1985 and December 1986, revealed numerous instances when permit limitations were exceeded for arsenic, cadmium copper, and lead (Refs. 3, pp. 1-9; 44, pp. 2, 3, 04 to 08 11-13, 16, 19, 20, 22, 25, 28, 29, 31, 34, 35, 37).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE (Source 2)

- Source Samples:

Below is a summary of hazardous substances in the blast furnace waste water. Results from samples collected by USS Lead in 1984 and 1985 are shown. In the results from USS Lead, only the highest concentration of a substance detected in one of the four (4) to five (5) samples collected per month are shown. For the 1984 USS Lead samples, arsenic and lead were the only heavy metals which were analyzed.

For every sample, the effluent from Source 2 was the media sampled. All hazardous substances detected are attributable to USS Lead.

Samples collected as a part of monitoring requirements for NPDES permit for discharge to site wetland (February and April 1984) and to site canal (May, August, and November 1985)

Date of Sample	Hazardous Substance	Sample Number	Conc. mg/l)	Lead Effluent Limitation (mg/l)	Effluent Reference
February 1984	lead	2/13/84	0.47	0.2	48, p. 2
April 1984	lead	4/10/84	0.60	0.2	48, p. 6
May 1985	cadmium	5/13/85	0.30	0.02	44, p. 4
	copper	5/13/85	0.08	0.02	44, p. 4
August 1985	arsenic	8/13/85	0.17	0.3	44, p. 19
	lead	8/13/85	4.55	0.2	44, p. 20

November 1985	cadmium	11/5/85	0.625	0.02	44, p. 28

- Method Detection Limits were not available on the laboratory forms. However, the effluent limitations were defined in the DMRs and these samples documented were greater than or equal to the effluent limitations (Refs. 44, 48).

NA Not available

2.2.4 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY (Source #2)

Containment Description	Containment Factor Value	References
Gas release to air:	NS	
Particulate release to air:	NS	
Release to ground water:	NS	
Release via overland migration and/or flood: Elevated levels of lead from the effluent from the NPDES outfalls were allowed to discharge directly in to the on-facility wetland. The metals in the effluent discharge exceeded the NPDES discharge limits for the metals.	10	1, Table 4-2, p. 51609; 44, pp. 2, 3, 4, 19, 20, 28, 30; 48, pp. 2, 6

Notes: NS-Not Scored

2.4.2. HAZARDOUS WASTE QUANTITY

Because constituent quantity information for the waste water discharged at USS Lead is not complete, the wastestream quantity for Source 2 will be used to arrive at the Hazardous Waste Quantity. The wastestream quantity for only seventy-seven days of discharge will be calculated as a conservative estimate based on available data (Refs. 45; 46).

2.4.2.1.1. Hazardous Constituent Quantity

Sufficient information is not available to document a hazardous constituent quantity (Ref. 1, Section 2.4.2.1.1, p. 51590).

Hazardous Constituent Quantity Value (S): NS

2.4.2.1.2 Hazardous Wastestream Quantity (W)

Hazardous Wastestream	Quantity (pounds)	References
Waste water discharge	43,000,000	45, 46
	Sum: 43,000,000 pounds	

Hazardous Wastestream Quantity Value (W): 8,600

In 1973, when the facility began to do secondary lead refining, the blast furnace on the facility operated on a regular basis (Ref. 22, p. 020). To obtain a wastestream quantity for Source 2, flow per day figures from several months of DMRs were summed. For the period from April 1983, to October 1984 (minus June 1983), a total discharge of 4,300,000 gallons was obtained for the 77 days (one a week) for which the effluent flow was documented (Refs. 45, pp. 66-91; 46, p.7).

After converting to the quantity to pounds, a divisor of 5,000 is used to determine the Hazardous Wastestream Quantity (Ref. 1, Table 2-5, p. 51591).

10 pounds/gallon x 4,300,000 gallons = 43,000,000 pounds
43,000,000/5,000 = 8,600

Source Hazardous Wastestream Quantity Value: 8,600
Source No: 2

2.4.2.1.3. Volume

No documented estimate of the volume is available; therefore the value of 0 has been assigned (Ref. 1, Section 2.4.2.1.3, p. 51591).

Volume Assigned Value: 0

2.4.2.1.4. Area

Because Source #2 is a source type "other," the area tier is not applicable.

Area Assigned Value: Not Applicable

2.4.2.1.5 <u>Source Hazardous Waste Quantity Value</u>

Source Hazardous Waste Quantity Value: 8,600
Source No.: 2

Source Hazardous Waste Quantity Factor Value: 8,600
(Ref. 1, Table 2-6, p. 51591)

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway				
			Ground water (GW) Table (3-2)	Surface Water (SW)		Air	
				Overland/flood (Table 4-2)	GW to SW (Table 3-2)	Gas (Table 6-3)	Particulate (Table 6-9)
1	>0, but amount unknown	N	NS	10	NS	NS	10
2	8,600	N	NS	10	NS	NS	NS

NS – not scored

Assigned Hazardous Waste Quantity Factor Value for Surface Water Migration Pathway: 100

Description of Other Possible Sources at USS Lead:

As can be seen in Figure 2-1 of this HRS Documentation Record, the shadow of a stack can be observed next to the former baghouse. Lead emissions at a rate of 16.07 tons of lead per year have been documented for the USS Lead facility (Ref. 38, p. 216). Two air emission sources were listed for the USS Lead facility: 1) a point source (stack) and 2) a volume source (roof vent) (Ref. 38, p. 219, 220).

Baghouse dust generated by the blast furnace used on the property was originally collected in bag filters inside of the baghouse and eventually resmelted (Ref. 22, p. 019). When the larger blast furnace was installed in 1973, however, recycling all of the approximate 300 tons of dust generated per month became impossible, and dust awaiting recycling was stored in piles mainly near the baghouse and on a three (3) to five (5) acre area to the north and west of the Tank House (Refs. 22, p. 019; 34, pp. 08, 10; 38, p. 015). By the late 1970's, an

estimated 8,000 tons of the baghouse dust were stockpiled on the facility (Refs. 22, p. 019; 34, p. 09; 38, p. 015).

The baghouse dust waste is a listed RCRA hazardous waste. It is classified as emissions control dust from secondary lead smelters (#K069). The analysis of one (1) sample of the dust collected by IDEM in December 1986 indicated 370,000 mg/kg lead (Refs. 10, p. 2; 24, sample F-2, C-1489, pp. 2, 6, 16, 17, 28, 31, 37). Results for a sample of the dust collected in 1981 support these findings (Ref. 29, pp. 4, 8).

In 1982, approximately 3,700 tons of the dust was brought into the Tank House to prevent dispersion by wind (Ref. 22, p. 019). Either later that year or in 1986, a smelting facility based in New Jersey removed approximately 1,600 of the 3,700 tons of dust for lead recovery (Refs. 22, p. 019; 34, p. 08). The volume of the dust remaining throughout the site at USS Lead was unknown as some further amounts of dust may have been recycled in-house. A July, 1991, document indicated that 2,100 tons of the baghouse dust were left in the Tank House (Ref. 50).

The condition of the Tank House building, where the majority of the baghouse dust was being stored, was noted by several state officials to be in poor condition. A number of reports state that the building had broken and missing windows and was also missing portions of roof (Refs. 6, p. 1; 10, p. 4; 28, pp. 05, 06).

According to the MRFI report, the baghouse dust areas were removed and disposed off the facility (Refs. 38, p. 015; 80, pp. 065-256). The baghouse dust is just a possible source of contamination at USS Lead. Other possible sources of fugitive dust are flue dust and battery casings that were located on plant property. Fugitive dust may also have been generated by traffic within the plant boundaries (Refs. 14, p. 2; 5, pp. 005, 006; 23, pp. 05, 06).

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

The surface water pathway starts at the edge of the slag pile (Source #1) and from the NPDES permit outfall (Source #2). It should be noted that the USS Lead facility had two different NPDES outfalls which are considered source 2 (Refer to Figure 2-2 of this HRS Documentation Record). From these two (2) sources the surface water pathway discharges through the on facility wetland, then flows into the Grand Calumet River, then enters the Indiana Harbor Canal, and finally empties into Lake Michigan (Refs. 18; 19; 20). There are two (2) releases by direct observation, documented by violation in NPDES permits and by the direct deposition of lead slag into an on-property wetland (Refer to Section 2.2.1 of this HRS Documentation Record). There are also sensitive environments such as wetlands and habitats for endangered species in the vicinity of the site (Ref. 91, pp. 4, 6-10, 35, 43, 47, 63, 72, 76 (W4), 82, 89, 90). The sensitive environments of the surface water pathway and the air pathway are the two (2) migration pathway routes that are being scored as part of this HRS Documentation Record.

4.1.1.1 Definition of Hazardous Substance Migration Pathway for Overland/Flood Component

The USS Lead property is adjacent to the east branch of the Grand Calumet River (GCR) to the south, and the Indiana Harbor Canal (IHC) to the west. The point where the IHC begins is near the northwest corner of the USS Lead property boundary (Ref. 18). From this point the IHC flows north and empties into Lake Michigan approximately five and one-half (5 ½) miles downstream (Refs. 11, pp. 05, 07; 12, p. 013; 18; 19; 20).

Other surface water bodies in the vicinity of the site include the USS Lead canal that begins near the southwest edge of the plant area, flows to the southwest, and enters the GCR at a point upstream from the IHC. The canal is approximately 1,000 feet long and 15 feet wide. An approximately 21 acre wetland area located on the southern portion of the USS Lead property is contiguous with the GCR for approximately one-half (½) mile and will also be considered part of the GCR (Refs. 68, p. 4; 87; 110; Figures 2-1, 2-2, 2-3, and 2-4 of this HRS Documentation Record; 91, pp.4, 6, 7, 8, 47, 62, 63, 72, 76 (W4)).

Due to the influence of Lake Michigan, the irregularity of industrial effluent discharge into the east branch of the GCR, and a surface water divide on the west branch of the GCR, flow patterns of the GCR and IHC are somewhat complex, and flow reversals can occur resulting in the flow going other routes (Refs. 11; p. 05, 07, 08; 12, p. 013; 19; 20; 86, p. 14). Possible routes for hazardous substances to migrate into the GCR from USS Lead would be either via the property canal, which discharges directly into the river, or via the on-property wetland, which borders the river (See Figures 2-2 to 2-4 of this HRS Documentation Record). The furthest upstream probable point of entry (PPE) of hazardous substances is where the eastern edge of the lead slag pile meets the on-property wetland (See Figures 2-2 to 2-4 of this HRS Documentation Record). The furthest downstream PPE is at the headwaters of the USS Lead canal (Ref. 64, p. 39).

The hazardous wastes at USS Lead pose a significant threat to surface water in the area because most of the sources are located either in or near surface water. A number of references state that Source 1, the blast furnace slag waste, was placed directly into part of the wetland area (Refs. 5, p. 6; 7, p. 1; 9, p.1; 25, p. 1). Analyses of slag samples collected from in and near the wetland indicate the presence of lead (Refs. 5, pp. 4, 9; 24, pp. 2, 4, 6, 8; 29, pp. 4, 8; 68, pp. 007, 008, 011, 012; Section 2.2.1 of this HRS documentation record).

Source 2, the blast furnace effluent, discharged directly into the on-property wetland or into the USS Lead canal, and hazardous substances in the effluent could migrate from the discharge point to the GCR (Figure 2-1 of this HRS documentation record). The effluent contained both process water from the blast furnace blowdown and cooling water (Ref. 11, Table 1, p. 7). Effluent samples collected during 1984 and 1985 show effluent violations of lead, arsenic, cadmium, and copper (Refs. 44, pp. 4, 19; 48, pp. 2, 6).

The probable points of entry (PPEs) for contamination of the surface water pathway occur at the eastern edge of the slag pile and the outfalls of the former NPDES discharge points (See Figures 2-2 to 2-4 of this HRS Documentation Record).

Likelihood of Release

4.1.2.1.1 Observed Release

Two (2) observed releases to surface water by direct observation are documented for USS Lead. The first is the dumping of Source 1, the waste lead bearing slag, directly into the on-property wetland. The second is non-permitted levels of heavy metals in blast furnace blowdown and cooling waste water, Source 2, directly into the wetland and canal (Refs. 13, pp. 2, 5; 46, p.2; 47, p.1).

As discussed in the Site Summary of this HRS Documentation Record, there are three probable points of entry (PPEs). Overland flow (surface water drainage) came in contact with the lead bearing slag and drained into the on-facility wetland from the southeast sector of the slag pile (PPE #1). At the time the original NPDES permit was issued in 1975, the outfall (PPE #2) was located between the main slag disposal area (south of the Battery Breaker Building and the By-products Building) and the smaller slag disposal area (southwest of the Mixed Metals Building) (Refs. 13, p. 5; 46, p. 020, 027; Figs. 2-2 and 2-3 of this HRS Documentation Record). In November 1984, a new outfall (PPE #3) was constructed and the former one (PPE #2) was sealed with cement (Refs. 43, p. 2; 46, pp. 002, 003, 020, 027). According to the daily monitoring reports (DMRs), discharge limits were exceeded for lead during the time that both NPDES outfalls (PPE #2 and PPE #3) were permitted (Refs. 3, pp. 2, 5, 8; 44, pp. 02, 03, 05, 07, 09, 12, 13, 17, 20, 29; 45, pp. 06, 15, 16A, 17, 18, 66, 68, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 98, 99, 101, 104, 105, 109-114, 115-120, 126, 127, 130).

Direct Observation

- **Basis for Direct Observation for Source 1**

In 1978, the Army Corps of Engineers reported to the State of Indiana Stream Pollution Control Board regarding an unauthorized placement of fill consisting of slag and refractory material into the wetland on the USS Lead property (Ref. 7, p. 1; 13, pp. 2, 5). The Indiana State Board of Health (ISBH) confirmed that this activity was unauthorized (Ref. 8, p. 1). In December 1978, an ISBH official met with two employees at USS Lead about the complaint (Ref. 9, p. 1). The process generated slag at a rate of 12 tons per day which was dumped on the plant property, and once a year it was leveled off into the wetland south of the plant (Ref. 9, p. 1). In 1989, the U.S. Fish and Wildlife Service sent another notice about the industrial waste in the wetland on USS Lead property to IDEM (Ref. 25, p. 1).

- **Hazardous Substances in the Release**

Analyses of the lead slag deposited into the wetland have shown it to contain lead (Refs. 24, pp. 2, 4, 8-12, 14, 15, 30, 31; 30, p.1).

Basis for Direct Observation for Source 2

The blast furnace blowdown and cooling waste water discharged to the wetland or property canal at the USS Lead facility was monitored on a regular basis for heavy metals, pH, fluoride, total dissolved solids, and total suspended solids (Ref. 13, pp. 02, 05). Violations in lead, cadmium, copper, and arsenic effluent limits occurred in 1984 and 1985 (Refs. 44, pp. 19, 20, 28, 29, 30; 48, p. 2; see Source 2 description in this HRS Documentation Record).

In May 1985, EPA filed a civil action suit for earlier permit violations by USS Lead (Refs. 4, pp. 1, 5; 44, p. 2).

- **Hazardous Substances in the Release**

Violations in lead, cadmium, copper, and arsenic effluent limits occurred in 1984 and 1985 (Refs. 44, pp. 19, 20, 28, 29, 30; 48, p. 2; see Source 2 description in this HRS Documentation Record).

Hazardous Substances Released:
Lead, cadmium, copper, and arsenic

Chemical Analysis

Observed releases by Chemical Analysis to the on-property wetland have been documented by chemical analysis of sediment samples collected during the 2007 ESI.

The Indiana Department of Environmental Management (IDEM) conducted an Expanded Site Inspection (ESI) in November 2007. During the ESI, sediment samples were collected from the on-property wetland area and from wetlands that were considered background wetland samples that were located east of the on-property wetlands (Ref. 64; 115) Analytical data from the 2007 ESI sampling event supports an observed release by chemical analysis to the on-property wetland.

Background Samples:

Background wetland sediment samples were also collected during the November 2007 ESI (Refs. 64, pp. 18-20, 25, 26, Appendix H, pp. 72 to 80, 85 to 91, 118, 159 to 168, 173, 174; 94, pp. 003 to 008, 012, 015 to 018, 061, 062, 063, 112 to 117, 120, 123 to 126, 138, 139, 155). The background wetland samples were collected in wetland areas located along the south side of the Grand Calumet River just east of USS Lead (Ref. 64, Appendix E). The Grand Calumet River predominantly flows from east to west. However, water levels in Lake Michigan may force the Grand Calumet River to flow backwards (Refs. 64, p. 24; 86, pp. 14, 15). These background samples also demonstrated similar properties with other samples collected from the on-property wetland (Ref. 64, pp. 19; 89). These samples were collected from the upper six (6) inches of sediment and were of the same general soil description as all of the other wetland samples collected. Four samples were selected for background soil samples. These samples include ME2PF7, ME2PF8, ME2PK0, and ME2PK1 (Ref. 64, pp. 19, 20).

A comparison of the background sediment samples and the on-property sediment samples shows relatively comparable ranges of properties and are suitable for comparison to establish background and release. The table below depicts the sample ID, sample characteristics, total organic carbon and total volatile solids. Note that all sediment samples collected are from the Carlisle soil series (Ref. 92, pp. 2, 4, 5).

EPA_Number	IDEM Control	Sample Location	Comments	Percent Solids	Total Organic Carbon	Total Volatile Solids	References
ME2PF4	SD4	Wetland sample obtained from the northeast sector of the wetland area	Black sediment (10YR 2/1), Soupy; extremely saturated; Dominant vegetation is cattails	14.8%	22.7%	43.1%	64, pp. 19, 173, 197; 107, pp. 1, 2
ME2PF5	SD5	Wetland sample located from the far northeast sector of the wetland area;	Black sediment (10YR 2/1), Soupy; extremely saturated; Dominant vegetation is cattails	16.2%	31.1%	55.7%	64, pp. 19, 173, 198; 107, pp. 1, 2
ME2PK0	SD8	Wetland sample obtained upstream from the USS Lead property at a point 30-40 feet from river, 150 yards east of Kennedy Av.	Black sediment (10YR 2/1), moist; Dominant vegetation is phragmites	43.2%	18.9%	27.3%	64, pp. 19, 87, 214
ME2PK1	SD9	Wetland sample obtained upstream from the USS Lead facility, 100 yards east of SD8, 100 feet south of the Grand Calumet River, about 350 yards east of Kennedy Av.	Black sediment (10YR 2/1), moist; Dominant vegetation is phragmites	38.6%	17.2%	26.5%	64, pp. 19, 87, 214
ME2PG0	SDA	Wetland sample obtained southwest of sample ME2PF4 and northeast of sample ME2PF1	Black sediment (10YR 2/1), moist; Dominant vegetation is cattails	18.6%	28.4%	53.6%	64, pp. 19, 174, 199
ME2PF7	SD7	Wetland sample obtained upstream from the USS Lead property at a point on the east side of Kennedy Av., S of Calumet River off of Kennedy Av.	Black sediment (10YR 2/1), moist; Dominant vegetation is phragmites	53.2%	8.56%	17.3%	64, pp. 19, 174, 198; 107, pp. 1, 2
ME2PF8	SD10	Wetland sample obtained upstream from the USS Lead property on the east side of bridge on Kennedy Av.; located adjacent to embankment	Black sediment (10YR 2/1), moist; Dominant vegetation is phragmites and cattails	63%	4.93%	10.1%	64, pp. 19, 174, 198

All samples were collected using the same protocols and were analyzed for the same parameters. The samples were analyzed for metals according to CLP SOW ILM05.4 analysis procedures. In addition, all wetland samples collected during the November 2007 ESI were analyzed for TOC, TS, and TVS. The wetland samples were sent to EPA's Central Regional Laboratory for the TOC, TS, and TVS analysis. TS and TVS analysis were performed according CRL SOP AIG019. TOC analysis was performed using the LECO SC 444 (Refs. 64, pp.18-20, 25, 26, Appendix H, pp. 72 to 80, 85 to 91,118, 159 to 168, 173, 174, 193-195, 206, 212; 94, pp. 003 to 008, 012, 015 to 018, 061, 062, 063, 112 to 117, 120, 123 to 126, 138, 139).

Sediment samples ME2PF7, ME2PF8, ME2PK0, and ME2PK1 were obtained for the November 2007, ESI (Ref. 64, pp 18-20, Appendices E, F). These samples, which were obtained upstream from the USS Lead facility, are considered reference background wetland samples. Even though these samples do not represent natural background due to the high lead levels, there is still a three times increase in the concentration of lead in the on-property wetland samples when compared to these samples. The samples were collected in an area east of the USS Lead property on the south side of the Grand Calumet River, east of Kennedy Avenue (Ref. 64, pp 18-20, Appendices E, F).

Sample ID	Sample Medium	Sample Location	Depth	Date	Reference
ME2PF7	Sediment	Wetland east of USS Lead	0-6 inches	11-14-07	64, pp. 18-20, Appendices E, H, p. 174; 115, p. 054
ME2PF8	Sediment	Wetland east of USS Lead	0-6 inches	11-14-07	64, pp. 18-20, Appendices E, H, p. 174; 115, p. 057
ME2PK0	Sediment	Wetland east of USS Lead	0-6 inches	11-14-07	64, pp. 18-20, Appendices E, H, p. 87; 115, p. 055
ME2PK1	Sediment	Wetland east of USS Lead	0-6 inches	11-14-07	64, pp. 18-20, Appendices E, H, p. 87; 115, p. 056

- Background Level

The table below provides a summary of the concentrations of hazardous substances detected in the background wetland samples collected from east of the on-property wetland during the 2007 ESI. The analytical data package and data validation report from the sampling event are provided in Reference 64, Appendix H, pp. 72 to 80, 85 to 91, 118, 159 to 167, 169, 171 to 175, 190 and Reference 94, pp. 003 to 008, 012, 015 to 018, 061, 062, 063, 112 to 117, 120, 123 to 126, 138, 139, 155.

Sample ID	Hazardous Substance	Sample Concentration (mg/kg)	Sample Quantitation Limit (SQL) (mg/kg)	References
ME2PF7	Lead	1270 mg/kg	2.0 mg/kg	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 159 to 167, 169, 171 to 175, 190; 94, pp. 112 to 117, 120, 123 to 126, 138, 155; 95
ME2PF8	Lead	332 mg/kg	1.6 mg/kg	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 159 to 167, 169, 171 to 175, 190; 94, pp. 112-116, 120, 123, 126, 139, 155; 95
ME2PK0	Lead	1780 mg/kg	2.3 mg/kg	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 72 to 79, 84, 85 to 91, 118; 94, pp. 003 to 008, 012, 015 to 018, 061, 063; 95
ME2PK1	Lead	1550 mg/kg	2.5 mg/kg	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 72 to

				79, 84, 85 to 91, 118; 94, pp. 003 to 008, 012, 015 to 018, 062, 063; 95

mg/kg milligrams per kilogram
U The analyte was analyzed for, but was not detected above the reported contract required detection limit (CRDL).

Based on the above lead concentrations, the highest lead level 1780 mg/kg was selected as the reference background lead concentration. The following sediment samples obtained from the on-property wetland were found to be greater than three times the 1780 mg/kg lead concentration and meet the requirements of an observed release (Refs. 1, Section 2.3, p. 51589; 64, pp 18-20, 25, 26, Appendices E, F, H, pp. 159 to 166, 168, 171 to 174, 190; 94, pp. 112 to 117, 119, 122 to 126, 135, 136, 141, 155).

- Contaminated Samples

Sample ID	Sample Medium	Sample Location	Distance from Source	Depth	Date	References
ME2PF4	Sediment	On-property wetland (USS Lead Property)	120 feet	0-6 inches	11/13/07	Ref. 64, pp 18-20, Appendix E, F, H, pp. 173, 174; 74; 115, p. 51
ME2PF5	Sediment	On-property wetland (USS Lead Property)	95 feet	0-6 inches	11/13/07	Reference 64, pp. 18-20, Appendices E, F, H, pp. 173, 174; 74; 115, p. 52
ME2PG0	Sediment	On-property wetland (USS Lead Property)	435 feet	0-6 inches	11/14/07	Ref. 64, pp. 18-20, Appendices E, F, H, pp. 173, 174; 74; 115, p. 59

Sample ID	Sample Medium	Hazardous Substance	Hazardous Substance Concentration	SQL	Benchmark for SW Environmental Ref. 2, p. 005	References
ME2PF4	Sediment	Lead	6570 mg/kg	7.7 mg/kg	NA	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 159 to 166, 168, 170, 173 to 175 190; 94, pp. 112 to 117, 119, 122, 124 to 126, 135, 155; 95
ME2PF5	Sediment	Lead	6440 mg/kg	3.6 mg/kg	NA	Refs. 64, pp 18-20, 25, 26, Appendices E, F, H, pp. 159 to 170, 173 to 175, 190; 94, pp. 112 to 117, 119, 120, 122, 124 to 126, 136, 155; 95

Sample ID	Sample Medium	Hazardous Substance	Hazardous Substance Concentration	SQL	Benchmark for SW Environmental Ref. 2, p. 005	References
ME2PG0	Sediment	Lead	5620 mg/kg	5.5 mg/kg	NA	Refs. 64, pp 18-20, 25, 26, Appendices E, F, H, pp. pp. 159 to 166, 167, 168, 169, 171 to 175, 190; 94, pp. 112 to 117, 120, 123 to 126, 141, 155; 95

Key
mg/kg milligrams per kilogram
NA Not Applicable

Attribution:

The information gathered documents the presence of a contaminant associated with the USS Lead and the sediments in the on-property wetlands. The hazardous substance in the waste slag are attributable to USS Lead because the slag was an on-facility generated waste. Also, because a hazardous substance was detected in waste water being discharged from the USS Lead facility, the lead in the release is at least partly attributable to the USS Lead property (Refs. 44, p. 5, 19, 20, 28, 29; 48, pp. 2, 6).

At least part of the contamination is attributed to the USS Lead facility by direct observation based on the following:

1) NPDES outfall Discharge Monitoring Reports;
2) The slag pile being deposited directly into the wetland.

The Dupont Corporation, located approximately ¼ mile upstream from the USS Lead facility on the Grand Calumet River, was a manufacturer and packager of inorganic pesticides (i.e. lead arsenate). Several waste management units have been established on the property. A slurry wall has also been completed on site to address any on site ground water issues. The facility is currently undergoing RCRA Corrective Action activities (Ref. 69).

Any potential contamination from the Dupont facility which may have reached the Grand Calumet River would be reflected in the background samples that are located between the Dupont facility and the USS Lead wetlands.

The concentrations of lead in the background samples are significantly less than what is currently being seen on the USS Lead property wetland. Therefore, the lead in the wetland on the USS Lead property can be at least partly attributed to USS Lead (Ref. 74; Section 3.1.1 of this HRS Documentation Record).

Also, please see the information in the Site Summary and Section 2.2 of this HRS Documentation Record.

Presently, the USS Lead on-property wetland consists of swampy areas of standing water that serve as wetlands. Several species of state endangered and threatened birds and plants are known to exist in the vicinity of the wetland (Ref. 91, pp. 4, 6-10, 23, 35, 43, 47, 63, 72, 76, 82, 90).

Hazardous Substances Released:
Lead
Cadmium*
Copper*
Arsenic*

*Although, cadmium, copper, and arsenic were released in regards to Source #2 in 1984 and 1985, current analytical data does not show these past releases (Refs. 44, pp. 19, 20, 28, 30; 48, p. 2; see Source 2 description in this HRS Documentation Record).

Surface Water Observed Release Factor Value: 550

4.1.4 Environmental Threat

4.1.4.2 Environmental Threat Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

The ecosystem toxicity and persistence values, the environmental bioaccumulation values, and the ecosystem toxicity/persistence/bioaccumulation factor values for all hazardous substances associated with Source #1 and Source #2 are presented in the table below. The combined ecosystem toxicity/persistence/bioaccumulation factor values were obtained from HRS Table 4-21 (Ref. 1, Section 4.1.4.2.1.4, p. 51623).

Hazardous Substance	Source No.	Ecosystem Toxicity Factor Value	Persistence Factor Value*	Bioaccumulation Value**	Ecosystem Tox/Persistence/Bio Factor Value (Table 4-21)	References (Ref 1, Section 4.1.4.2.1.4, p. 51623)
Lead	1, 2	1000	1	50,000	50,000,000	Ref. 2, p. 005
Arsenic	2	10	1	5,000	50,000	Ref. 2, p. 007
Cadmium	2	10,000	1	50,000	500,000,000	Ref. 2, p. 009
Copper	2	1,000	1	5,000	5,000,000	Ref. 2, p. 011

* The river persistence value was used since the nearest sensitive environment is the on-property wetland which is part of the Grand Calumet River.

**Bioaccumulation factor value for Freshwater

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.4.2.2 Hazardous Waste Quantity

Source No.	Source Type	Source Hazardous Waste Quantity
1	Waste Pile (slag)	>0, but value is unknown
2	Other: Waste Water Discharge	8600

Sum of Values:

As documented in Section 4.1.4.3 of this HRS Documentation Record, targets along the surface water migration pathway are subject to Level II concentrations; therefore, a Hazardous Waste Quantity factor value from Table 2-6 or 100, whichever is greater, is assigned as the hazardous waste quantity factor value for that pathway (Ref. 1, Section 2.4.2.2, p. 51592).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Section 2.4.2.2, p. 51592)

4.1.4.2.3 Waste Characteristics Factor Category Value

The environmental waste characteristics factor value is obtained by multiplying the (ecosystem toxicity/ persistence factor value) and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply the product by the ecosystem bioaccumulation potential factor

value for that hazardous substance, subject to a maximum product of 1 x 10^{12} (Ref. 1, Section 4.1.4.2.3, p. 51624). The product is assigned a waste characteristic factor category value from HRS Table 2-7 (Ref. 1, Section 2.4.3.1, p. 51592). The values presented below are for cadmium.

Ecosystem Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100
Bioaccumulation Potential Factor Value: 50000

10,000 (Ecotox) X 100 (Hazardous Waste Quantity is 100) = 1 x 10^6 X 50,000 (Bio Accumulation) = 5 X 10^{10}
Then enter 5 X 10^{10} into HRS Table 2-7
HRS Table 2-7 gives you a waste characteristics factor category value of 320

Waste Characteristics Factor Category Value: 320
(Ref. 1, Table 2-7, p. 51592)

4.1.4.3 Environmental Threat Targets

4.1.4.3.1.1 Level I Concentrations

There are no level I concentrations; therefore, level I concentrations were not evaluated as part of this HRS Documentation Record.

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.2 Level II Concentrations

Actual contamination is shown in the preceding sections by establishing an observed release by chemical analysis to wetland sediments, which includes other sensitive environments, of the same substance. Contaminants that meet the criteria for observed releases to the surface water pathway were detected in sediment samples (Section 4.1.2.1.1of this HRS Documentation Record). Therefore, Level II concentrations are assigned (Ref. 1, Sec. 2, p. 51592).

A 39+/- acre wetland, is present on the southern portion of the facility property. This area meets the criteria for a wetland as defined by the Hazard Ranking System and as defined in 40 CFR Section 230.3 (Refs. 1, p. 51625; 91, pp. 3, 4, 6, 8, 49, 51, 53, 55, 57, 59, 61, 62, 63; 88; 110). This area is inundated and/or saturated by surface water at frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. This portion of the property contains hydrophytes in both hydric and non-hydric soils (Refs. 88; 91, pp. 47 through 61). National Wetland Inventory Maps published by the U. S. Fish and Wildlife Service indicate that this wetland is designated as freshwater emergent wetland (Ref. 87). This wetland meets the HRS definition of a wetland, 40 CFR 230.3, and is considered eligible for HRS scoring (Refs. 1, Table 4-24, p. 51625; 87; 88; 110).

This wetland had become contaminated with lead and other metals as a result of lead bearing slag (Source #1) being dumped directly into the wetland and of discharging water from an NPDES permitted outfall (Source #2)(Refs. 44, pp. 4, 19-20, 28, 30; 48, pp. 2, 6; 36, pp. 9-14; 64, pp 18-20, 25, 26, Appendices E, F; 65, p. 12; 68, pp. 7, 8, 11-13, 15; 94, pp.112-116, 119, 122, 126, 135-136, 141, 153).

The wetland is a habitat known to be used by State designated endangered or threatened species. A habitat known to be used by State designated endangered or threatened species meets the HRS definition of a sensitive environment (Ref. 1, Table 4-23, p. 51624). The wetland is an area/habitat known to be used by the marsh wren, cistothorus palustris, a state designated endangered bird (Refs. 91, pp. 9, 10; 111, p. 1). The last sighting of the bird was in 2007. Bebbs Sedge, carex bebbii, a state designated threatened plant, was found in the wetland area in 2007(Refs. 91, pp. 9, 10, 35, 43, 76, 82, 90; 105; 111, p. 1). Also, the wetland area, a particular area, relatively small in size, is important to the maintenance of unique biotic communities. It is part of the Grand Calumet River Corridor (Refs. 91, pp. 3, 4, 6, 7, 8, 18, 24; 112, pp. 1-6).

Sample ID	Sample Medium	Hazardous Substance	Hazardous Substance Concentration	SQL	Benchmark for SW Environmental Ref. 2, p. 005	Reference
ME2PF4	Sediment	Lead	6570 mg/kg	7.7 mg/kg	NA	Refs. 64, pp. 18-20, 25, 26, Appendices E, F, H, pp. 159 to 166, 168, 170, 173 to 175 190; 94, pp. 112 to 117, 119, 122, 124 to 126, 135, 155; 95
ME2PF5	Sediment	Lead	6440 mg/kg	3.6 mg/kg	NA	Refs. 64, pp 18-20, 25, 26, Appendices E, F, H, pp. 159 to 171, 173 to 175, 190; 94, pp. 112 to 117, 119, 120, 122, 124 to 126, 136, 155; 95
ME2PG0	Sediment	Lead	5620 mg/kg	5.5 mg/kg	NA	Refs. 64, pp 18-20, 25, 26, Appendices E, F, H, pp. pp. 159 to 166, 168, 169, 171 to 175, 190; 94, pp. 112 to 117, 120, 123 to 126, 141, 155; 95

Key
mg/kg: milligrams per kilogram

Sensitive Environment	Distance from PPE to Nearest Sensitive Environment	Reference	Sensitive Environment Value (Ref. 1, Table 4-23, p. 51624)
Habitat known to be used by State designated endangered species (Marsh Wren)	0 ft	74; 91, pp. 9, 10, 35, 43; 111, p. 1	50
Habitat known to be used by State designated threatened species (Bebbs Sedge)	0 ft	74; 91, pp. 9, 10, 76, 82, 90; 111, p. 1	50
Particular areas, relatively small in size, important to maintenance of unique biotic life (Grand Calumet River Corridor)	0 ft	74; 91, pp. 4, 10, 18, 24; 112, pp. 1-6	25

There is evidence that the Blandings Turtle and the Franklin Ground Squirrel, both of which are State designated endangered or threatened species, are also in the area. These two species were last observed in the area in 1999 and 1992 respectively (Ref. 91, pp. 9, 10). It is unclear whether these species remain in the site area at this time.

As PPE#1 is within the wetlands, there is no distance from PPE #1 to the nearest sensitive environment (Ref. 74).

Sum of Level II Sensitive Environments Value: 125

Wetlands

Wetland sediment samples ME2PF4, ME2PF5, and ME2PG0 meet the requirements for an observed release (Refs. 1, Section 2.3, p. 51589; Section 4.1.2.1.1 of this HRS Documentation Record). The total length of wetlands frontage documented at the USS Lead on-property wetland that are subject to Level II concentrations of hazardous substances is determined by measuring the distance from PPE #1 to sample ME2PF4 to sample ME2PG0 to sample ME2PF5 and then back to the PPE (Refs. 74; 76). The perimeter of the wetlands outlined by connecting a line to PPE #1 and these three sample points represents a quadrilateral (Ref. 74). The perimeter of the wetland measured by this quadrilateral that is subject to Level II concentrations is 1,206.52 feet or .228 miles (Ref. 74). The distance from PPE #1 to each of the three (3) sample points and back to the PPE #1 was calculated using ESRI®ArcMap™ 9.2, Copyright© 1999-2007, ESRI Inc (Refs. 74, 76). The distance was determined based on the locations of the sediment samples as logged into the Trimble Global Positioning System Unit upon the time of collection, and then transferred to the ESRI®ArcMap™ 9.2 program. These locations were then placed on the digitized and rectified aerial photograph of the area. Then using this program, the ruler option of the program allows users to find distances between sample locations (Refs. 74, 76). Sample locations are depicted in Reference 64, Appendices E and F. The perimeter of the wetlands was calculated using ESRI®ArcMap™ 9.2, Copyright© 1999-2004, ESRI Inc (Ref. 76). The assigned HRS wetland rating for Level II concentrations is 25 (Ref. 1, Table 4-24, p. 51625).

Wetland	Wetland Frontage (ft)	Wetland Frontage (miles)	Reference
PEM	1,206.52	.228	Refs. 74; 76; 91, p.4, 6, 7, 8, 47, 63, 72, 76

Notes:
Sum of Level II Wetland Frontages: .228 miles
Wetlands Value (Ref. 1, Table 4-24): 25

Sum of Level II Sensitive Environments Value + Wetlands Value: 25 + 125

Level II Concentrations Factor Value: 150

Soil Exposure Pathway – Not Scored

Evidence of soil contamination, both on and off the property exists in the vicinity of USS Lead. Levels of lead, which may pose a threat to nearby individuals, have been documented on the USS Lead property, as well as on nearby residential and industrial areas. Investigations in the area indicate that a lead release had occurred to residential properties greater than 0.25 miles but less than 4 miles of USS Lead (Refs. 64, pp.16, 26, 27, 30-32, Appendix D; 68, p. 12; 81, Table 3, Figures 4a, 4b, 8a,8b & 9, Appendix E Tables E-1, E-2 & E-3; 82, pp. 7, 8, 9, Table 1 (p. 58); 94, pp 003 to 018, 044 to 050, 052 to 060, 063, 065 to 070, 072, 073, 075 to 079, 086, 087, 090, 092, 093, 110). In 2007, there were at least 18 residential properties identified during a recent sampling event as having elevated levels of lead in their soil. Residential soil lead levels ranged from as low as 62.6 mg/kg (background level) to as high as 1680 mg/kg (Refs. 64, pp. 16, 26, 27, 30-32, Appendix D; 94, pp 003 to 018, 044 to 050, 052 to 060, 063, 065 to 070, 072, 073, 075 to 079, 086, 087, 090, 092, 093, 110). In 1985, EPA conducted a lead soil survey where 19 lead soil samples were taken in areas surrounding USS Lead. At six of these locations, the lead levels were greater than or equal to 11,000 mg/kg. Four of these samples were to the north-northeast in residential area directly north of USS Lead (Ref. 68, p. 12). However, until a more comprehensive study can be done, elevated lead levels will not be used in the overall site score.

6.0 AIR MIGRATION PATHWAY

Literature indicates that lead releases have occurred to soils and air from lead smelters (Refs. 38, p. 227; 101, p.2; 102, pp. 1-3). The State of Indiana as part of their State Implementation Plan was working on a rulemaking which would propose emission limitations in June 1986 (Refs. 31, p. 1; 103; 104).

As can be seen in Figure 2-1 of this HRS Documentation Record, the shadow of a stack can be observed next to the former baghouse. Lead emissions at a rate of 16.07 tons of lead per year have been documented for the USS Lead facility (Ref. 38, pp. 205, 216). Two air emission sources were listed for the USS Lead facility: 1) a point source (stack) and 2) a volume source (roof vent) (Ref. 38, pp. 205, 219, 220).

Inspection of the site indicates that "lead flue dust had been casually hauled around in a front end loader, for example, with excessive loss by spill or by wind" (Ref. 5, p. 006). The air pathway may have also been compromised because the slag pile was never capped and was subject to dispersion (Refs. 36, pp. 11, 12; 67, p. 008; 100; Figure 2-1 of this HRS documentation record). Therefore, there were likely airborne releases of contaminants prior to the remediation of this area (Refs. 67, p. 006; 100).

As the past air releases from USS Lead may pose a potential threat to human health and the environment, EPA is scoring the air migration pathway as part of this HRS Documentation Record (Ref. 102, p. 1).

6.1 LIKELIHOOD OF RELEASE

This HRS Documentation Record will evaluate the release factor in terms of an observed release by direct observation and chemical analysis (See Section 6.1.1 of this HRS Documentation Record).

6. 1. 1 OBSERVED RELEASE BY DIRECT OBSERVATION AND CHEMICAL ANALYSIS

Direct Observation

An observed release of lead to the air by direct observation has been documented at the USS Lead property. According to an inspection of the facility by the Air Pollution Control Division in April 1985, the company was told that they were violating 325 IAC6-4 which applies to Maximum Allowable Fugitive Dust Emissions (Refs. 15; 31, p. 14).

The inspection noted "a number of areas where there were problems. Many piles of material were scoured by the wind. Dust on nearly all drives with vehicle traffic which were a source of wind-blown emissions crossing the property line. Handling of collected dust from baghouses was not satisfactory. Street sweeper was not adequately cleaning the roads (although it was not seen in operation)" (Ref. 15).

The slag pile was never capped (Refs. 36, pp. 11, 12; 67, p. 008; 100; Figure 2-1 of this HRS Documentation Record). The 1985 inspection of the facility noted wind-blown emissions crossing the property line that may have come from storage piles of furnace slag, flue dust, and battery casings on the plant property (Refs. 14, p. 02; 15). In addition, as mentioned above, another inspection of the facility found that "lead flue dust had been casually hauled around in a front-end loader, for example, with excessive loss by spill or by wind" (Ref. 5, p. 006).

Chemical Analysis

Air data collected by the Indiana State Board of Health on September 16, 1985, showed that a release (primary) sample, collected downwind of the USS Lead site, had a total suspended particulate concentration that exceeded the maximum allowable increase (as defined in Indiana's air regulations) over background. Since the air sample exceeded an allowable particulate concentration, the USS Lead facility was found to be out of compliance with (in violation of) Regulation 325 IAC 6-4, Section 2(c) (Ref. 14, p. 02).

The background and release (primary) samples were also analyzed for lead. The air release sample downwind of the USS Lead facility contained lead at a concentration of 38.187 ug/m^3. This concentration was found to be over 100 times the level in the background sample (Ref. 14, p. 13). Since the air release sample was

significantly greater than the background air sample, an observed release by chemical analysis is noted. Based on the locations of the primary and background samples and on wind direction, the elevated levels of lead in the primary sample may be at least partially attributed to the USS Lead facility (Refs. 14, pp. 02, 13; 96, pp. 001, 006; 97, pp. 001, 002).

Background Sample – across Grand Calumet River, opposite southernmost part of USS Lead property

In an effort to document airborne releases from the USS Lead facility, it was necessary to determine the wind directions during days when air lead samples were obtained. The appropriate raw meteorological data was reviewed and a wind vector analysis was constructed. A background air sample was obtained based on these parameters and was obtained just south of the USS Lead facility (Refs. 14, pp. 02, 08; 96, p.006; 97, p. 001). Below are the background concentrations that were obtained.

Particulate Concentration: 122 $\mu g/m^3$
Lead Concentration: 0.375 $\mu g/m^3$
References: 14, pp. 02, 08, 11, 13; 97, p. 002
µg/m = micrograms per cubic meter

Release (Primary) Sample – just beyond northeast corner of USS Lead property

On September 16, 1985, an air sample was obtained (Ref. 97, pp. 001, 002). This air sample was considered a release sample based on a vector analysis of wind direction (Refs. 96, p. 001; 97, p. 001). On this date, the ground was sufficiently dry to allow the dust from the USS lead facility to become entrained in the air (Ref. 97, p. 001). The sample was obtained just northeast of the USS Lead facility (Refs. 14, p. 08; 18). Below are the results of the test.

Particulate Concentration: 218 $\mu g/m^3$
Lead Concentration: 38.187 $\mu g/m^3$
References: 14, pp. 02, 08, 10, 13; 97, p. 002

Attribution: Attribution to the site via the air pathway is supported by the presence of the slag waste pile, flue dust and battery casings located on the USS Lead property (Refs. 14, p. 02; 15, 100). In addition, an observed release to the air by direct observation has been documented (Refs. 14, pp. 02, 08, 10, 11, 13; 15; 96, p. 001; 97, pp. 002, 003; and See Section 6.1.1 of this HRS Documentation Record).

Other Possible Non Site-related Sources

IDEM conducted a review of files and Sanborn Maps to determine if there are any other sources of lead that may have adversely impacted the air as well as the surrounding soils via the air pathway. The review revealed the presence of at least six other facilities that were involved with lead processing activities in the past. The facilities are Anaconda, Eagle Picher, Metals Refining, US Reduction, Hammond Lead and Dupont. A map showing the location of these other facilities is found in Reference 75, p. 79. The layout of these facilities were reviewed on 1930 Sanborn Insurance maps (Refs. 75, pp. 81, 82, 83; 113, pp. 1-9). Below are brief findings regarding these facilities:

<u>The Glidden Co.; Metals Refining. Inc. Division (1.36 mi. SW of USS Lead)</u>

Sanborn maps show that Metals Refining, Inc. recycled lead at the site in 1930. The maps indicate that an oxidizing plant and a refinery had operated at this site. A metal powder blending area, an iron powder facility, and other processes were utilized. Historical research indicated that lead smelting has occurred at the site (Refs. 75, pp. 9, 79, 83; 113, pp. 1, 2; 114, pp. 1, 2, 3).

<u>United States Reduction (US Reduction) (0.77 mi. N of USS Lead)</u>
According to 1930 Sanborn maps, US Reduction was a manufacturer of white metal. The facility consisted of an evaporating building, ore storage areas, an oil tank room, ingot storage, a machine shop, a melting area, other metal storage buildings, and an ore mill. No other historical information was found (Refs. 75, pp. 9, 79, 81, 82, 83; 113, pp. 1, 2).

Anaconda Lead Products/International Lead Products (0.62 mi. N, NW of USS Lead)
According to 1930 Sanborn maps, Anaconda Lead Products was a manufacturer of white lead and zinc oxide. The facility consisted of a pulverizing mill, white lead storage areas, an electrical substation, a lowden drier building, several water towers, an electrolytic building consisting of a tank room and a cell room, a chemical laboratory, a machine shop, a zinc oxide experimental unit building, a furnace, several settlers, a motor room, offices, a baghouse, and other miscellaneous buildings and processing areas. No other historical information was found (Refs. 75, pp. 9, 79, 83; 113, pp. 1, 2, 3, 4, 5, 6, 7, 8).

Metals Thermit Corporation (0.77 mi. NW of USS Lead)
The Metal Thermit Corporation operated a detinning plant. The facility consisted of a smelter, a general laboratory, a raw materials room, a general repair shop, an engine room, offices, and other miscellaneous buildings and processing areas (Refs. 75, pp. 9, 79, 83; 113, pp. 1, 2, 9).

Hammond Lead (1.53 mi. SW of USS Lead)
No historical information was found for this facility at this time (Ref. 75, pp. 9, 79, 83).

Eagle Picher (location unspecified)
No historical information was found for this facility at this time (Ref. 75, pp. 9, 79, 83).

The Dupont Corporation (0.3 mi. E of USS Lead)
The Dupont Corporation was a manufacturer and packager of inorganic pesticides (i.e. lead arsenate). Several waste management units have been established on site. A slurry wall has also been completed on site to address any on site ground water issues. The facility is currently undergoing RCRA Corrective Action activities (Refs. 69; 75, p. 79).

Air Observed Release Factor Value: 550

6.1.2 POTENTIAL TO RELEASE

Because an observed release has been identified, air potential to release is not scored (Ref. 1, Section 6.1.1, p. 51651).

6.2 WASTE CHARACTERISTICS

6.2.1 TOXICITY/MOBILITY

Because lead meets the criteria for an observed release to the atmosphere, a mobility factor of 0.02 is assigned to it (Ref. 1, Section 6.2.1.2, p. 51655).

Hazardous Substance	Source(s)	Toxicity Factor Value	Gas Mobility Factor Value	Particulate Mobility Factor Value	Toxicity Mobility Factor (Table 6-13)
Lead	1	10,000	N/A	0.02	200

Refs: See Source Description Section, Source 1, in this documentation record which indicates that lead is associated with this source. See Reference 1 and 2 for toxicity and mobility factor values (Refs. 1, Section 6.2.1.2, p. 51655 and Table 6-13, p. 51660; 2, p. 005).

The substance with the highest toxicity/mobility factor value is lead, with a value of 200.

Toxicity/Mobility Factor Value: 200

6.2.2 HAZARDOUS WASTE QUANTITY

Source#	Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete?
1	*>0, but amount is unknown	no

***** Although the majority of the slag pile has been remediated, remnants/residual material still remains. Therefore a value of >0, but amount unknown is assigned (Ref. 1, Section 2.4.2.2, p. 51591).

Sum of values: >0, but amount is unknown

The Hazardous Waste Quantity Factor Value is assigned 100, because an air migration pathway target is subject to a Level I concentration (Ref. 1, Section 2.4.2.2, p. 51592 and Section 6.2.2, p. 51660).

6.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

Toxicity/mobility factor value
x hazardous waste quantity factor value = 2×10^4

$200 \times 10^2 = 2 \times 10^4$

From Table 2 – 7, Reference 1, p. 51592, a factor category value of 10 is assigned.

Hazardous Waste Quantity Factor Value: 100
Waste Characteristics Factor Category Value: 10

6.3 TARGETS

As noted in the Superfund Chemical Data Matrix, the NAAQS/NESHAPS benchmark for lead in air is 1.5 ug/m³. Since the air release sample was significantly greater than the background air sample, and this sample exceeded a benchmark, 1.5 ug/m³, targets subject to this concentration are considered level I (Refs. 1, Section 6.3, pp. 51660, 51661, Table 6-14; 2, p. 005).

Because a Level I observed release to air has been documented, the population, resources, and sensitive environments within a four (4)-mile radius of the USS Lead site are considered to be subject to either Level I or potential contamination. The four (4)-mile radius of the site includes a large number of residents, students, and workers. Major recreation areas are located within four (4) miles of the site, as are numerous sensitive environments, wetlands, and endangered species.

Based on the 1985 air sampling event, an air sample was obtained northeast of source 1. The air sample was obtained ¼ mile from the site source. Analysis of that air sample showed that the lead concentration in that sample was three times greater than background and exceeded an air benchmark. Therefore all targets up to ¼ mile are subject to actual contamination (the level I concentration) (See Section 6.1.1 of this HRS Documentation Record).

Level I Distance Categories

Sample ID: Release (Primary) sample from air observed release
Location: Just beyond the property boundary of USS Lead at its northeast corner
References: 14, p. 08; 18; 99
Sources: 1
Distance from the source in miles: 1458 feet or 0.276 mile

References: 14, pp. 02, 08, 11, 13; 15; 18; 36, p. 14; 67, p. 008; 99
Distance categories subject to Level I concentrations: on-a source and 0 to ¼ mile

There are two Distance Categories: 1) On a source
2) >0 to ¼ mile

Level II Distance Categories

There are no Level II distance categories.

Actual Contamination Distance Categories

Potential Contamination Distance Categories

The area greater than one-quarter (¼) mile but less than four (4) miles from Source 1 is subject to potential contamination.

6.3.1 NEAREST INDIVIDUAL FACTOR

Nearest Individual – Level I Concentrations

Based on the 1985 air sampling event, an air sample was obtained northeast of source 1. The air sample was obtained ¼ mile from the site source. Analysis of that air sampled showed that the lead concentration in that sample was three times greater background and exceeded an air benchmark. Therefore all targets up to ¼ mile are subject to actual contamination (the level I concentration) (See Sections 6.1.1 and 6.3 of this HRS Documentation Record).

The nearest population that is subject to Level I concentration is based on the workers on the USS Lead property, the site wetland and part of the Grand Calumet River Natural Area.

Location: on-site
Source: 1
Distance from the nearest source in miles: 1,458 feet or 0.276 mile
References: 14, pp. 02, 08, 11, 13; 99

Nearest Individual Factor Value: 50

6.3.2 POPULATION

6.3.2.2 LEVEL I CONCENTRATIONS

6.3.2.2 LEVEL I CONCENTRATIONS

According to a directory published in 1986, the USS Lead facility employed 71 people (Ref. 37, p. 4). This figure is from prior to the plant closing in December 1985.

Also included in the Level I population category is those people living or working within the 0 to ¼ mile distance ring. This includes 50 employees at the E. I. Dupont plant to the east and 160 employees at Harbison Walker Refractory to the south (Refs. 41; 90).

The population data as documented in the 1991 HRS Documentation Record is being used. An observed release by chemical analysis was established as documented in Section 6.1.1 of this HRS Documentation Record. The population data for the time in which the release occurred is as follows:

USS Lead----------71 People
E.I Dupont----------50 People
Harbison Walker Refractory-----160 People

Total----------281 People

Target Score: (281 x 10) = 2810

Level 1
Target Score: 2810

The conditions at the USS Lead property have changed since the time of which the release occurred (See the Site Summary of this HRS Documentation Record). However, as only the source of the release was addressed and not where the releases have come to be located, this documentation record will also provide the current 2008 population in the vicinity of USS Lead. The current 2008 population is as follows:

Distance Category	Name of Facility	No. of students/ residents/employees	References
0 - ¼ Mile*			
	W. R Grace	50	Ref. 51
	RESCO	62	Ref. 52
	Resident Population	652	Ref. 64, Appendix A
	TOTAL	764	

*The 0 -1/4 mile radius is currently measured from the boundary of the small pond where the slag pile was located prior to its removal.

6.3.2.3. LEVEL II CONCENTRATIONS

There are no level II targets.

6.3.2.4 POTENTIAL CONTAMINATION

Employees, residents, and students located greater than one-quarter (¼) mile and less than four (4) miles from USS Lead are considered to be subject to potential contamination. The table below is a partial listing of the population within each distance category. IDEM staff had called the schools/businesses/factories listed below to obtain the number of employees (see references listed below).

Distance Category	Name of Facility	No. of students/ residents/employees	Distance-Weighted Population	References
0 - ¼ Mile	NA	NA	NA	(All targets in 0-1/4 Mile are considered Level 1)
¼ - ½ Mile	Universal SVCS	3		Refs. 49, p. 1; 53
	Calregion Supply	4		Refs. 49, p. 1; 54
	Pinder Polyurethane & Plastics	8		Refs. 49, p. 1; 55

	Central Rent A Crane	25		Refs. 49, p. 1; 56
	Meretic Corporation	14		Refs. 49, p. 1; 57
	Resident Population*	1205		Refs. 49, p. 1; 64, Appen. A
	Central States Marketing	34		Refs. 49, p. 1; 85, p 1
	Total	1293	88	Ref. 1, Table 6-17, p. 51661

*Note: Elevated levels of lead were detected in the soil in the residential area to the north/northeast of the USS Lead property that lies in the ¼ - ½ mile radius of Source 1 (Refs. 68, p. 12; 81, Table 3, Figures 4a,4b, 8a,8b & 9, Appendix E Tables E-1, E-2 & E-3; 82, pp. 1,2,3, Table 1; 64, pp. 3-3, 4-5 to 4-6, 4-9 to 4-11, Appendix D; 94, pp 003 to 018, 044, 048, 049, 050, 052 to 055, 057 to 060, 063, 065 to 070, 072, 073, 075 to 079, 086, 087, 090, 092, 093, 110).

½ - 1 Mile	Resident Population	4433		Refs. 49, p. 1; 64, Appen. A
	St. Joseph Carmelite Home for Girls	122		Refs. 49, p. 1; 85, p. 2
	Union Tank Car Co.	5		Refs. 49, p. 1; 85, p. 3
	Fuentes Auto Repair	2		Refs. 49, p. 1; 85, p. 4
	Polaris Kars Auto Body	2		Refs. 49, p. 1; 85, p. 5
	Mikes Automotive	3		Refs. 49, p. 1; 85, p 6
	Creviston Trucking Inc. Center	7		Refs. 49, p. 1; 85, p. 7
	Chicago Flame Hardening Co. Inc.	30		Refs. 49, p. 1; 85, p. 8
	Topbulb.com LLC	15		Refs. 49, p. 1; 85, p. 9
	United States Postal	50		Refs. 49, p. 1; 85, p 10
	Majac Inc.	13		Refs. 49, p. 1; 85, p. 11
	Budget Maintenance & Construction Service	25		Refs. 49, p. 1; 85, p. 12
	Total	4707	83	Ref. 1, Table 6-17, p. 51661
1 -2 Mile	St. Mary's School	71		Refs. 49, p. 1; 58
	Block Junior High School	80+ 500 students		Refs. 49, p. 1; 59
	Harding Elementary School	710		Refs. 49, p. 1; 60

	St. Catherine	170		Refs. 49, p. 2; 62
	West Side Junior High School	593		Refs. 49, p. 2; 63
	Resident Population	32589		Ref. 64, Appendix A
	TOTAL:	34713	266	Ref. 1, Table 6-17, p. 51661
2 – 3 Miles	Resident Population	46,423		Ref. 64, Appendix A
	Total		120	Ref. 1, Table 6-17, p. 51661
3 to 4 Miles	Edison Elementary School	780		Ref. 61
	Resident Population	41,099		Ref. 64, Appendix A
	Total	41,879	73	Ref. 1, Table 6-17, p. 51661

Distance Weighted Total = 88+ 83 + 266 + 120 + 73= 630

Distance – weighted = 630

Population Subject To Potential Contamination: 630 X .1 =63 **Potential Contamination Factor Value:** 63

6.3.3 RESOURCES

No commercial agriculture, or silviculture or major or designated recreation areas are located with ½ mile of a source at USS Lead.

Resources Factor Value: 0

6.3.4 SENSITIVE ENVIRONMENTS

6.3.4.1 ACTUAL CONTAMINATION

A 39+/- acre wetland, is present on the southern portion of the facility property. This area meets the criteria for a wetland as defined by the Hazard Ranking System and as defined in 40 CFR Section 230.3 (Refs. 1, p. 51625; 91, pp. 3, 4, 6, 8, 49, 51, 53, 55, 57, 59, 61, 62, 63; 88; 110). This area is inundated and/or saturated by surface water at frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. This portion of the property contains hydrophytes in both hydric and non-hydric soils (Refs. 88; 91, pp. 47 through 61). National Wetland Inventory Maps published by the U. S. Fish and Wildlife Service indicate that this wetland is designated as freshwater emergent wetland (Ref. 87). This wetland meets the HRS definition of a wetland, 40 CFR 230.3, and is considered eligible for HRS scoring (Refs. 1, Table 4-24, p. 51625; 87; 88; 110).

The wetland is a habitat known to be used by State designated endangered and threatened species. A habitat known to be used by State designated endangered or threatened species meets the HRS definition of a

sensitive environment (Ref. 1, Table 4-23, p. 51624). The wetland is an area/habitat known to be used by the marsh wren, cistothorus palustris, a state designated endangered bird. The last sighting of the bird was in 2007. Bebbs Sedge, carex bebbii, a state designated threatened plant, was found in the wetland area in 2007(Refs. 91, pp. 9, 10, 35, 43, 76, 82, 90; 111, p. 1).

The wetland area is also within a habitat known to be used by the state designated endangered blandings turtle, emydoidea blandingii. The last sighting of the turtle was in 1999. The franklin ground squirrel, spermophilus franklinii, a state designated endangered animal, was also observed in this habitat. The last sighting of the squirrel was in 1992 (Ref. 91, pp. 9, 10). It is unclear whether these two species remain in the site area at this time. Also, the wetland area, a particular area, relatively small in size, is important to the maintenance of unique biotic communities. It is part of the Grand Calumet River Corridor (Refs. 91, pp. 4, 10, 18, 24; 112, pp. 1-6).

The sensitive environments with ¼ mile of USS Lead are considered to be subject to actual contamination. This includes the site wetland and the habitat for two state designated endangered or threatened species, the Marsh Wren and Bebbs Sedge (Refs. 91, pp. 9, 10, 35, 43, 76, 82, 90; 105; 111, p. 1).

Sensitive Environments

Sensitive Environment	Distance Category	Species References(s)	Sensitive Environment Value(s)
Habitat of the Bebbs Sedge	0 – ¼	91, pp. 9, 10, 76, 82, 90; 111, p. 1	50
Habitat of Marsh Wren	0 – ¼	91, pp. 9, 10, 35. 43; 111, p.1	50
Grand Calumet River Corridor (wetland)	0 – ¼	91, pp. 4, 10, 18, 24; 112, pp. 1-6	25

Sum of Sensitive Environments Value: 125

Wetlands Distance Category	Wetland Acreage	Category Reference
0 – ¼	83.365*	Ref. 105

* This wetland acreage represents the area of wetlands within the ¼ mile radius of the source (Ref. 105). Wetland acreage within a quarter mile radius of Source 1 was determined and calculated by using ESRI®ArcMap™ 9.2, Copyright© 1999-2007, ESRI Inc. (ArcMap) and the National Wetland Inventory (USFWS) dataset. Using the Clip (Analysis) tool in ArcMap, the wetland dataset was clipped to include only acreage contained within a quarter mile radius of the source. After defining the wetland dataset, the acreage for each of the wetland areas was calculated using the Field Calculator in ArcMap (Refs. 76; 105).

Total Wetland Acreage: 83.365

Wetland Acreage Value: 75
(Ref. 1, Table 6-18, p. 51662)

Sensitive Environment Actual Contamination Factor Value: 200
50+50+25+75

6.3.4.2 POTENTIAL CONTAMINATION

A number of sensitive environments and wetland areas are located from ½ to 4 miles from the sources at USS Lead. However, as the air migration pathway score has reached the maximum possible score of 100.00, the extent of the potential contamination was not evaluated as part of this HRS Documentation Record.