Name of Site: Old American Zinc Plant

Contact Persons

Site Investigation: Lance Range/Illinois Environmental Protection Agency
Office of Site Evaluation (217) 524-1661

Documentation Record: Lance Range/Illinois EPA/Office of Site Evaluation
(217) 524-1661

Pat Hamblin/United States Environmental Protection Agency-Region 5
(312) 886-6312

Pathways, Components, or Threats Not Scored

The soil exposure pathway, the air migration pathway, and the ground water migration pathway were not scored at this time due to the lack of available data on these pathways, and because the listing decision is not affected significantly by those pathways. The site score is sufficient to list the site scoring the environmental threats using the overland/flood migration to surface water component of the surface water migration pathway (pp. 2 – 5 of this HRS documentation record).

Though contaminants in the Old American Zinc Plant Facility Area could potentially be transported via air migration, especially under dry and windy conditions, the results of a remedial investigation (Ref. 3) by a private party indicate that this has not been a significant migration pathway for contaminants from the source areas (Ref. 3, p. 123), thus the air pathway was not scored. The soil exposure route was not scored because of the Time Critical Removal Action (TCRA) at residential, commercial and industrial properties located adjacent to the Facility Area, resulting in removal of the contaminants of concern from known contamination areas located off property (Ref. 21, p. 14). The ground water pathway was not scored in this HRS documentation record because ground water samples were not collected during the CERCLA Integrated Site Assessment (Ref. 13, p. 30), and the fact that ground water use in the area is limited (Ref. 3, p. 4084). The citizens of Fairmont City currently receive their drinking water from the Mississippi River (Ref. 3, p. 4084). The nearest municipal wells are located approximately 3.5 miles to the east and upgradient, of the facility area, which serve the City of Collinsville (Ref. 3, p. 4084).

While the soil exposure pathway, air migration pathway and ground water migration pathway were not evaluated in the scoring of this site, available information suggests that the ground water pathway (Ref. 3, p. 4113 – 4114), soil exposure (Ref. 3, p. 4082), and air migration pathway (Ref. 3, p. 4082) may have been impacted by past waste disposal practices and subsequent activities at this site. Therefore, these pathways may be of future concern to the U.S. Environmental Protection Agency (EPA).

HRS DOCUMENTATION RECORD

Name of Site: Old American Zinc Plant

Date Prepared: September 2015

EPA ID No. IL0000034355

EPA Region: Region V

Street Address of Site*: Junction of 45th Street and Cookson Road

City, County, State, Zip Code: Fairmont City, St. Clair County, Illinois, 62201

General Location in the State: Southwestern portion of the State of Illinois, East St. Louis metropolitan area

Topographic Map: USGS - Monks Mound Quadrangle, Illinois (Ref. 5)

Latitude: 38.648° North

Longitude: 90.099° West

Ref: Center of Old American Zinc Plant facility property (Fig. 2 of this HRS documentation record)

*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, disposed, or placed, or has 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 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.

SCORES

Air Pathway	Not Scored
Ground Water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Surface Water Pathway	60.00

HRS SITE SCORE 30.00

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	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	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	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		3600.00
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root		30.00

NS = Not Scored

Surface Water Overland/Flood Migration Component Scoresheet
Watershed Evaluated: Old Cahokia Creek

Factor Categories and Factors	Maximum Value	Value Assigned
Drinking Water Threat		**Not Scored**
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)	-
7. Hazardous Waste Quantity	(a)	-
8. Waste Characteristics	100	-
Targets:		
9. Nearest Intake	50	-
10. Population:		
10a. Level I Concentrations	(b)	-
10b. Level II Concentrations	(b)	-
10c. Potential Contamination	(b)	-
10d. Population (lines 10a + 10b + 10c)	(b)	-
11. Resources	5	-
12. Targets (lines 9 + 10d + 11)	(b)	
Drinking Water Threat Score:		
13. Drinking Water Threat Score ([lines 5 x 8 x 12]/82,500, subject to a maximum of 100)	100	

Human Food Chain Threat		Not Scored
Likelihood of Release:		
14. Likelihood of Release (same value as line 5)	550	550
Waste Characteristics:		
15. Toxicity/Persistence/Bioaccumulation	(a)	-
16. Hazardous Waste Quantity	(a)	-
17. Waste Characteristics	1,000	-
Factor Categories and Factors	**Maximum Value**	**Value Assigned**
Targets:		
18. Food Chain Individual	50	-
19. Population:		
19a. Level I Concentrations	(b)	-
19b. Level II Concentrations	(b)	-
19c. Potential Human Food Chain Contamination	(b)	-
19d. Population (lines 19a + 19b + 19c)	(b)	-
20. Targets (lines 18 + 19d)	(b)	-
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	
Environmental Threat		
Likelihood of Release:		
22. Likelihood of Release (same value as line 5)	550	550
Waste Characteristics:		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	5.0E+08
24. Hazardous Waste Quantity	(a)	10000
25. Waste Characteristics	1,000	1000
Targets:		
26. Sensitive Environments:		
26a. Level I Concentrations	(b)	0
26b. Level II Concentrations	(b)	25
26c. Potential Contamination	(b)	-
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	25
27. Targets (value from 26d)	(b)	25
Environmental Threat Score:		
28. Environmental Threat Score ([lines 22 x 25 x 27]/82,500, subject to a maximum of 60)	60	60

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
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

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

SITE DESCRIPTION AND SUMMARY

The Old American Zinc Plant, EPA ID No. IL0000034355, is located at Junction of 45th Street and Cookson Road, Fairmont City, Illinois (Figure 1 of this HRS documentation record; Ref. 13, p. 8; Ref. 14). The property and surrounding environs are shown in Figure 1 of this HRS documentation record. The site, as scored, includes the release of hazardous substances from operations at the Old American Zinc Plant facility. This includes the release of hazardous substances (arsenic, cadmium, mercury, lead and zinc) from three slag waste piles (Source 1), a metal rich slag pile consisting of ground slag redistributed across the facility property (Source 2), and contaminated sediment within West Ditch 1 (Source 3), to a portion of a palustrine wetland (Old Cahokia Watershed) (target) located to the northwest of the facility. The metal rich slag piles and contaminated sediments in West Ditch 1 resulted from the deposition of waste generated from past smelting operations at the facility. Surface water from the facility is allowed to permeate and infiltrate Sources 1 and 2. A portion of this surface water from the facility flows into West Ditch 1 (Source 3) which is located on the western and northwestern portions of the property, and flows to the north into a palustrine wetland (target) which is located immediately north of the facility (Ref. 3, p. 74; Ref. 3, Figure 4, p. 148). Hazardous substances have migrated from each of the three sources to be deposited in Old Cahokia Watershed. Level II contamination levels, as a result of releases of hazardous substances from the three sources, have been documented in sediment within the wetland area located north of the facility property. For the purposes of this Hazard Ranking System (HRS) evaluation, three sources are being scored, as well as the release of the hazardous substances (arsenic, cadmium, mercury, lead and zinc) from these sources via flooding and overland flow migration, which threatens nearby HRS-eligible wetlands (Old Cahokia Watershed, palustrine wetland) (Ref. 8; Figure 8 of this HRS documentation record).

In 1916, American Zinc Company of Illinois, a subsidiary of American Zinc, Lead and Smelting Company, purchased an existing primary zinc smelter located in Fairmont City from Granby Mining and Smelting Company. American Zinc produced slab zinc, zinc carbonate, cadmium, lead, and sulfuric acid at this smelting facility. The primary residue generated during the smelter's operation was slag. In 1941, American Zinc entered into an "Agreement of Lease" with two government entities: Defense Plant Corporation (DPC) and Metals Reserve Company (MRC) as part of meeting the increased zinc production needs of the country during World War II. During this lease period DPC constructed additional smelting facilities on the property. In April 1951, American Zinc purchased the federal facilities from DPC. (Ref.3, p.29) American Zinc discontinued use of the zinc furnace operations in 1953, but continued to roast ores for other smelter facilities and to produce acid from the roasting process. All facility operations by American Zinc were terminated by the end of 1967. American Zinc maintained ownership of the facility until 1979 when it sold the property to XTRA Intermodal, Inc. (XTRA). (Ref.3, p. 30).

Buildings associated with the former smelter were razed sometime between 1967 and 1978 (Ref. 3, p. 30). Information gathered from the aerial photos and Sanborn Fire Insurance maps depicts a cadmium department, coal pit stack, acid tower, paint shop, and leaching area (Ref. 3, Figure 5, p. 149). The 1950 aerial photo (Ref. 3, p. 149, Appendix B-1, p. 342) of the facility depicts smoke coming from at least two stacks. This smoke can be seen drifting to the south (from the furnace transfer room) over the facility and over residential homes. One large pile of debris/slag can be seen on the far north portion of the property (Ref. 3, Appendix B-1, p. 342). The 1960 aerial photo reveals many of the 1940 structures that were still present, including the residue bins, residue churn, furnace transfer room, concentrator mill, and acid tanks and chamber (Ref. 3, Figure 5, p. 149).

XTRA leased the property from American Zinc from 1976 to 1979 when it purchased the property. XTRA used the property from 1976 to sometime after 2003 as a transport trucking terminal which included the lease, storage, and maintenance of over-the-road trailers (Ref. 3, p. 30). Between 1976 and 1995, XTRA ground and spread the slag from the piles along the northern section of the property across the majority of the property to level the surface for the storage of trailers, and constructed an office and maintenance buildings to support its operations (Ref. 3, p. 28). XTRA discontinued operations at the property sometime after 2003 and the facility is currently inactive (Ref. 3, p. 30).

A chain-linked perimeter fence currently encircles the property with locked entrance gates along the eastern boundaries. Three slag piles are currently present in the northern section of the property (Ref. 3, p. 27). Surface water drainage from the property is collected and transported by a series of man-made ditches. A number of these ditches flow in a southerly direction into Rose Creek. The northwestern portion of the property is drained by the West Ditch 1. This ditch transported runoff northward directly into a palustrine emergent wetland which is a part of the Old Cahokia Watershed (Ref. 3, p. 29).

A 2009 Final Remedial Investigation Report (Ref. 3, p. 14) commissioned by the Blue Tee Corporation documented the presence of various heavy metals in: the slag piles located on the property, West Ditch 1, and the wetland into which West Ditch 1 drains (see sections 2.2.1 of this HRS documentation record for Sources 1, 2 and 3). When compared to background levels, a number of samples collected in the wetland near the West Ditch 1 discharge contained inorganic contaminants (also known as hazardous substances for purposes of this HRS evaluation) at levels meeting HRS observed release criteria (see section 4.1.2.1.1 of this HRS documentation record).

Figures Attached:

Figure 1 Old American Zinc Plant - Facility Location Map

Figure 2 Old American Zinc Plant Property

Figure 3 Old American Zinc Plant Slag Piles – Source 1

Figure 4 Surface Water Migration Route - 15 Mile Target Distance Limit Map

Figure 5 Old Cahokia Creek Wetlands

Figure 6 West Ditch 1 Sediment Sample Locations

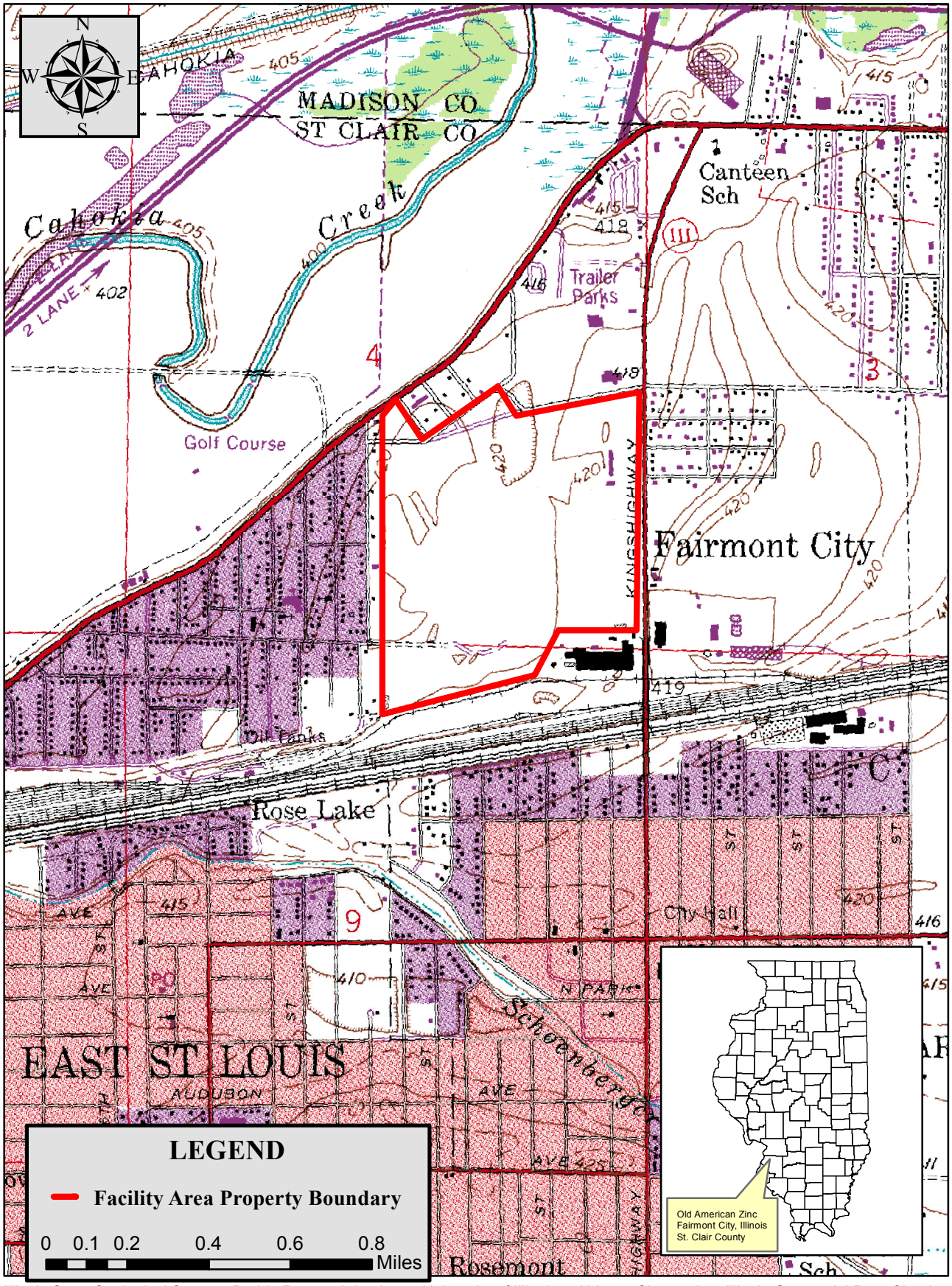
Figure 7 Area of Source #2 – Old American Zinc Plant

Figure 8 Old Cahokia Creek Wetland Sampling Points and Frontage

Figure 9 Old American Zinc Plant West Ditch 1 Width Measurement Locations

Figure 10 Cahokia Creek Wetland Sampling Points and Frontage

Figure 1
Old American Zinc Plant- Facility Location Map



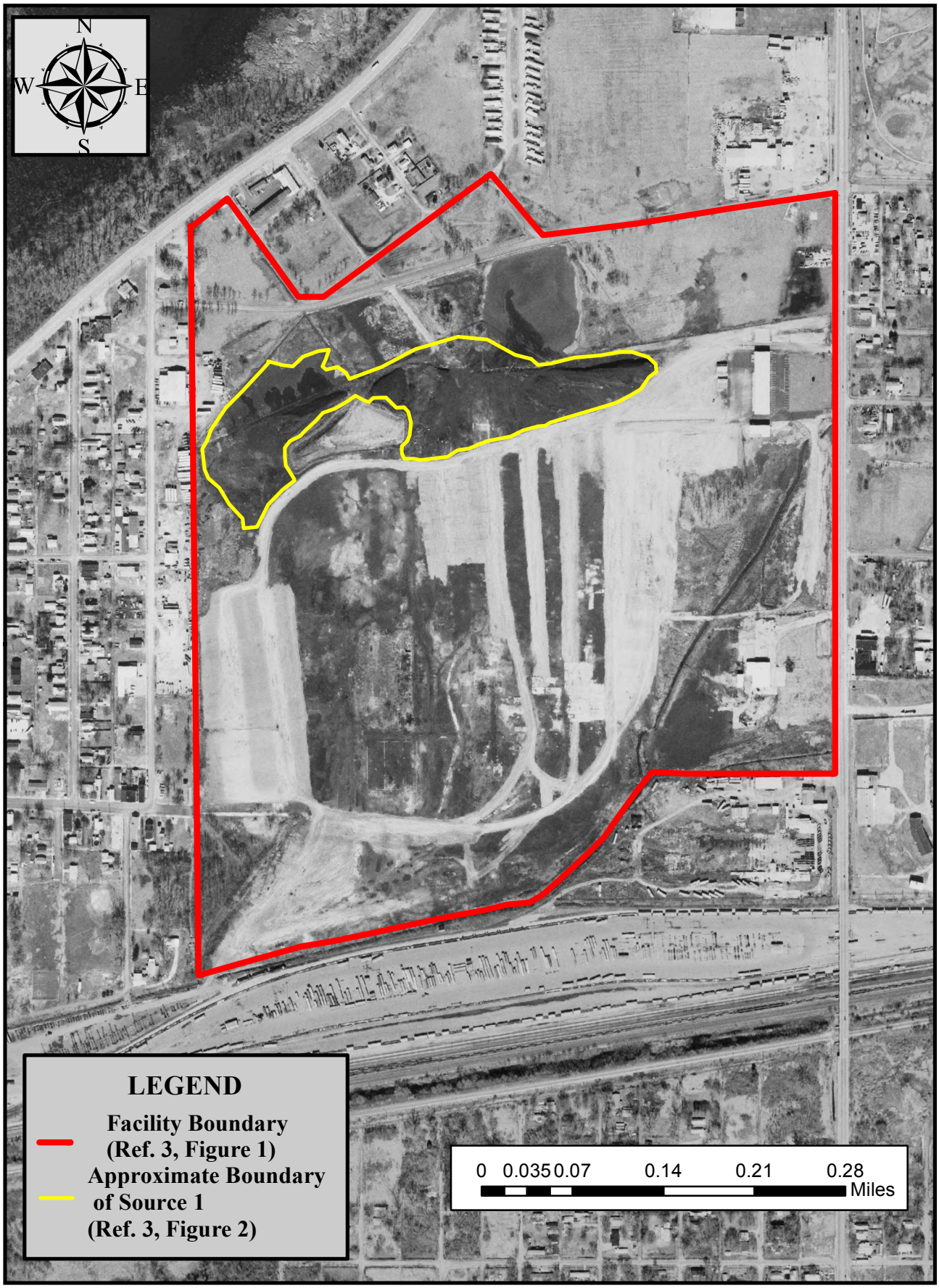
Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by CountyUniversal Transverse Mercator (UTM), Monks Mound Quadrangle. http://www.isgs.uiuc.edu/nsdihome/webdocs/drgs/drgorder24bymap.html. Accessed on June 15, 2015
Facility Area Property Boundary taken from Ref. 3, Figure 1

Figure 2
Old American Zinc Plant Property

Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by County Universal Transverse Mercator (UTM) Zones 15 and 16, St. Clair, Monks Mound Quadrangle, SW section. http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html. Accessed on June 15, 2015.

Figure 3

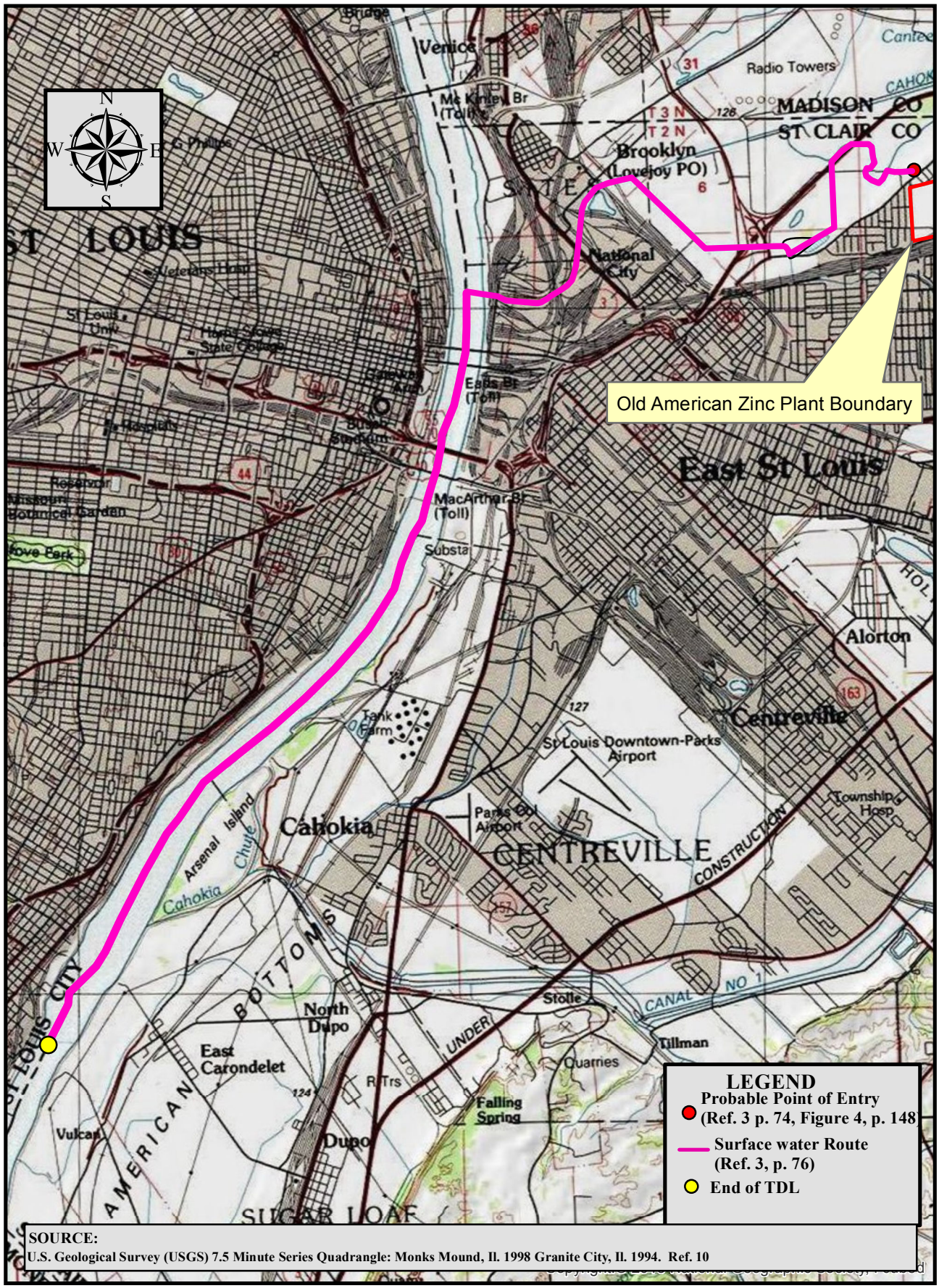
Old American Zinc Plant Slag Piles - Source 1



Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by County Universal Transverse Mercator (UTM) Zones 15 and 16, St. Clair, Monks Mound Quadrangle, SW section. http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html. Accessed on June 15, 2015.

Figure 4

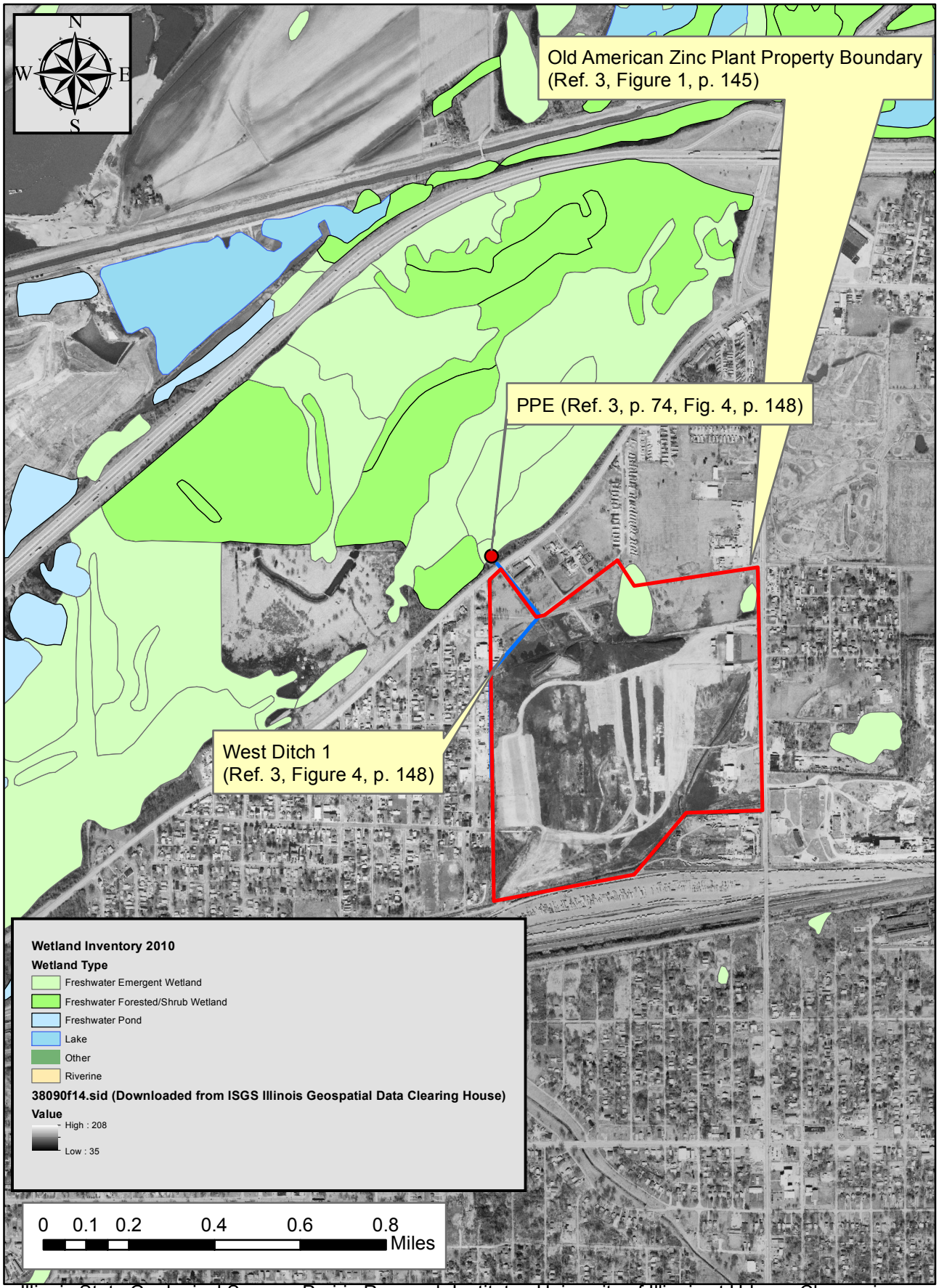
Surface Water Migration Route - 15 Mile Target Distance Limit



Ref. 10 contains the process for calculating the 15 Mile TDL

Figure 5

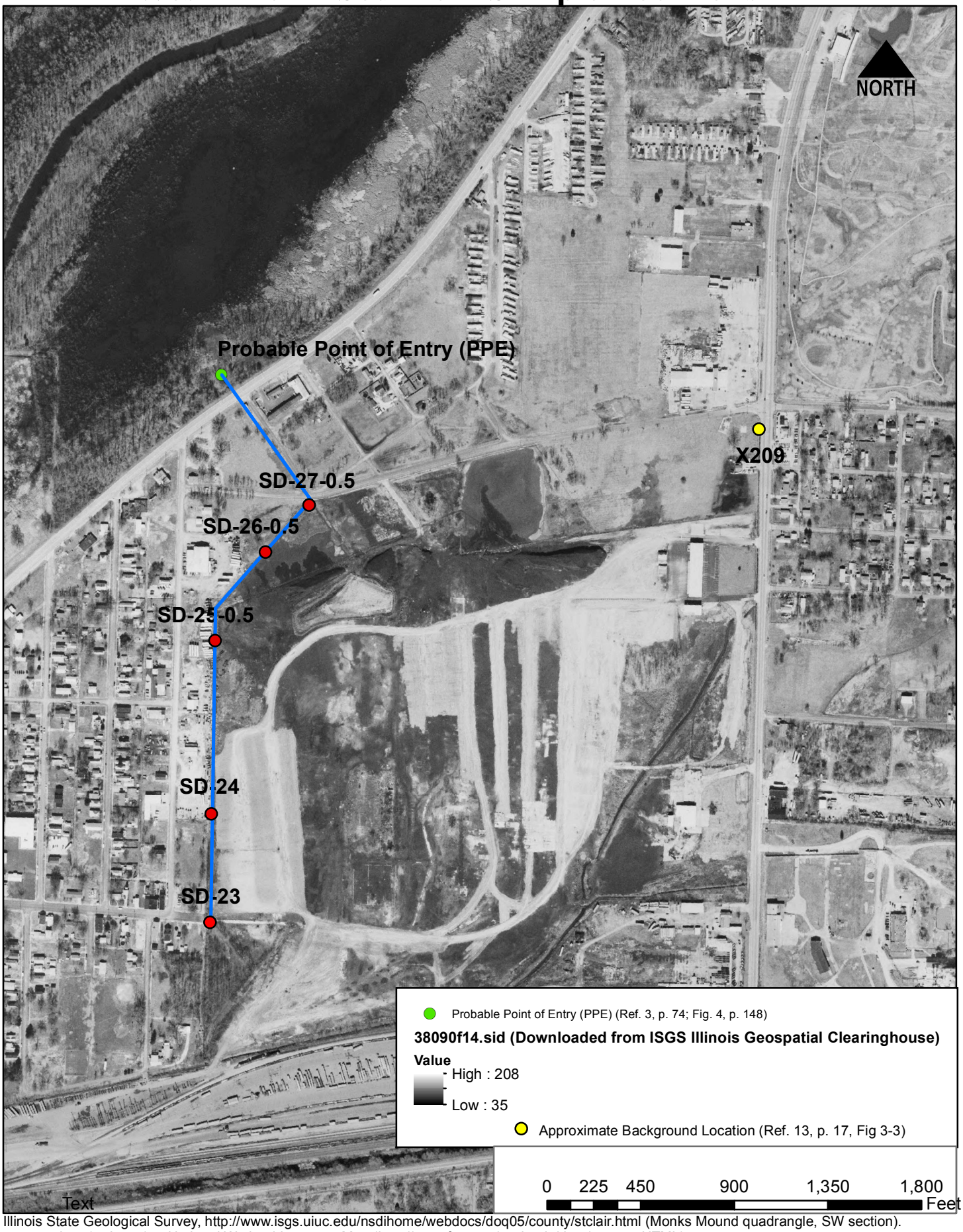
Old Cahokia Creek Wetlands



Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by County Universal Transverse Mercator (UTM) Zones 15 and 16, St. Clair, Monks Mound Quadrangle, SW section. http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html. Accessed on June 15, 2015.

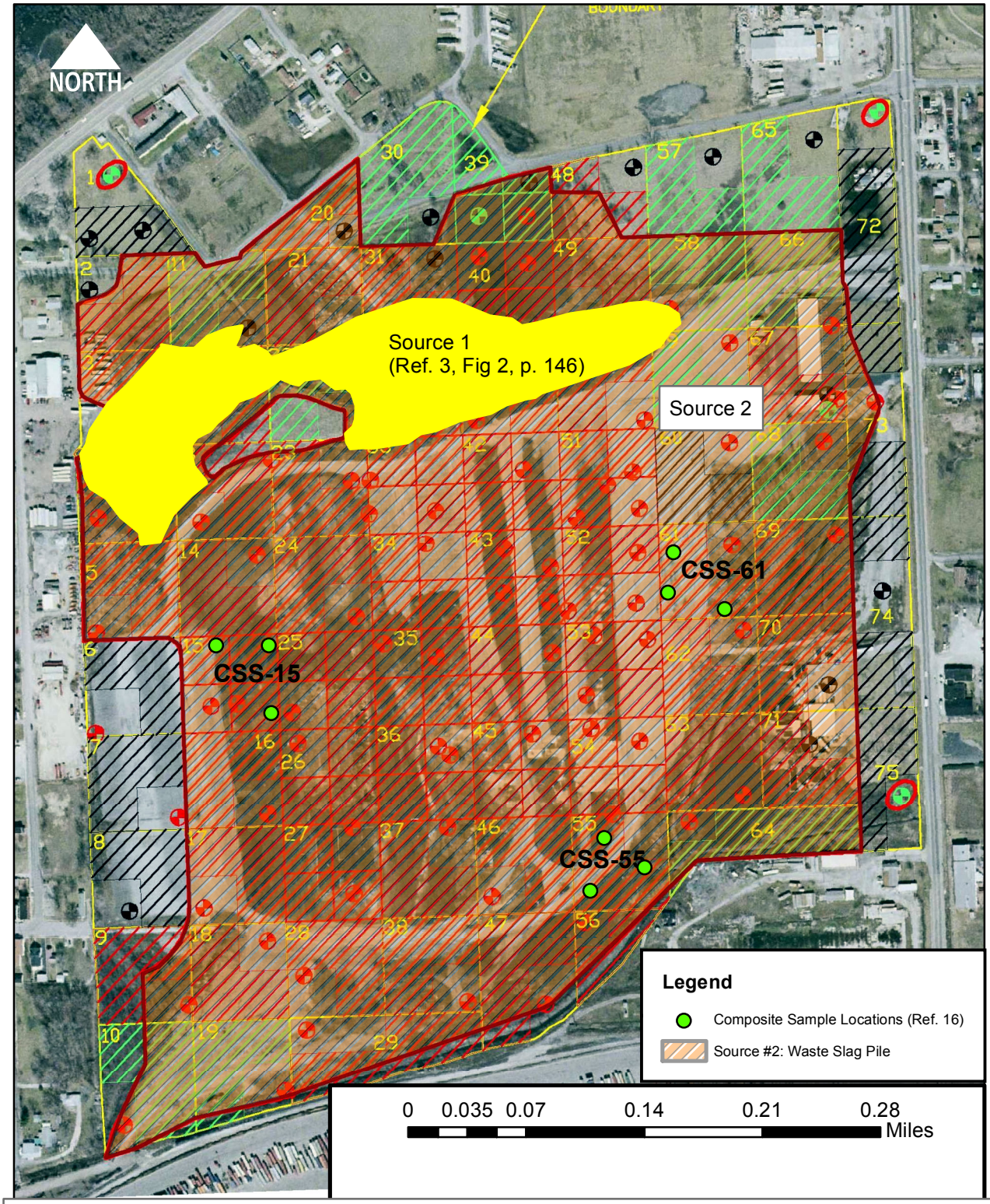
Figure 6

West Ditch 1 Sediment Sample Locations



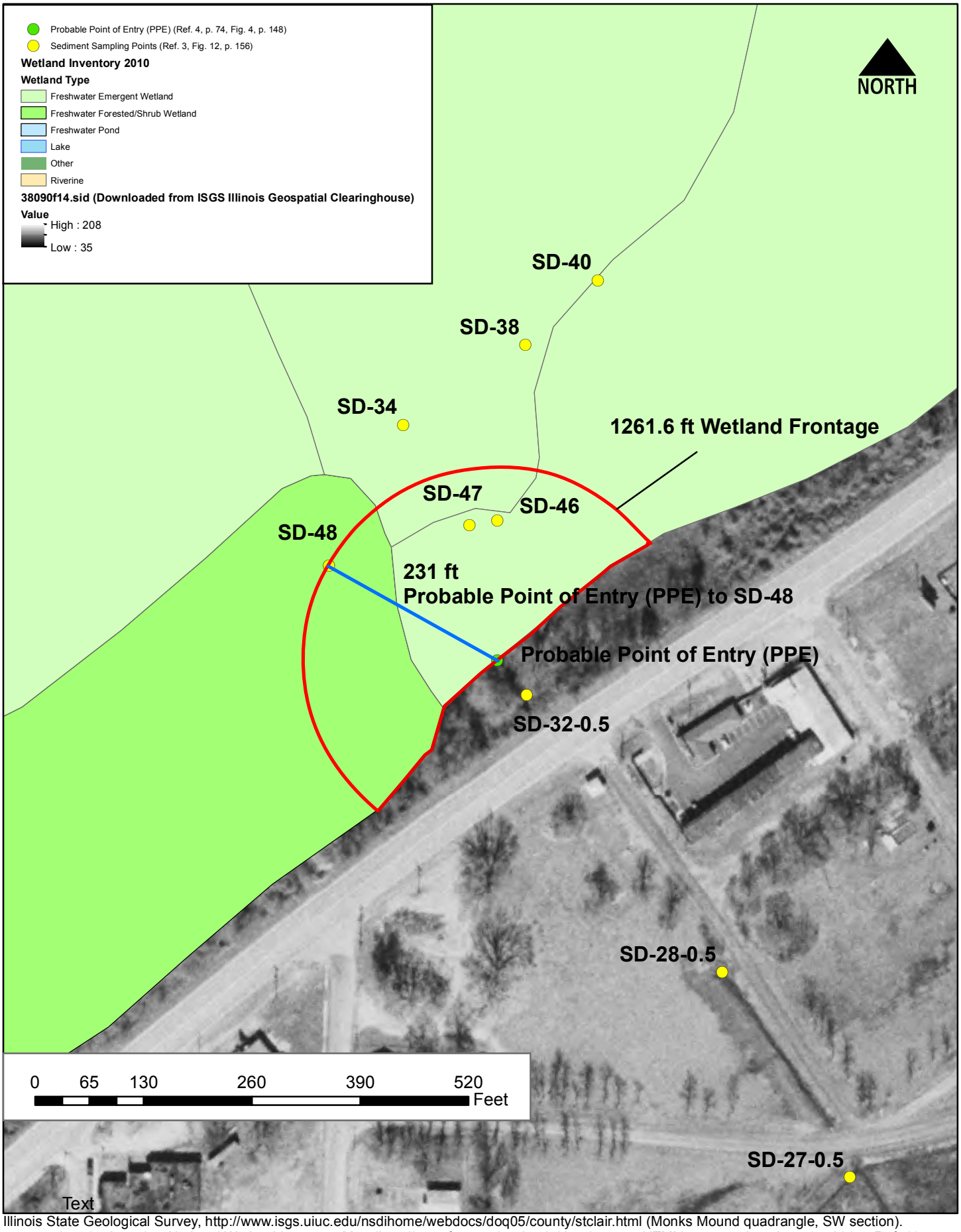
Illinois State Geological Survey, http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html (Monks Mound quadrangle, SW section). accessed on 15 June 15. National Wetland Inventory Map (http://www.fws.gov/wetlands/data/mapper.HTML) accessed on June 15, 2015. Ref. 11. The PPE is the point where the overland segment reaches an eligible surface water body (Ref. 1, Section 4.1.1.1). West Ditch 1 location (Ref. 3, p. 74, Fig. 4, p. 128)

Figure 7
Area of Source #2
Old American Zinc Plant



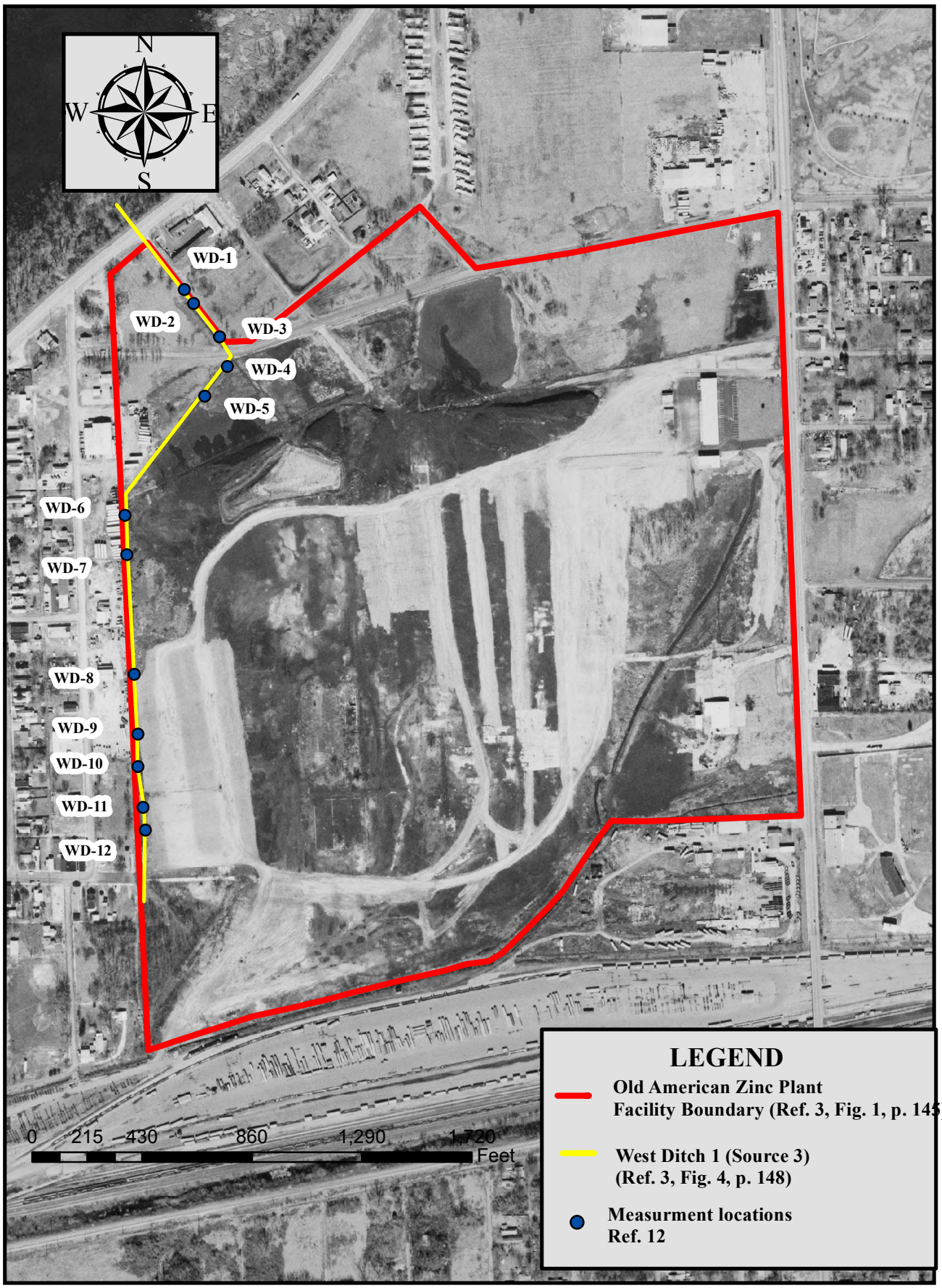
Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by County Universal Transverse Mercator (UTM) Zones 15 and 16, St. Clair, Monks Mound Quadrangle, SW section. http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html. Accessed on June 15, 2015. Ref. 9 explains how area was calculated. Ref. 3, Fig. 19, p. 166 was used for sample locations. Basemap was provided by Surdex, Chesterfield, MO (2005 Ortho-Rectified Aerial Photograph). Composite Sample Locations (Ref. 16)

Figure 8
Cahokia Creek Wetland Sampling Points and Frontage



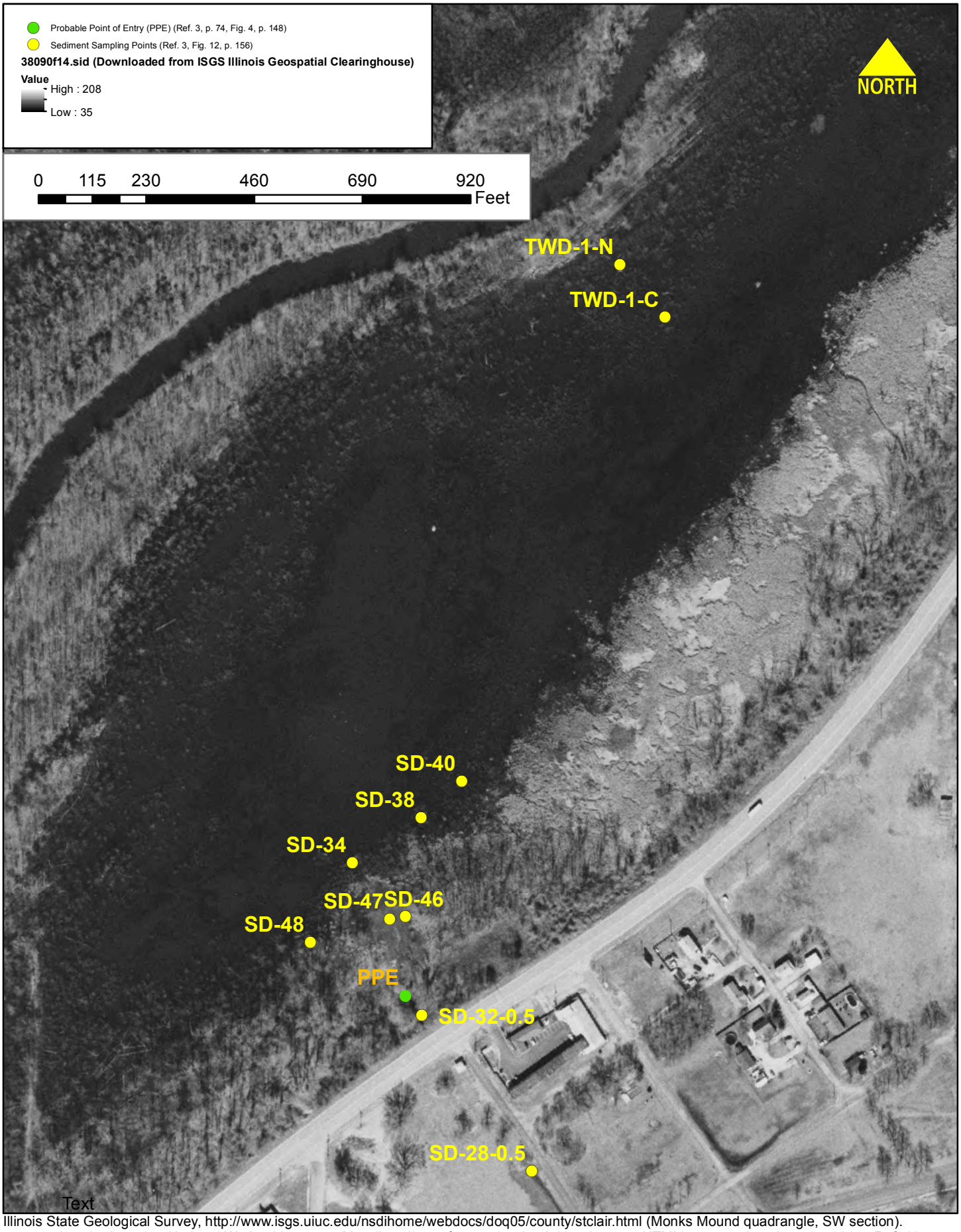
Illinois State Geological Survey, http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html (Monks Mound quadrangle, SW section). accessed on 15 June 15. National Wetland Inventory Map (http://www.fws.gov/wetlands/data/mapper.HTML) accessed on June 15, 2015. Ref. 11.
The Probable Point of Entry (PPE) is the point where the overland segment reaches an eligible surface water body (Ref. 1, Section 4.1.1.1).

Figure 9
Old American Zinc Plant
West Ditch 1 Width Measurement Locations



Illinois State Geological Survey. Prairie Research Institute. University of Illinois at Urbana-Champaign. Illinois Geospatial Data Clearing House. Access 2005 DOQQ files for Illinois by CountyUniversal Transverse Mercator (UTM) Zones 15 and 16, St. Clair, Monks Mound Quadrangle, SW section. http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html. Accessed on June 15, 2015.

Figure 10
Cahokia Creek Wetland Sampling Points and Frontage



Illinois State Geological Survey, http://www.isgs.uiuc.edu/nsdihome/webdocs/doq05/county/stclair.html (Monks Mound quadrangle, SW section). accessed on 15 June 15. National Wetland Inventory Map (http://www.fws.gov/wetlands/data/mapper.HTML) accessed on June 15, 2015. Ref. 11.
The Probable Point of Entry (PPE) is the point where the overland segment reaches an eligible surface water body (Ref. 1, Section 4.1.1.1).

Reference Number	Description of Reference

1. U.S. Environmental Protection Agency (EPA). Hazard Ranking System, Final Rule, 40 CFR 300, Appendix A. Federal Register. December 14, 1990. A complete copy of the rule is available at http://www.epa.gov/superfund/sites/npl/hrsres/index.htm#HRS. (139 pages)

2. U.S. EPA. Superfund Chemical Data Matrix (SCDM) – Hazardous Substance Factor Values BI. June 20, 2014. Accessed and printed, http://www.epa.gov/superfund/sites/npl/hrsres/tools/method_1.pdf, http://www.epa.gov/superfund/sites/npl/hrsres/tools/app_bi.pdf, on July 22, 2015. A complete copy of SCDM is available at http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm. (17 pages)

3. ENTACT, LLC. Final Remedial Investigation Report. Old American Zinc Plant Site, Fairmont City, Illinois. Revision 2, March 2009. (4694 pages)

4. Illinois State Geological Survey. Fairmont City Potential Wetland Compensation Site: Hydrogeologic Characterization Report. March 14, 2003. (54 pages)

5. U.S. Department of the Interior Geological Survey (USGS). Monks Mound Quadrangle, Illinois, 7.5-Minute Series (Topographic). Revised 1993. (1 map)

6. U.S. Department of the Interior Geological Survey (USGS). Granite City Quadrangle, Illinois-Missouri, 7.5-Minute Series (Topographic). Revised 1993. (1 map)

7. U.S. EPA. Using Qualified Data to Document an Observed Release and Observed Contamination. Quick Reference Fact Sheet EPA 540-F-94-028. Office of Emergency and Remedial Response. November 1996. (18 pages)

8. U.S. Fish and Wildlife Service. National Wetlands Inventory Map. Unknown date. (1 page)

9. Range, Lance. Illinois Environmental Protection Agency. Memorandum, Subject: Documentation of the Area of Waste Pile Present at the Old American Zinc Plant site. June 1, 2015. (5 pages)

10. Range, Lance. Illinois Environmental Protection Agency. Memorandum, Subject: Documentation of the Surface Water Pathway Target Distance Limit for the Old American Zinc Plant site. June 1, 2015. (2 pages)

11. Range, Lance. Illinois Environmental Protection Agency. Memorandum, Subject: Documentation of the Wetland Frontage with the Old Cahokia Creek Wetland for the Old American Zinc Plant site. June 15, 2015. (3 pages)

12. Range, Lance. Illinois Environmental Protection Agency. Memorandum, Subject: Calculation of the Area of West Ditch 1. April 3, 2014. (4 pages)

13. Illinois Environmental Protection Agency, CERCLA Integrated Site Assessment. August 4, 1995. Excerpt. (106 pages)

14. Federal Emergency Management Agency. Flood Insurance Rate Map. St. Clair County, Illinois and Incorporated Areas. http://www.illinoisfloodmaps.org/DFIRMpdf/stclair/17163C0038E.pdf. Accessed on April 27, 2015. November 5, 2003. (1 page)

15. Reference Number Reserved

16. Desai, Shelia. U.S. EPA. Email Correspondence to Lance Range (Illinois EPA) and Pat Hamblin containing GPS coordinates for samples collected during the Final Remedial Investigation of the Old American Zinc Plant property. May 19, 2015. (4 pages)

17. Reference Number Reserved

18. Reference Number Reserved

19. U.S. EPA, Region 5. In The Matter of: Old American Zinc (OAZ) Site, American Zinc, lead and Smelting Company, American Zinc company of Illinois, Blue Tee Corporation. Admistrative Order on Consent For Remedial Investigation and Feasibility Study. May 31, 2005. (72 pages)

20. ENTACT & Associates, LLC. Support Sampling Plan for the Old American Zinc Plant Site, Fairmont City, Illinois, Revision 3. April 2006. (519 pages)

21. ENTACT, Removal Action Report/1 of 2, Old American Zinc Site, Fairmont City, Illinois. August 2003. (397 pages).

22. Illinois EPA. CERCLA Integrated Site Assessment, Excerpt of Appendix G, Analytical Results. January 4, 1995. (50 pages)

23. Reference Number Reserved

2.2 SOURCE CHARACTERIZATION — SOURCE 1

2.2.1 SOURCE IDENTIFICATION

Name of source: Source 1

Name and description of source: Waste slag from historic smelting operations at the Old American Zinc Plant Facility Property

Source Type: Pile

Description and Location of Source (Figure 3 of this HRS documentation record):

Source 1 consists of the three adjacent slag waste piles that were generated from the historic smelting of zinc ores at the Old American Zinc Plant facility property (Figure 3 of this HRS documentation record). The stockpiled slag was deposited in a molten state and observed to be massive and vitrified, dark brown to black with areas of discoloration and erosion on the edges of the pile and in areas of past disturbance (Ref. 3, pp. 27, 716). There was an observed physical distinction between the stockpiled slag and the ground slag that was redistributed across the Facility Area, waste characterization sampling was conducted on both the stockpiled and ground slag to assess leachability and determine toxicity characteristics unique to the undisturbed and ground slag materials (Ref. 3, p. 45).

American Zinc produced slab zinc, zinc carbonate, cadmium, lead, and sulfuric acid at the existing smelting facilities located on the facility property. The primary residue generated during the smelter's operation was slag (Ref. 3, p. 29). The area currently covered by the stockpiled slag is located in the northern portion of the Facility Area and is estimated to cover approximately 4.3 acres (Ref. 3, pp. 27-28). Based on the topographic survey, the current existing volume of the three slag stockpiles along the northern boundary of the Facility Area is approximately 39,000 to 40,000 cubic yards (Ref. 3, pp. 28, 43-44). For this HRS evaluation the value of 39,000 cubic yards will be utilized.

Three waste characterization samples were collected from the stockpiled slag in the northern section of the Facility Area including the east pile, the center pile, and the west pile (Ref. 3, p. 45, Table 4-2, p. 192). Slag piles are depicted in Ref. 3, Figure 2, p. 146. Arsenic, cadmium, lead, mercury and zinc were the primary contaminants detected within Source 1 (Ref. 3, p. 84; Source 1 analytical data table of section 2.2.1 of the HRS documentation record). Waste samples were determined based on the physical distinction between the stockpiled slag and the ground slag that was redistributed across the Facility Area (Ref. 3, p. 45). Each waste sample consisted of a 4-point composite. Four discrete aliquots of equal volume were collected with a stainless-steel trowel, placed into a clean, re-sealable plastic bag and mixed to achieve a homogenous blend and transported to the mobile sampling trailer for X-Ray Fluorescence (XRF) analysis. Following XRF analysis, the homogenized sample was then

transferred to a clean, 8-ounce laboratory-supplied container, labeled, and packed into an iced cooler. Samples were submitted to the approved laboratory for metal analysis of the eight total and RCRA TCLP metals and zinc, and the SPLP eight RCRA metals and zinc (Ref. 3, pp. 12, 45).

Additionally, one composite sample, CSS-32, was collected from the area of the waste slag piles (Ref. 3, Figure 19, p. 166; Figure 3 of this HRS documentation record). The sample description for this sample identifies it as slag (Ref. 3, Table 4-4, pp. 209). Surface samples were collected from the upper 0.1 foot in three of the four quadrants of each of the 75 grids for XRF analysis of lead, arsenic, cadmium, zinc, and copper. The samples were collected as discrete surface samples randomly collected from three of the four grid quadrants that comprised the 300 foot by 300 foot grid cell (Ref. 3, p. 2-2, p. 43). Following XRF screening, the three discrete grid quadrant samples were placed into a clean, 1- gallon, re-sealable plastic bag and mixed to achieve a homogenous, composite sample (Ref. 3, p. 2-2, p. 43).

Field activities were performed in accordance with the U.S. EPA approved Support Sampling Plan (SSP) (Ref. 20), Field Sampling and Analysis Plan (FSAP) (Ref. 20, p. 64), Quality Assurance Project Plan (QAPP) (Ref. 20, p. 469), and subsequent U.S. EPA-approved Addenda 1 through 4 to the SSP. Any variations to the U.S. EPA-approved SSP, based on field conditions encountered, were communicated to the U.S. EPA or to the U.S. EPA oversight (CH2M Hill) on-Site representative (Ref. 3, p. 42).

The data validation report is provided in the April 11, 2007, Data Validation Technical Memorandum presented in Ref. 3, p. 67 and Appendix H, p. 789. The data was considered valid and acceptable, with no data rejected or invalidated (Ref. 3, p. 67). Analytical results have been evaluated using the EPA guidance documents "National Functional Guidelines for Inorganic Data Review", dated February, 1994, EPA-540/R-94-013 and the EPA Region V "Standard Operating Procedure (SOP) for Validation of CLP Inorganic Data, September 1993". The data quality objectives contained in the approved quality assurance project plan (QAPP) "Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study at Old American Zinc Plant Site, Fairmont City Illinois, Revision 2, dated April 2006" were used as the definitive validation criteria. The review was based on the Level IV data packages supplied by the analytical laboratory, STL, located in University Park, Illinois (Ref. 3, Appendix H, p. 789). All metals data was usable or usable and qualified as estimated or undetected (Ref. 3, Appendix H, p. 789). EPA digestion methods 3010A, 3020A, 1311, 1312 and EPA methods 6010B and 7470A were followed for sample analysis. Based on the documentation reviewed, no significant deviations adversely affecting data quality were made to the cited EPA reference methods. No action was needed to qualify sample data (Ref. 3, Appendix H, p. 790).

Containment

Gas release to air: The air migration pathway was not scored; therefore, gas containment was not evaluated.

Particulate release to air: The air migration pathway was not scored; therefore, gas and particulate containment were not evaluated.

Release to ground water: The ground water pathway was not scored; therefore, ground water containment was not evaluated.

Release by overland flow migration and/or flood:

The ditches that drain the Old American Zinc Plant property consist of a series of man-made drainage features constructed to divert surface water flow from the property (Ref. 3, p. 17; Section 4.1.1.1 of this HRS documentation record). During the 2009 Final Remedial Investigation of the Old American Zinc Plant property (Ref. 3), a total of eleven samples were collected from the sediments within the western most drainage way (West Ditch 1) and the West Ditch 1 outfall to the Old Cahokia Creek watershed and wetlands (Ref. 3, p. 100). Results of this analysis showed that sediments within West Ditch 1 contained concentrations of arsenic, cadmium, lead, and zinc that exceeded the EPA's residential and/or industrial screening criteria (Ref. 3, pp. 100-101). Additionally, the highest concentrations of these metals were found in samples closest to the property (section 2.2.2 of this HRS documentation record, Figure 6, Ref. 3, Table 4-19, pp. 243-244). Boring hole locations in the area of Source 1 are SB-03-SW-1, SB-11-SE-0.5, SB-12-SW-0.5, SB-22-SE-3, SB-21-SE-4, SB-32-NE-1, SB-41-SW-7.0, SB-49-SW-3.0, SB-58-SW-2.0 (Ref. 3, Figure 8, p. 152). Boring hole logs for these samples do not indicate any type of maintained engineered cover of functioning and maintained run-on control system and runoff management system or liner with a functioning leachate collection system present in the Source 1 area (Ref. 3, Appendix C, p. 421-524). Based on the historic lack of containment and the evidence of overland hazardous substance migration from the source, a surface water containment factor value of 10 is assigned for this source (Ref. 1, Table 4-2).

Source 1 is located in a 100 year floodplain (Ref. 14). Based on the source being located in a 100 year floodplain, the Flood Frequency Factor value is 25 (Ref. 1, Table 4-9). There is no documentation that the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated. Based on this criteria the containment (flood) factor value is 10 (Ref. 1, Table 4-8).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

Sample ID	Lab ID	Sample Type	Sampling Date	Hazardous Substance	Hazardous Substance Concentration (mg/kg)	Method Detection Limit* (mg/kg)	Reference
Site Specific Std – 1	246763-1	Waste (Ref. 3, p. 45, p. 192)	5/24/2006	Arsenic Cadmium Mercury Lead Zinc	83 0.24 0.0095 750 22,000	0.34 0.054 0.0061 0.23 63	Ref. 3, Appendix L pp. 1225, 1226, 1238, 1239
Site Specific Std – 2	246763-2	Waste (Ref. 3, p. 45, p. 192)	5/24/2006	Arsenic Cadmium Mercury Lead Zinc	260 3.2 0.49 910 13,000	0.37 0.058 0.031 0.25 68	Ref. 3, Appendix L pp. 1225, 1227, 1238, 1239
Site Specific Std – 3	246763-3	Waste (Ref. 3, p. 45, p. 192)	5/24/2006	Arsenic Cadmium Mercury Lead Zinc	27 250 0.050 660 100,000	0.38 0.060 0.0068 0.26 71	Ref. 3, Appendix L pp. 1225, 1228, 1238, 1239
CSS-32	246931-22	Waste (Ref. 3, Table 4-4, p. 209, Table B.1.a-1, p. 4510)	6/5/2006	Arsenic Cadmium Mercury Lead Zinc	310 220 200 96,000 46,000	0.35 0.056 13 24 130	Ref. 3, Appendix L p.1687, 1709, 1736, 1737

Notes:
mg/kg – milligrams per kilogram
* – The HRS directs if the sample analysis is not performed under the EPA Contract Laboratory Program, that the detection limit be used in place of the sample quantitation limit (Ref. 1, Section 2.3, Table 2-3).

List of Hazardous Substances Associated with Source: Arsenic, cadmium, mercury, lead, zinc

2.4.2 HAZARDOUS WASTE QUANTITY

There is insufficient historical and current data available to adequately evaluate Hazardous Constituent Quantity, Hazardous Waste stream Quantity, and Area for Source 1. Therefore the hazardous waste quantity value for Source 1 will be calculated using the volume of the waste pile (Tier C) (Ref. 1, Section 2.4.2.1.4).

2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Scored

The total Hazardous Constituent Quantity for Source No.1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data (manifests, potentially responsible parties (PRP) records, State records, permits, waste concentration data , etc.) are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity estimate for Source No.1 with reasonable confidence.

2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) - Not Scored

The total Hazardous Wastestream Quantity for Source No.1 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [(Ref. 1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestream and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source No.1 with reasonable confidence.

2.4.2.1.3 Volume (Tier C)

The 2009 Final Remedial Investigation Report of the Old American Zinc Plant property (Ref. 3) included an evaluation and estimation of the volume of the slag piles. Based on the topographic survey conducted by ENTACT, the current existing volume of the three slag stockpiles along the northern boundary of the Facility Area is approximately 39,000 to 40,000 cubic yards (Ref. 3, pp. 26, 28).

Source Type	Units (yd^3)	References
Pile	39,000	Reference 3, pp. 28, 42, Fig. 2, p. 146 and Fig. 20, p. 167, Appendix D, p. 709, 711, 716

Equation for Assigning Value (Ref. 1, Table 2-5): $\frac{39{,}000\ yd^3}{2.5}$

39,000 (cubic yards of the pile) divided by 2.5 volume divisor for pile (Ref 1, Table 2-5) = 15,600

Volume Assigned Value: 15,600

2.4.2.1.4. Area (Tier D)

The 2006-2008 Remedial Investigation of the Old American Zinc Plant property (Ref. 3), included an evaluation and estimation of the area of the slag piles. Based on the topographic survey conducted by ENTACT, the current existing area of the three slag stockpiles along the northern boundary of the Facility Area is approximately 4.3 acres (Ref. 3, p. 26, 28). Although not required by the HRS, as the volume of the source can be determined, the area calculation of Source 1 identified below is provided as supporting information and is not used in the scoring evaluation.

4.3 (acres of the pile) multiplied by 43,560 (square feet per acre) = 187,308 ft^2

Source Type	Units (ft^2)	References
Pile	187,308	Reference 3, p. 28, 42, Figures 2, p. 146 and 20, p. 167; Ref. 9, p. 1).

Equation for Assigning Value (Ref. 1, Table 2-5): $\frac{187{,}308\ ft^2}{13}$

187,308 (square feet of the pile) divided by 13 area divisor for pile (Ref 1, Table 2-5)
= 14,408.30

Area Assigned Value: 0

2.4.2.1.5. Source Hazardous Waste Quantity Value

According the HRS, the highest of the values assigned to each source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value. Because volume (Tier D) was the highest value evaluated for Source 1, the volume calculation will be assigned as the source hazardous waste quantity value for Source 1 (Ref. 1, Section 2.4.2.1.5).

Highest assigned value assigned from Ref. 1, Table 2-5	15,600

2.2 SOURCE CHARACTERIZATION — SOURCE 2

2.2.1 SOURCE IDENTIFICATION

Name of source: Source 2

Name and description of source: Waste slag from historic smelting operations at the Old American Zinc Plant Facility Property

Source Type: Pile

Description and Location of Source (with reference to a map of the site):

Source 2 consists of the ground, relocated slag from the approximately 15 acres of slag piles which appear in early aerial photographs (Ref. 3, pp. 27, 28, Appendix B-1, pp. 342-347; Figure 7 of this HRS documentation record). The historic stockpiles of slag have been historically used as fill by the surrounding area, including the Village of Fairmont city (Village) alleyways, commercial facilities, and residential properties. The area currently covered by the stockpiled slag is located in the northern portion of the Facility Area and is estimated to cover approximately 4.3 acres (Source 1) indicating that much of the historical material has been moved and relocated following cessation of smelting operations (Ref. 3, p. 28).

Between 1976 and 1995 XTRA Intermodal Incorporated ground and spread the slag from these piles across the majority of the Facility Area (Ref. 3, p. 28). This was done for the purpose of leveling the surface for the storage of trailers, and the construction of an office and maintenance buildings (Ref. 3, 28). The redistributed slag was observed to be granular, dry, dark brown to black and loose (Ref. 3, p. 28). The 2006-2008 Remedial Investigation of the Old American Zinc Plant property also included an evaluation of the slag area for the purpose of determining the lateral and vertical extent of the slag material. This investigation was undertaken from May 30th to December 13th, 2006, and more than 600 discrete samples (Ref. 3, p. 83) were collected within the slag area and analyzed for inorganic constituents to depths of 4 to 24 feet below ground surface (Ref. 3, pp. 26, 43, 44).

A minimum of one boring was advanced in each of 75 grids within the property, with some additional borings added in the vicinity of historic smelting facilities or former XTRA operations (Ref. 3, 2-3). Based on the concentrations found and the frequency of detection lead, arsenic, cadmium and zinc are considered the primary Constituents of Interest (COIs) in slag. The primary COIs are found above industrial screening criteria in both stockpiled and ground slag. These COIs were found throughout the vertical extent of the ground slag, with average concentrations in the surface slag being similar to the levels found in subsurface slag samples. Samples collected in the interior of the Facility Area showed a similar range of concentrations as found along the Facility Area perimeter in areas where surface slag was present. Therefore, there is no observed spatial variability of COIs in the Facility Area within this primary source material (Ref. 3, p. 4-5). The lateral extent of the redistributed, ground slag across the

Facility Area is illustrated in Figure 19 (Ref. 3, p. 166). Depths of the ground slag, where present, were determined at each of the 100 borings advanced across the Facility Area as listed in Ref. 3, Table 3-1 and detailed in Appendix C-1. The thickness of the slag ranged between 0.5 to over 9 feet with an average thickness across the Facility Area of 3.47 feet. The vertical extents of ground slag across the Facility Area are shown in Ref. 3, Figure 20. The estimated volume of the redistributed, ground slag material is approximately 500,000 cubic yards (Ref. 3, pp. 86, 87). Even with the extensive sampling that was conducted for this investigation, there remains areas that are unknown if slag exists across the entire area of the Facility, especially under building foundations and paved areas. For the purpose of this documentation record, it is feasible to assign an area of greater than zero, but unknown.

Three composite waste characterization samples (CSS-15, CSS-55, CSS-61) were selected from the 64 composite samples collected from the corresponding grids (Ref. 3, Figure 19, p. 166, Table 4-1, pp. 189-191) of the redistributed slag in the Facility Area. These three samples will be used to characterize the hazardous substances that are present within the ground, redistributed slag material that is Source 2. Each of these samples was a composite of three different locations within the associated number grid. Composite sample locations are depicted in Figure 7 of this HRS documentation record. Sample descriptions identify these samples as slag (Ref. 3, Table 4-4, pp. 208-210). Surface samples were collected from the upper 0.1 foot in three of the four quadrants of each of the 75 grids for XRF analysis of lead, arsenic, cadmium, zinc, and copper. The samples were collected as discrete surface samples randomly collected from three of the four grid quadrants that comprised the 300 foot by 300 foot grid cell (Ref. 3, p. 2-2, p. 43). Following XRF screening, the three discrete grid quadrant samples were placed into a clean, 1- gallon, re-sealable plastic bag and mixed to achieve a homogenous, composite sample (Ref. 3, p. 2-2, p. 43). The same hazardous substances documented to be present in Source 2 were also present in the waste samples collected to characterize the three slag piles of Source 1 (see section 2.2.1 of this HRS documentation record).

Field activities were performed in accordance with the U.S. EPA approved Support Sampling Plan (SSP) (Ref. 20), Field Sampling and Analysis Plan (FSAP) (Ref. 20, p. 64), Quality Assurance Project Plan (QAPP) (Ref. 20, p. 469), and subsequent U.S. EPA-approved Addenda 1 through 4 to the SSP. Any variations to the U.S. EPA-approved SSP, based on field conditions encountered, were communicated to the U.S. EPA or to the U.S. EPA oversight (CH2M Hill) on-Site representative (Ref. 3, p. 42).

The data validation report is provided in the April 11, 2007, Data Validation Technical Memorandum presented in Ref. 3, Appendix H (Ref. 3, p. 67). The data was considered valid and acceptable, with no data rejected or invalidated (Ref. 3, p. 67). Analytical results for samples collected at the Old American Zinc Plant, Fairmont city, Illinois have been evaluated using the EPA guidance documents "National Functional Guidelines for Inorganic Data Review", dated February, 1994, EPA-540/R-94-013 and the EPA Region V "Standard Operating Procedure (SOP) for Validation of CLP Inorganic Data, September 1993". The data quality objectives contained in the approved quality assurance project plan (QAPP) "Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study at Old American Zinc Plant Site, Fairmont City Illinois, Revision 2, dated April 2006" were used as the definitive validation criteria. The review was based on the Level IV data packages supplied by the analytical laboratory, STL, located in University Park, Illinois (Ref. 3, Appendix H, p. 789). All metals data was usable or usable and qualified as estimated or undetected (Ref. 3, Appendix H, p. 789).

EPA digestion methods 3010A, 3020A, 1311, 1312 and EPA methods 6010B and 7470A were followed for sample analysis. Based on the documentation reviewed, no significant deviations adversely affecting data quality were made to the cited EPA reference methods. No action was needed to qualify sample data (Ref. 3, Appendix H, p. 790).

Containment

Gas release to air: The air migration pathway was not scored; therefore, gas containment was not evaluated.

Particulate release to air: The air migration pathway was not scored; therefore, gas and particulate containment were not evaluated.

Release to ground water: The ground water pathway was not scored; therefore, ground water containment was not evaluated.

Release by overland flow migration and/or flood:

The ditches that drain the Old American Zinc Plant property consist of a series of man-made drainage features constructed to divert surface water flow from the property (Ref. 3, p. 17; section 4.1.1.1 of this HRS documentation record). During the 2006-2008 remedial investigation of the Old American Zinc Plant (Ref. 3), a total of 11 samples were collected from the sediments within the western most drainage way (West Ditch 1) and the West Ditch 1 outfall to the Old Cahokia Creek watershed and wetlands (Ref. 3, p. 100). Results of this analysis showed that sediments within West Ditch 1 contained concentrations of arsenic, cadmium, lead, and zinc that exceeded the EPA's residential and/or industrial screening criteria (Ref. 3, pp. 100-101). Additionally, the highest concentrations of these metals were found in samples closest to the property (Ref. 3, Table 4-19, pp. 243-244; section 2.2.2 and Figure 6 of this HRS documentation record). None of the following containment features are present: maintained engineered cover or functioning and maintained run-on control system and runoff management system, or liner with functioning leachate collection and removal system immediately above liner. Based on the historic lack of containment and the evidence of overland hazardous substance migration from the source, a surface water containment factor value of 10 is assigned for this source (Ref. 1, Table 4-2).

Source 2 is located in a 100 year flood plain (Ref. 14). Based on the source being located in a 100 year flood plain the Flood Frequency Factor value is 25 (Ref. 1, Table 4-9). There is no documentation that the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated. Based on this criteria the containment (flood) factor value is 10 (Ref. 1, Table 4-8).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

Sample ID	Lab Sample ID	Sample Type	Sampling Date	Hazardous Substance	Hazardous Substance Concentration (mg/kg)	Method Detection Limit*	Reference
CSS-15	246903-5	Slag (Ref. 3, Table 4-4, p. 208, Table B.1.a-1, p. 4510)	6/2/2006	Arsenic Cadmium Mercury Lead Zinc	480 260 3.7 23,000 110,000	0.34 0.054 0.13 23 130	Ref. 3, Appendix L p. 1583, 1588, 1639, 1640; Ref. 16, p. 4; Fig. 7 of this HRS documentation record
CSS-55	247049-9	Slag (Ref. 3, Table 4-4, p. 209, Table B.1.a-1, p. 4511)	6/8/2006	Arsenic Cadmium Mercury Lead Zinc	280 190 3.8 11,000 46,000	0.38 0.059 0.64 51 280	Ref. 3, Appendix L p. 1959, 1968, 2025, 2026; Ref. 16, p. 4; Fig. 7 of this HRS documentation record
CSS-61	247049-19	Slag (Ref. 3, Table 4-4, p. 210, Table B.1.a-1, p. 4511)	6/8/2006	Arsenic Cadmium Mercury Lead Zinc	350 310 43 11,000 59,000	0.39 0.062 0.68 53 290	Ref. 3, Appendix L p. 1959, 1978, 2025, 2026; Ref. 16, p. 4; Fig. 7 of this HRS documentation record

Notes:
mg/kg – milligrams per kilogram

* – The HRS directs if the sample analysis is not performed under the EPA Contract Laboratory Program, that the detection limit be used in place of the sample quantitation limit (Ref. 1, Section 2.3, Table 2-3).

List of Hazardous Substances Associated with Source: Arsenic, mercury, lead, zinc, cadmium

2.4.2 HAZARDOUS WASTE QUANTITY

There is insufficient historical and current data available to adequately evaluate Hazardous Constituent Quantity, Hazardous Waste stream Quantity, and Volume for Source 2. Therefore the hazardous waste quantity value for Source 2 will be calculated using the area of the contaminated soil (Tier D) (Ref. 1, Section 2.4.2.1.4).

2.4.2.1.1 Hazardous Constituent Quantity (Tier A) - Not Scored

The total Hazardous Constituent Quantity for Source 2 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [(Ref. 1, p. 51591 (Section 2.4.2.1.1)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity for Source 2 with reasonable confidence.

2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) - Not Scored

The total Hazardous Wastestream Quantity for Source 2 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [(Ref. 1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source 2 with reasonable confidence.

2.4.2.1.3 Volume (Tier C)

The volume for Source 2 could not be adequately determined according to the HRS requirements; that is, the total volume of the source is not known and cannot be estimated with a reasonable confidence (Ref. 1, Section 2.4.2.1.3). There are insufficient historical and current data available to adequately calculate the total volume of Source 2. Additionally, even with the extensive sampling that was conducted for this investigation, there remains areas that are unknown if slag exists across the entire area of the Facility, especially under building foundations and paved areas. Therefore, there is insufficient information to evaluate the volume of Source 2 with reasonable confidence and a value of 0 is assigned. As a result the evaluation of hazardous waste quantity proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: 0

2.4.2.1.4 Area (Tier D)

The 2006-2008 Remedial Investigation of the Old American Zinc Plant property also included an evaluation of the slag area for the purpose of determining the lateral and vertical extent of the slag material. This investigation was undertaken from May 30th to June 20th and on December 13th, 2006, and conducted by advancing a number of soil borings to depths of 4 to 24 feet below the surface. A minimum of one boring was advanced in each of 75 grids within the property, with some additional borings added in the vicinity of historic smelting facilities or former XTRA operations (Ref. 3, pp.26, 43-44).

The thickness of slag encountered at each boring location is identified in the Final Remediation Investigation Report for the Old American Zinc Plant facility (Ref. 3, Table 3-1, pp. 185-186). The lateral extent of the waste slag across the property is illustrated in Figure 19 of that report (Ref. 3, pp. 86-87, Figure 19, p. 166). According to the report, the lateral extent of the source areas cover 124.3 acres, and the vertical extent of the waste slag ranges between 0.5 to 9.3 feet below grade surface (Ref. 3, p. 120).

For the purposes of the HRS, it has been determined that wastes are located on the Facility Area and are of an area of greater than zero, but unknown, due to unknown information whether slag is located underneath former building foundations and roads on the property.

Source Type	Units (ft^2)	References
Pile	Unknown, but greater than 0	Figure 7 of this HRS documentation record; Ref. 3, p. 86; Ref. 1, Section 2.4.2.1.5; Ref. 9, pp. 1 - 2

Equation for Assigning Value (Ref. 1, Table 2-5): $\frac{\text{unknown, but greater than 0 ft}^2}{13}$

Area Assigned Value: Unknown, but greater than 0

2.4.2.1.5. Source Hazardous Waste Quantity Value

According to the HRS, the highest of the values assigned to each source for hazardous constituent quantity (Tier A), hazardous waste stream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity. Because area (Tier D) was the only tier evaluated for Source 2, the area calculation will be assigned as the source hazardous waste quantity value for Source 2 (Ref. 1, Section 2.4.2.1.5).

Highest assigned value assigned from Ref. 1, Table 2-5	Unknown, but greater than 0

2.2 SOURCE CHARACTERIZATION — SOURCE 3

2.2.1 SOURCE IDENTIFICATION

Name of source: Source 3

Name and description of source: Contaminated sediments within West Ditch 1

Source Type: Contaminated soil

Description and Location of Source (Figure 9 of this HRS documentation record):

Source 3 consists of the contaminated soils that lie within the bottom of West Ditch 1. The contaminants of concern (arsenic, cadmium, lead and zinc) are documented to be present in all sources at elevated concentrations and are also found on the facility property.

The ditches that drain the Old American Zinc Plant facility consist of a series of man-made drainage features constructed to divert surface water flow (Ref. 3, p. 17, Figure 4, p. 148; Figure 9 of this HRS documentation record). The property is drained by a set of four drainage ditches; two located in the eastern portion of the property designated as East Ditch 1 and East Ditch 2, and two located in the western portion of the property designated as West Ditch 1 and West Ditch 2 (Ref. 3, p. 73).

The western and northwestern portion of the property is drained by West Ditch 1. According to Figure 4 of the 2009 Final Remedial Investigation Report for the Old American Zinc Plant facility, West Ditch 1 begins on the west side of the property. Also according to the map there are not any confluences between the West Ditch 1 and the Old Cahokia Creek wetlands (Ref. 3, p. 148). West Ditch 1 runs along the western border of the property. This ditch continues across the northwestern corner of the property where it exits the property and flows in a north-northwesterly direction along 47th Street (Ref. 3, p. 74; Ref. 12, p. 1). Waters and sediments conveyed in West Ditch 1 then flow through a culvert beneath Collinsville Road, where they are discharged into the Old Cahokia Creek wetlands immediately north of the West Ditch Outfall. This outfall is located approximately ¼ mile north of the Old American Zinc Plant property (Ref. 3, p. 74; Figures 5 and 8 of this HRS documentation record). The total length of West Ditch 1 is 3058 feet (Ref. 12, pp. 1 – 2).

The bottom width of West Ditch varies at different locations within its approximate 3058 foot length. On April 3, 2014 a representative of the Illinois Environmental Protection Agency collected information regarding the width of West Ditch 1. A that time, the width of West Ditch was measured at twelve locations throughout its 3058 foot length (Ref. 12, pp. 1, 2; Figure 9 of the HRS documentation record). These measurements documented an average width of 5.5 feet (Ref. 12, p. 2).

During the Final Remedial Investigation of the Old American Zinc Plant facility, a total of six samples

were collected from the sediments of West Ditch 1 (Ref. 3, p. 100) arsenic, cadmium, lead and zinc were the primary contaminants of concern identified within West Ditch 1 (Ref. 3, p. 100; Figure 6 of this HRS documentation record). Within the West Ditch 1, concentrations of arsenic, cadmium, lead and zinc in various samples exceeded concentrations of the same hazardous substances documented in a sediment sample (X209) collected in 1994 from the northeastern area of the facility property (X209, Ref. 13, Table 3-4, p. 40; Ref. 3, Table 4-19, p. 243 – 244; Figure 6 of this HRS documentation record). The only sediment description identifying the sample medium from the sediment samples collected during the Final Remedial Investigation (Ref. 3) is for sample SD-23, which is identified as a moist dark brown organic soil (Ref. 3, Appendix C-3, p. 591). Source materials have contributed COIs to the sediments in the ephemeral ditches and Rose Creek on, or adjacent to, the Facility Area (Ref. 3, p. 121). Sediment data collected as part of the Final Remedial Investigation documents that COIs from the Facility Area source areas have been transported by stormwater run-off drainages and then by these drainages to the Old Cahokia Watershed (Ref. 3, p. 125).

During a 1994 CERCLA Integrated Site Assessment (Ref. 13), sediment sample X209 was collected from upstream drainage way system (Ref. 13, p. 17, 26, 28, 104) or as in East Ditch 1 (Ref. 3, Figure 12, p. 156) to represent background conditions for sediment samples (Ref. 13, p. 26 and Figure 3-3, p. 17). X209 was collected in a drainage way along the northeast corner of the Old American Zinc property (Ref. 13, Table 3-2, p. 28, Figure 3-3, p. 17). The provided sample description was a dark brown silt material with organic material collected from 0-6 inches (Ref. 13, Table 3-2, p. 28). Although not required by the HRS, to establish that Source 3 contaminant levels are not representative of naturally occurring or ubiquitous levels, sediment sample X209 was used for comparison purposes (see section 2.2.2 of this HRS documentation record below).

Field activities associated with the remedial investigation of the Old American Zinc Plant site were performed in accordance with the U.S. EPA approved Support Sampling Plan (SSP) (Ref. 20), Field Sampling and Analysis Plan (FSAP) (Ref. 20, p. 64), Quality Assurance Project Plan (QAPP) (Ref. 20, p. 469), and subsequent U.S. EPA-approved Addenda 1 through 4 to the SSP. Any variations to the U.S. EPA-approved SSP, based on field conditions encountered, were communicated to the U.S. EPA or to the U.S. EPA oversight (CH2M Hill) on-Site representative (Ref. 3, p. 42).

The data validation report is provided in the April 11, 2007, Data Validation Technical Memorandum presented in Ref. 3, Appendix H, p. 789 and p. 47). The data was considered valid and acceptable, with no data rejected or invalidated (Ref. 3, p. 47). Analytical results for samples collected at the Old American Zinc Plant, Fairmont city, Illinois have been evaluated using the EPA guidance documents "National Functional Guidelines for Inorganic Data Review", dated February, 1994, EPA-540/R-94-013 and the EPA Region V "Standard Operating Procedure (SOP) for Validation of CLP Inorganic Data, September 1993". The data quality objectives contained in the approved quality assurance project plan (QAPP) "Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study at Old American Zinc Plant Site, Fairmont City Illinois, Revision 2, dated April 2006" were used as the definitive validation criteria. The review was based on the Level IV data packages supplied by the analytical laboratory, STL, located in University Park, Illinois (Ref. 3, Appendix H, p. 789). All metals data was usable or usable and qualified as estimated or undetected (Ref. 3, Appendix H, p. 789). EPA digestion methods 3010A, 3020A, 1311, 1312 and EPA methods 6010B and 7470A were followed for sample analysis. Based on the documentation reviewed, no significant deviations

adversely affecting data quality were made to the cited EPA reference methods. No action was needed to qualify sample data (Ref. 3, Appendix H, p. 790).

Containment

Gas release to air: The air migration pathway was not scored; therefore, gas containment was not evaluated.

Particulate release to air: The air migration pathway was not scored; therefore, particulate containment was not evaluated.

Release to ground water: The ground water pathway was not scored; therefore, ground water containment was not evaluated.

Release by overland flow migration and/or flood:

The ditches that drain the Old American Zinc Plant property are man-made drainage features constructed to divert surface water flow from the property (Ref. 3, p. 17). Piles of slag and slaglike material are present along the banks of the ditches (Ref. 3, p. 137). During the Final Remedial Investigation of the Old American Zinc Plant (Ref. 3), Sediment samples SD-23 through SD-33 were collected from this drainage system and the West Ditch Outfall area from the sediments within the ephemeral ditch located along the western boundary of the Facility Area (West Ditch 1) (Ref. 3, p. 29, 99). Results of this analysis showed that sediments within West Ditch 1 contained concentrations of arsenic, mercury, cadmium, lead, and zinc that exceeded more than three times the concentration of these metals that were found to be present in the two background sediment samples (TW-01-N-0-6, TW-01-C-0-6, collected from open water) collected from the same watershed (Ref. 3, Table 4-19, p. 244; see section 4.1.2.1.1 of this HRS documentation record). These samples were selected due to the depth at which they were collected (0-0.5 ft) (Ref. 3, Table 4-19, p. 244) is similar to the sample depths of the sediments collected from West Ditch 1 and wetland areas (Ref. 3, Table 4-19, p. 243-244). Additionally, sediment samples collected from West Ditch 1 were documented to contain elevated levels of arsenic, mercury, cadmium, lead and zinc in comparison to a sediment sample considered representative of background conditions in a 1994 investigation (see section 2.2.2 of this HRS documentation record below). Based on the analytical data for the sediment samples collected from West Ditch 1, there is evidence of hazardous substances migrating from the source area (Ref. 3, p. 5-8, p. 125) and there is no evidence of a maintained engineered cover or a functioning and maintained run-on control system and runoff management system (Ref. 3, p. 125). Based on the historic lack of containment and the evidence of overland hazardous substance migration from the source, a surface water containment factor value of 10 is assigned for this source (Ref. 1, Table 4-2; Ref. 3, p. 137-138).

Source 3 is located in a 100 year floodplain (Ref. 14). Based on the source being located in a 100 year flood plain the Flood Frequency Factor value is 25 (Ref. 1, Table 4-9). There is no documentation that

the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated. Based on this criteria the containment (flood) factor value is 10 (Ref. 1, Table 4-8).

To demonstrate data usability, the Administrative Order on Consent for the Old American Zinc Site (Ref. 19) provided the corresponding guidance for the prospective contractor to follow.

Accordingly the prospective contractor will have a Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP). As part of the SSP, Respondents shall submit to EPA a QAPP and FSP. As described in the SOW and guidances (Ref. 19, p. 8). The QAPP shall be consistent with the requirements of the U.S. EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP (Ref. 19, p. 52). The Respondents shall develop a Field Sampling Plan, as described in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," October, 1988. The Field Sampling Plan should supplement the QAPP and, cover all RI sample collection activities (Ref. 19, p. 53).

Respondents shall only use laboratories which have a documented quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995) and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA (Ref. 19, p. 12).

To satisfy the requirements in the Administrative Order on Consent (Ref. 19), Field activities were performed in accordance with the U.S. EPA approved Support Sampling Plan (SSP) (Ref. 20), Field Sampling and Analysis Plan (FSAP) (Ref. 20, Section 5, p. 64). , Quality Assurance Project Plan (QAPP) (Ref. 20, p. 469), and subsequent U.S. EPA-approved Addenda 1 through 4 to the SSP. Any variations to the U.S. EPA-approved SSP, based on field conditions encountered, were communicated to the U.S. EPA or to the U.S. EPA oversight (CH2M Hill) on-Site representative (Ref. 3, p. 42).

The laboratory data and narratives were reviewed by the laboratory QA Manager, the ENTACT QA Manager and, a third-party chemist, to ensure that the samples were received in acceptable condition, the requested analyses were performed within the required holding times, and the laboratory QA/QC results were acceptable to ensure the validity and usability of the data (Ref. 3, p. 65).

STL of University Park, Illinois was utilized to analyze all soil, sediment, surface water, groundwater, and waste samples collected at the Site (Ref. 3, p. 66). The laboratory QA/QC included one matrix spike (MS) and one matrix spike duplicate (MSD) for every 20 samples analyzed for each matrix received (Ref. 3, p. 66-67). A comparison of the results indicates that the duplicate sample results are all within an acceptable order of magnitude of the investigative sample at all locations, as determined by the relative percent difference (RPD). Based on a review of the analytical data packages, the data have been determined to be valid and acceptable. Laboratory QC results on continuing calibration verification, laboratory control standards, holding times, and MS/MSD results are contained along with the analytical data. Based on a review of the laboratory QC results, the analytical data are considered to be within the acceptable QA/QC criteria defined in the QAPP and has been signed and approved by the STL reviewing chemist (Ref. 3, p. 67).

The data validation report is provided in the April 11, 2007 Data Validation Technical Memorandum presented in Ref. 3, Appendix H, p. 789. As detailed in the report, the analytical data was considered valid and acceptable, with no data rejected or invalidated. Based on the conclusions provided in the report, the analytical data met all requirements for reliability and usability (Ref. 3, p. 67).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

Contaminated Soil

Sample ID	Sample Medium	Sample Location	Depth	Date	Percent Solids	References
X209/ MEXD38	sediment	Drainageway along the northeast corner of the Old American Zinc Plant property	0-6 in	11/30/1994	55.2	Ref. 13, pp. 17, 28; Ref. 22, pp. 9, 24

Sample ID	Hazardous Substance	Concentration (mg/kg)	Adjusted Concentration (mg/kg)#	References
X209/ MEXD38	Arsenic	13.6	13.6	Ref. 22, pp. 5, 9, 24, 34
	Cadmium	8.7 J	12.27	
	Lead	76.7	76.7	
	Zinc	955 J	1432.5	
	Mercury	0.14 J	0.26	

Notes:
"J" Indicates the associated value is an estimated quality (Ref. 22, p. 5).
The duplicate audits of Cd (59.8%) and Zn (65%) are out of control. The matrix spike recoveries of Cd (-448.7%) and Zn (-16290%) were not flagged by the laboratory since the sample concentrations were > 4 times the spike level. Cd and Zn data are not qualified based on the matrix spike. All Cd and Zn data are estimated (J) due to poor precision. The matrix spike recovery Hg (-447.9%) was not flagged by the laboratory since the sample concentration was > 4 times the spike level. Hg data are not qualified based upon this audit. The duplicate audit of Hg (65.2%) is out of control. All Hg data are estimated (J) due to poor precision (Ref. 22, p. 3).
– Due to the unknown bias for this analyte of the background sample (X209), per Reference 7, *Using Qualified Data to Document an Observed Release and Observed Contamination*, the detected concentration is multiplied by the appropriate substance-specific concentration factor to reflect the possible bias (Ref. 7, pp. 8, 18).

Sample ID	Sample Type	Sampling Date	Hazardous Substance	Hazardous Substance Concentration (mg/kg)	Method Detection Limit (mg/kg)*	Percent Solids	Reference
SD-23-0.5	Contaminated soil (Sediment)	6/2/2006	Arsenic Cadmium Mercury Lead Zinc	78 130 1.4 1,700 14,000	0.43 0.067 0.077 0.29 16	79.4	Ref. 3, Appendix L p. 1602, Fig. 12, p. 156; Figure 6 of this HRS documen-tation record
SD-24-0.5	Contaminated soil (Sediment)	6/1/2006	Arsenic Cadmium Mercury Lead Zinc	130 630 0.93 600 40,000	1.2 0.20 0.022 0.84 46	27.2	Ref. 3, Appendix L pp. 1535, 1536, Fig. 12, p. 156; Ref. 16, p. 4; Figure 6 of this HRS documen-tation record
SD-25-0.5	Contaminated soil (Sediment)	6/1/2006	Lead Zinc	3,300 6,800	0.62 34	31.4	Ref. 3, Appendix L p. 1347, Fig. 12, p. 156; Ref. 16, p. 4; Figure 6 of this HRS documen-tation record

Sample ID	Sample Type	Sampling Date	Hazardous Substance	Hazardous Substance Concentration (mg/kg)	Method Detection Limit (mg/kg)*	Percent Solids	Reference
SD-26-0.5	Contaminated soil (Sediment)	6/1/2006	Cadmium Lead Zinc	64 810 21,000	0.062 0.27 73	85.7	Ref. 3, Appendix L p. 1351, Fig. 12, p. 156; Ref 16, p. 4; Figure 6 of this HRS documen-tation record
SD-27-0.5	Contaminated soil (Sediment)	6/1/2006	Cadmium Lead Zinc	61 980 20,000	0.059 0.25 140	90.6	Ref. 3, Appendix L p. 1356, Fig. 12, p. 156; Ref. 16, p. 4; Figure 6 of this HRS documen-tation record

Notes:
mg/kg – milligrams per kilogram

* – The HRS directs if the sample analysis is not performed under the EPA Contract Laboratory Program, that the detection limit be used in place of the sample quantitation limit (Ref. 1, Section 2.3, Table 2-3).

List of Hazardous Substances Associated with Source: Arsenic, cadmium, mercury, lead, zinc

2.4.2 HAZARDOUS WASTE QUANTITY

There is insufficient historical and current data available to adequately evaluate Hazardous Constituent Quantity, Hazardous Waste stream Quantity, and Volume for Source 3. Therefore the hazardous waste quantity value for Source 3 will be calculated using the area of the contaminated sediments (soil) (Tier D) (Ref. 1, Section 2.4.2.1.4).

2.4.2.1.1 Hazardous Constituent Quantity (Tier A) - Not Scored

The total Hazardous Constituent Quantity for Source 3 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data (manifests, potentially responsible parties (PRP) records, State records, permits, waste concentration data , etc.) are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to calculate a total or partial Hazardous Constituent Quantity for Source 3 with reasonable confidence.

2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) - Not Scored

The total Hazardous Wastestream Quantity for Source 3 could not be adequately determined according to the HRS requirements; that is, the total mass, or partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants for the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, p. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestream and CERCLA pollutants and contaminants for the source and the associated releases from the source. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for Source 3 with reasonable confidence.

2.4.2.1.3 Volume (Tier C)

The hazardous volume of Source 3 could not be adequately determined according to the HRS requirements; that is, the total volume of the source is not known and cannot be estimated with a reasonable confidence (Ref. 1, Section 2.4.2.1.3). There are insufficient historical and current data available to adequately calculate the total volume of Source 3. Therefore, Source 3 has been assigned a value of 0 for the volume measure.

Volume Assigned Value: 0

2.4.2.1.4 Area (Tier D)

The Final Remedial Investigation of the Old American Zinc Plant (Ref. 3) property also included an

analysis of the sediments within the bottom of West Ditch 1. Sediment samples SD-23 through SD-33 were collected from West Ditch 1 and the West Ditch Outfall area (Ref. 3, p. 99 and Figure 12, p. 156). The western and northwestern portion of the property is drained by West Ditch 1. West Ditch 1 runs along the western border of the property for approximately 1608 feet. This ditch continues across the northwestern corner of the property for an additional 688 feet where it exits the property. Surface water then flows for 762 feet in a north-northwesterly direction along 47th Street, then through a culvert beneath Collinsville Road, where they are discharged into the Old Cahokia Creek wetlands immediately north of the West Ditch Outfall (762 ft). This outfall is located approximately ¼ mile north of the Old American Zinc Plant property (Ref. 3, p. 74; Ref. 12, p. 1).

The bottom width of West Ditch 1 varies at different locations within its approximate 3058 foot length (Figure 9 of this HRS documentation record; Ref. 12, p. 2). On April 3, 2014 a representative of the Illinois Environmental Protection Agency collected information regarding the width of West Ditch 1. At that time, the width of West Ditch was measured at twelve locations throughout its 3058 foot length. (Figure 9 of this HRS documentation record; Ref. 12, pp. 1 – 2) These measurements documented an average width of 5.5 feet (Ref. 12, p. 2). When one multiplies the total length of West Ditch 1 (3058 feet) times the average width of the ditch (5.5 feet) the area of contaminated soils is determined to be 16,819 square feet (Ref. 12, p. 2).

Source Type	**Units (ft^2)**	**References**
soil	16,819	Reference 12

Equation for Assigning Value (Ref. 1, Table 2-5): $\frac{16,819}{34,000}$

16,819 square feet of contaminated soil divided by 34,000 (area divisor for soil)
(Ref 1, Table 2-5) = 0.494 (hazardous waste quantity value for area of Source 3)

Area Assigned Value: 0.494

2.4.2.1.5. Source Hazardous Waste Quantity Value

According to the HRS, the highest of the values assigned to each source for hazardous constituent quantity (Tier A), hazardous waste stream quantity (Tier B), volume (Tier C), and area (Tier D) should

be assigned as the source hazardous waste quantity. Because area (Tier D) was the only tier evaluated for Source 3, the area calculation will be assigned as the source hazardous waste quantity value for Source 3 (Ref. 1, Section 2.4.2.1.5).

Highest assigned value assigned from Ref. 1, Table 2-5: 0.494

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) (Ref. 1, Table 3-2)	Surface Water (SW)		Air	
				Overland / flood (Ref. 1, Table 4-2, Table 4-8)*	GW to SW (Ref. 1, Table 3-2)	Gas (Ref. 1, Table 6-3)	Particulate (Ref. 1, Table 6-9)
1	15,600	N	NS	10	NS	NS	NS
2	Unknown, but greater than 0	N	NS	10	NS	NS	NS
3	0.494	N	NS	10	NS	NS	NS

NS = Not Scored
* = A value of 10 is assigned for both the overland flow containment value and the flood containment value.

Description of Other Possible Sources: The Rose Creek drainage way and portions of the residential area of Fairmont City are other possible sources that have not been included in this documentation record, or used for scoring purposes. Surface water run-off across the Facility Area has allowed COIs in ground slag to reach ephemeral ditches and Rose Creek that drain the Facility Area. The ground slag has either been observed as part of the constructed ditches or extends to the limits of the Facility Area where the ditches or Rose Creek are present (Ref. 3, p. 20). Slag from the Facility Area has been transported to surrounding properties for use as yard fill and as surfacing material for alleyways. Current residents may be potentially exposed to constituents of potential concern (COPCs) in yard fill and in alleyways. Casual recreational use of vacant lots adjacent to the Facility Area has been observed and considered a current and future potential exposure scenario. Utility repairs and future redevelopment of the lots and alleyways would allow potential exposure by utility workers and/or construction workers to subsurface soil (Ref. 3, pp. 21 - 22).

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/flood Component

The hazardous substance migration path includes both the overland and the in-water segment that hazardous substances would take as they migrate away from site sources (Ref. 1, Section 4.1.1.1). There is one watershed being evaluated for purposes of this HRS documentation record, which begins on the Old American Zinc Plant facility property.

Overland Segment

The Old American Zinc Plant property is drained by four distinct drainage ditches; two located in the eastern portion of the property (East Ditch 1 and East Ditch 2), and two located in the western portion of the property (West Ditch 1 and West Ditch 2) (Ref. 3, p. 73, Figure 4, p. 148; Figure 9 of this HRS documentation record). East Ditch 1 begins at the eastern edge of the Facility Area east of the XTRA buildings and continues approximately 2,200 feet in a southwesterly direction across the far eastern portion of the Facility Area, until its confluence with Rose Creek near the southeastern corner of the Facility Area. This ditch is bermed with spoil and/or slag. East Ditch 2 begins at Kingshighway north of the Cargill Property and extends west for approximately 800 feet to its confluence with East Ditch 1, approximately 600 feet upstream of Rose Creek (Ref. 3, p. 73, Figure 4, p. 148).

West Ditch 2 is located in the southwestern corner of the Facility Area and is a very shallow, 800 foot long, erosional swale that discharges to Rose Creek via a culvert outfall at the extreme southwestern corner of the Facility Area (Ref. 3, p. 74, Figure 4, p. 148).

Rose Creek is a shallow ephemeral stream which flows in a westerly direction past the south edge of the Facility Area. Prior to reaching the Facility Area's southern boundary, Rose Creek flows along the southern boundary of the General Chemical property, crossing beneath Kingshighway and along the Cargill property's southern boundary (Ref. 3, Figure 4, p. 148). East Ditch 1 joins with Rose Creek near the southeastern corner of the Facility Area. From this point, Rose Creek flows westerly along the southern boundary of the Facility Area where West Ditch 2 joins the creek. Rose Creek continues in a general westerly direction approximately 4,000 feet along the northern side of the CSXI railroad corridor, to a point approximately 600 feet from Collinsville Road, where it bends to the northwest. Beyond this bend, Rose Creek flows in a northwesterly direction for approximately 800 feet where it is conveyed via a culvert beneath Collinsville Road. North of Collinsville Road the creek discharges into the Old Cahokia Watershed at the Rose Creek Outfall, approximately ¾-mile west of the western boundary of the Facility Area (Ref. 3, p. 74, Figure 4, p. 148, Figure 5, p. 150).

Although East Ditches 1 and 2, West Ditch 2 and Rose Creek are not included in this HRS evaluation that does not mean that the U.S. EPA is not concerned about potential releases of hazardous substances via these drainageways. For the purposes of this evaluation, only West Ditch 1 will be evaluated for HRS scoring purposes.

Only West Ditch 1 will be evaluated for this overland migration. Sources 1 (slag piles) and portions of Source 2 (redistributed slag with soil) are located in the north and northwestern portions of the Facility Area. Surface water from the western and northwestern portion of the Old American Zinc Plant property is drained by West Ditch 1 (Ref. 3, pp. 73 - 74; Figures 3 and 7 of this HRS documentation record). West Ditch 1 is also considered a source (Source 3) due to the large amounts of contaminants found within the soil in the bottom of the ditch (see Section 2.2.1 for Source 3 of this HRS documentation record). All three sources share the same probable point of entry (PPE) into the Old Cahokia Creek Watershed. Although no sample descriptions are available the amount and concentration of contaminants identified in the bottom soils of the ditch indicate that contamination has entered into West Ditch 1. West Ditch 1 runs along the western border of the property for approximately 1608 feet before turning northeast across the northwestern corner of the property for an additional 688 feet where it exits the property. Overland flow in West Ditch 1 then runs along 47th Street for approximately 762 feet, where it is conveyed through a culvert beneath Collinsville Road and discharges into the Old Cahokia Watershed wetlands. The total length of West Ditch 1 was approximately 3058 feet (Ref. 12, p. 1). The western and northwestern portion of the Facility Area is drained by West Ditch 1, which runs along the western border of the Facility Area (Ref. 3, p. 74). The point where the Collinsville Road culvert discharges into the Old Cahokia Watershed wetlands represents the probable point of entry to the surface water pathway for the West Ditch 1 drainage (Ref. 3, p. 74, Figure 4, p. 148; Ref. 14; Figure 8 of this HRS documentation record).

Probable Point of Entry

A PPE is the point at which the overland segment of a hazardous substance migration path intersects with HRS-eligible surface water (Ref. 1, p. 51605). The PPE is assigned as the point at which entry of the hazardous substances to surface water occurs. The western and northwestern portion of the Facility Area is drained by West Ditch 1, which runs along the western border of the Facility Area. As noted above in the overland segment discussion for the surface water migration pathway, surface water runoff from the north and northwestern portions of the Old American Zinc Plant facility property are drained by West Ditch 1. Consequently, surface water runoff from Sources 1 and 2 would enter into West Ditch 1, also known as Source 3 (Ref. 3, p. 74, Figure 2, p. 146). This ditch continues across the northwestern corner of the Facility Area and thence along Maryland Avenue, where it is conveyed through a culvert beneath Collinsville Road. This ditch discharges into the Old Cahokia Watershed at the West Ditch Outfall, approximately 1/4 -mile north of the Facility Area (Ref. 3, p. 74, Figure 4, p. 148). Accordingly, Sources 1, 2, and 3 would share a common PPE into the HRS-eligible surface water body being evaluated. Calculations determined by sample location and using geographic information system software (Ref. 11), surface water flow (Ref. 3, Figure 4, p. 148) indicate that the distance of West Ditch 1 from sediment sample SD-24 to SD 32 (West Ditch 1 Outflow) (Ref. 3, Table 4-19, p. 244) is 2361.5 feet (Ref. 3, Figure 12, p. 156; Figure 8 of this HRS documentation record). The distance from SD-32 to the PPE is 52.6 feet (Ref. 3, Figure 12, p. 156; Figure 8 of this HRS documentation record).

<u>In-water Segment</u>

The in-water segment begins at the PPE into the wetland and continues on to the release sample

farthest from the PPE documented in the wetland, which is sample SD-48. Samples SD-34D, SD-46 and SD-48 were all documented to contain Level II concentrations of hazardous substances (see sections 4.1.2.1.1 and 4.1.4.3 of this HRS documentation record). The Old Cahokia Watershed wetlands being scored in this HRS evaluation, according to HRS Section 4.0.2, are HRS eligible since the wetlands are contiguous to Old Cahokia Creek (Ref. 1 pp. 51605; Ref. 3, p. 75, Figure 4, p. 148). The PPE is located in a freshwater emergent type wetland (Figure 8 of this HRS documentation record; Ref. 11, pp. 1, 3).

The Old Cahokia Creek Watershed is a 1,300-acre area complex consisting of wetlands, standing water, man-made ponds, and isolated upland areas, and is located between Collinsville Road to the south, Illinois Highway 111 to the east, Interstate 55/70 to the north, and Illinois Highway 203 to the west (Ref. 3, p. 74). Historically, Old Cahokia Creek drained the watershed before flowing south through East St. Louis and discharging to the Mississippi River. However, the construction of Interstate 55/70 in the early 1960's, and the expansion of the Milam Landfill have significantly altered the natural drainage of the watershed (Ref. 3, pp. 74-75). Surface water flow in the Old Cahokia Creek watershed is generally toward the west. Old Cahokia Creek, which loops through the northern part of the site, conveys water from the eastern portion of the watershed to a culvert under I-55/70. The culvert discharges into a pond north of the highway. This pond is connected to a series of ponds which discharge, via another culvert under I-55/70, into a drainage ditch south of the highway (also known as Engineered Drainage Ditch in Ref. 3, pp. 74-75, Figure 4, p. 148; Ref. 4, p.27-28). The Engineered Drainage Ditch and other waters of the Old Cahokia Creek watershed discharge into Schoenberger Creek via two culverts at points just north of Collinsville Road (Ref. 3, p. 76, Figure 4, p. 148).

Schoenberger Creek continues to flow west for approximately 0.6 miles where it converges with a tributary of the Cahokia Canal (Ref. 3, pp. 76-77). According to a 1993 topographic map (Ref. 6), the tributary flows northwest for approximately one mile to Cahokia Canal. From this point Cahokia Canal meanders west approximately four- tenths of a mile then south for approximately one mile and west again approximately seven-tenths of a mile to the Mississippi River. The water then discharges into the Mississippi River via a discharge gate that flows under a railroad corridor (Ref. 3, pp. 76-77). The end of the 15 mile surface water target distance limit for the Old American Zinc Plant site lies in the Mississippi River at a point west of the Village of Cahokia, Illinois (Ref. 10, Figure 4 of this HRS documentation record). Although HRS-eligible wetlands adjacent to wetlands evaluated as subject of actual contamination are present, an evaluation of potential targets was not expected to contribute significantly to the HRS site score. Furthermore, it can be noted that not evaluating these environments does not mean that they may not be of concern to the U.S. EPA.

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release

Chemical Analysis

The background sediment sample locations are upstream (north) of the outflow area for West Ditch 1 (Ref. 3, Figure 12, p. 156). The sample location map indicates that the samples were collected in a similar area on the edge of the body of water representing a portion of Old Cahokia Wetland Area. T-WD-1-N-0-6 (also documented as TWD-1-N-0-6 (Ref. 3, p. 244) and TWD-1-N (Ref. 16, p. 4) appears to be in a more similar location to the release sediment samples being evaluated as opposed to T-WD-1-C-0-6 (also documented as TWD-1-C-0-6 (Ref. 3, p. 244) and TWD-1-C (Ref. 16, p. 4) (Figure 10 of this HRS documentation record). A photo of TWD-1-N indicates standing vegetation including cattails (Ref. 3, p. 3903-3906). The sample description for 0 to 1" indicates the presence of organics and wood, while 0 to 6 inches indicates a gray/brown silty clay, iron nodules, organics, and a soft, saturated appearance (Ref. 3, p. 627). Photos of TWD-1-C depict standing water with emerging vegetation (Ref. 3, p. 3907-3910, 3912). Sample description for TWD-1-C indicated from 0-4" black, loose organic, soft, with a strong organic odor, while 4-6" there was a gray/brown silty clay (Ref. 3, p. 628). For the purposes of this HRS documentation record, both samples will be used for comparison to sediment release samples to establish an observed release. The highest concentration between samples TWD-1-N-0-6 and TWD-1-C-0-6 for each analyte of interest will be used in establishing the background level for that analyte (see section 4.1.2.1.1 of this HRS documentation record). Detailed information is not available for sample similarity, although the Final Remedial Investigation Report identifies samples TWD-1 (N,C,S) as reference samples (Ref. 3, pp. 99, 100).

Sediment samples were collected between May 2006 and July 2007 in the four drainage ditches of the Facility Area (West Ditch 1, West Ditch 2, East Ditch 1, and East Ditch 2), Rose Creek, the Rose Creek and West Ditch 1 Outfall areas in the Old Cahokia Watershed, and Schoenberger Creek. The samples consisted of shallow grab samples (SD-1 through SD-52) collected from the upper 6 inches of sediments and core samples collected along six transects (TRC-1, TRC-2, TRC-3, TWD-1, TWD-2 and TWD-3) in the Old Cahokia Watershed (Ref. 3, p. 53). All sediment samples were analyzed for the eight RCRA metals plus zinc, with some samples analyzed for pesticides and copper (Ref. 3, p. 100).

The shallow grab sediments samples were collected using a decontaminated, stainless-steel spoon or trowel, and placing the material directly into a labeled, laboratory-supplied, glass sample jar with a polytetrafluoroethylene-lined lid. Shallow sediment samples retrieved from locations where water was present were collected using a decontaminated, extendable metal trowel or a decontaminated HDPE dip cup and placing the saturated sediments into a dedicated, plastic bag. The bag was then drained of excess water and the sample material transferred to a labeled, laboratory-supplied, glass sample jar with a polytetrafluoroethylene-lined lid. All shallow sampling locations were marked by a pin flag and labeled for surveying (Ref. 3, p. 54).

Sediment core samples were collected along six transects in the Old Cahokia Watershed in July 2007. The transect sample locations, shown in Figure 12 (Ref. 3, p. 156), were accessed by a jon boat with trolling motor, by wading using the jon boat as a work platform, or by foot depending on field conditions encountered. The core samples were collected using dedicated, 2-inch diameter, 12-inch long rigid plastic sampling tubes advanced by a multistage sludge sampler.
Due to limited recoveries, an alternate method was used that included manually pushing the tube into the sediments until refusal was encountered, usually between 8 and 14 inches. Upon sample retrieval, the tube was capped with dedicated plastic caps, labeled with the sample location, date, and time, and transported back to the sample station at the Facility Area, where they were opened and described. Sediment materials in increments of 0 to 5 inches were then transferred directly into laboratory-supplied, glass sample containers equipped with a polytetrafluoroethylene-lined lids. The field documentation forms for sediment sampling are included in Ref. 3, Appendix C-3 (Ref. 3, pp. 54-55).

All sediment samples were packed into an iced sample cooler and submitted to the approved laboratory for analysis of eight RCRA metals plus zinc and/or copper. Selected samples were analyzed for pesticides, total organic carbon (TOC), grain size distribution, iron, manganese, ortho-phosphates, and total phosphates (Ref. 3, p. 55).

Field activities were performed in accordance with the U.S. EPA approved Support Sampling Plan (SSP) (Ref. 20), Field Sampling and Analysis Plan (FSAP) (Ref. 20, p. 64), Quality Assurance Project Plan (QAPP) (Ref. 20, p. 469), and subsequent U.S. EPA-approved Addenda 1 through 4 to the SSP. Any variations to the U.S. EPA-approved SSP, based on field conditions encountered, were communicated to the U.S. EPA or to the U.S. EPA oversight (CH2M Hill) on-Site representative (Ref. 3, p. 42).

The data validation report is provided in the April 11, 2007, Data Validation Technical Memorandum presented in Ref. 3, Appendix H (Ref. 3, p. 67). The data was considered valid and acceptable, with no data rejected or invalidated (Ref. 3, p. 67). Analytical results for samples collected at the Old American Zinc Plant, Fairmont city, Illinois have been evaluated using the EPA guidance documents "National Functional Guidelines for Inorganic Data Review", dated February, 1994, EPA-540/R-94-013 and the EPA Region V "Standard Operating Procedure (SOP) for Validation of CLP Inorganic Data, September 1993". The data quality objectives contained in the approved quality assurance project plan (QAPP) "Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study at Old American Zinc Plant Site, Fairmont City Illinois, Revision 2, dated April 2006" were used as the definitive validation criteria. The review was based on the Level IV data packages supplied by the analytical laboratory, STL, located in University Park, Illinois (Ref. 3, Appendix H, p. 789). All metals data was usable or usable and qualified as estimated or undetected (Ref. 3, Appendix H, p. 789). EPA digestion methods 3010A, 3020A, 1311, 1312 and EPA methods 6010B and 7470A were followed for sample analysis. Based on the documentation reviewed, no significant deviations adversely affecting data quality were made to the cited EPA reference methods. No action was needed to qualify sample data (Ref. 3, Appendix H, p. 790).

Background Concentrations:

Sediment Samples:

Sample ID	Sample Medium	Sample Location	Depth	Date	References
T-WD1-N-0-6	Sediment	Upgradient – East Side of OCW (Old Cahokia Creek Watershed)	0-6”	7/17/2007	Ref. 3, p. 244, p. 3279; Figures 5 and 10 of this HRS documentation record; Ref. 16, p. 4
T-WD1-C-0-6	Sediment	Upgradient – East Side of OCW (Old Cahokia Creek Watershed)	0-6”	7/17/2007	Ref. 3, Table 4-19, p. 244, p. 3280; Figures 5 and 10 of this HRS documentation record; Ref. 16, p. 4

Sample ID	Hazardous Substance	Concentration (mg/kg)	Adjusted Concentration (mg/kg)[#]	Method Detection Limit[*]	References
TWD-1-N-0-6	Arsenic Cadmium Lead Zinc Mercury	7.7 55 140 2000B 0.070	3,000	0.43 0.096 0.38 0.40 0.0087	Ref. 3, Appendix L p. 3299
TWD-1-C-0-6	Arsenic Cadmium Lead Zinc Mercury	16 44 78 2900B 0.076	4,350	0.51 0.11 0.46 0.48 0.011	Ref. 3, Appendix L p. 3301

Notes:
MDL – Method Detection Limit or Adjusted Method Detection Limit (Ref. 3, pp. 67, 2353, 3501)
mg/kg – milligrams per kilogram
* – The HRS directs if the sample analysis is not performed under the EPA Contract Laboratory Program, that the detection limit be used in place of the sample quantitation limit (Ref. 1, Section 2.3, Table 2-3).

Notes:
B – Compound was found in the blank and sample (Ref. 3, Appendix L, p. 3304). Zinc was found in the method blank (MB 500-19031/1-A) at 1 mg/kg J (Ref. 3, Appendix L, p. 3312). The analytical results are assumed to have an unknown bias.
– According to Reference 7, *Using Qualified Data to Document an Observed Release and Observed Contamination*, due to the unknown bias designation for this background sample analyte, the detected concentration is multiplied by the appropriate substance-specific concentration factor (1.5) to reflect the possible bias (Ref. 7, pp. 8, 18).

- Contaminated Samples:

The samples identified below meet observed release criteria as defined by the HRS (Ref. 1, Section 2.3, Table 2-3).

Sample ID	**Sample Medium**	**Sample Location**	**Distance from PPE**	**Depth**	**Date Collected**	**References**
SD-46	Sediment	Cahokia Creek wetland	170 feet	0-6”	12/13/2006	Ref. 3, Appendix L p.3103; Ref. 11, pp. 1, 3; Ref. 3, Table 4-19, p. 244; Fig. 8 of this HRS documentation record
SD-34D	Sediment	Cahokia Creek wetland	307 feet	0-6”	6/28/2006	Ref. 3, Appendix L p. 2331; Ref. 11, pp. 1, 3; Ref. 3, Table 4-19, p. 244; Fig. 8 of this HRS documentation record

Sample ID	Sample Medium	Sample Location	Distance from PPE	Depth	Date Collected	References
SD-48	Sediment	Cahokia Creek wetland	231 feet	0-6”	12/13/2006	Ref. 3, Appendix L p.3105; Ref. 11, pp. 1, 3; Ref. 3, Table 4-19, p. 244, Fig. 8 of this HRS documentation record

Notes:
PPE = probable point of entry

Sample ID	Hazardous Substance	Concentration (mg/kg)	Method Detection Limit*	References
SD-46	Lead Zinc Mercury	590 23000 0.320	0.4 44 0.012	Ref. 3, Appendix L p.3103
SD-34D	Cadmium Lead Zinc	380 550 43,000	0.21 0.91 100	Ref. 3, Appendix L pp.2331, 2355
SD-48	Lead Zinc Mercury	670 26000 0.360	0.31 34 0.0097	Ref. 3, Appendix L p.3105

Notes:
mg/kg – milligrams per kilogram
1 milligram – 1,000 micrograms
* = The HRS directs if the sample analysis is not performed under the EPA Contract Laboratory Program, that the detection limit be used in place of the sample quantitation limit (Ref. 1, Section 2.3, Table 2-3).

Attribution:

The ditches that drain the Old American Zinc Plant property consist of a series of man-made drainage features constructed to divert surface water flow from the property (Ref. 3, p. 17, Figure 4, p. 148). The western and northwestern portion of the property is drained by West Ditch 1 (Ref. 3, p. 74, Figure 4, p. 148).

West Ditch 1 runs along the western border of the property, turns in a northeastern direction across the northwestern corner of the property where it exits the property and flows in a north-northwesterly direction along 47th Street. Waters and sediments conveyed in West Ditch 1 then flow through a culvert beneath Collinsville Road, where they are discharged into the Old Cahokia Creek wetlands (Ref. 12, p. 1; Figures 5, 8 and 9 of this HRS documentation record). Other than the Old American Zinc Plant facility property, there are no known potential sources of contamination along this drainage way (Figure 2 of this HRS documentation record).

During the 2006-2008 remedial investigation of the Old American Zinc Plant, a number of samples were collected from the three slag waste piles (identified as Source 1), the ground slag redistributed across the Old American Zinc Plant facility property (identified as Source 2), and the sediments within West Ditch 1 (identified as Source 3). Many of the contaminants (e.g., cadmium, lead, mercury, zinc) found to be present in the slag piles (Source1) and the ground and redistributed slag (Source 2) were also found to be present in the sediments within West Ditch 1 (see sections 2.2.1 for Sources 1, 2, and 3 of the HRS documentation record). Additionally, there was a significant decrease in the mean concentrations of contaminants in West Ditch 1 with distance from the slag source area (Ref. 3, p. 102).

Additional samples were collected from the wetland area north of the point where the West Ditch 1 drains into the Old Cahokia Creek wetlands (Ref. 3, pp. 99-100). Results of this analysis showed that sediments within the West Ditch 1 outfall area contained concentrations of cadmium, lead, zinc and mercury that were more than three times the concentrations of these metals that were found to be present in the two background samples (see section 4.1.2.1.1 of the HRS documentation record). These same hazardous substances were documented to be present in Sources 1, 2, and 3 (see sections 2.2.1 for Sources 1, 2, and 3 of the HRS documentation record).

Information gathered from aerial photos and Sanborn Fire Insurance maps depicts a cadmium department, coal pit stack, acid tower, paint shop, and leaching area (Ref. 3, Figure 5, p. 149). The 1950 aerial photo (Ref. 3, p. 149, Appendix B-1, p. 342) of the facility depicts smoke coming from the at least two stacks. This smoke can be seen drifting to the south (from the furnace transfer room) over the facility and over residential homes. One large pile of debris/slag can be seen on the far north portion of the property (Ref. 3, Appendix B-1, p. 342). The 1960 aerial photo reveals many of the 1950 structures that were still present, including the residue bins, residue churn, furnace transfer room, concentrator mill, and acid tanks and chamber (Ref. 3, Figure 5, p. 149, p. 342).

Removal Action
There were 462 residential, vacant, or commercial/industrial properties located adjacent to the Facility Area, that were sampled as part of the 2002-2003 TCRA, with a soil removal action conducted at 209 properties (Ref. 3, p. 4082).

LaMear Dump
In 1984, Illinois EPA conducted a drum removal from the LaMear Dump within the Old Cahokia Creek Watershed. The LaMear property is located within the Old Cahokia Watershed north of Collinsville Road. A total of 138 drums containing copper mud, copper scale, waste oils, enamels, solvents and sludge wastes were illegally dumped on the LaMear property sometime between 1972 and 1975. Remediation of the area was conducted between August 20 and August 30, 1984. A total of 138 barrels were recovered and 4 inches of soil was removed around the barrels where excess residue had accumulated (Ref. 3, p. 3824). Soil and sediment samples collected after the removal contained cadmium at 22.4 mg/kg to 43.6 mg/kg, lead at 124.7 mg/kg to 512 mg/kg, and zinc at 1703 mg/kg to 2341 mg/kg (Ref. 3, Appendix B-3, p. 408-410). From the information provided it is unknown as to the exact location of sample collection (Ref. 3, p. 407).

Other possible areas include Cargill Facility Area (formerly Swift Agricultural Chemical Corp.) (Ref. 3, p. 4083), the CSXI Terminal, Budget Truck Rental (formerly Biggs Brothers Service Station) (Ref. 3, p. 27), General Chemical Corporation, Milam Landfill. Cargill, CSXI, General Chemical and Budget Truck Rental are all located to the south or southeast of Old American Zinc property. Surface water runoff from these facilities would not enter into West Ditch 1 (Ref. 3, Figure 2, p. 146, Figure 6, p. 150).

Hazardous Substances Released: Lead, Mercury, Cadmium, and Zinc

Surface Water Observed Release Factor Value: 550

4.1.4.2 Environmental Threat Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Ecosystem Toxicity Factor Value (Ref. 1, Section 4.1.4.2.1.1)	Persistence Factor Value* Ref. 1, Section 4.1.4.2.1.2)	Ecosystem Bio-accumulation Value** (Ref. 1, Section 4.1.4.2.1.3)	Ecosystem Toxicity/ Persistence/ Ecosystem Bio-accumulation Factor Value (Ref. 1, Table 4-21)	References
Arsenic	1,2	10	1	50000	5.0 E5	Ref. 1, Table 4-21; Ref. 2, pp. 5, 6, 11, 14
Cadmium	1,2,3	10000	1	50000	5.0 E8	
Lead	1,2,3	1000	1	50000	5.0 E7	
Mercury	1,2,3	10000	1	50000	5.0 E8	
Zinc	1,2,3	10	1	50000	5.0 E5	

Notes:
*Persistence value for (Rivers) (Ref. 3, p. 75)
** Ecosystem Bioaccumulation Potential Factor Value (Fresh)
Cadmium, lead, mercury and zinc were also documented to be present in samples meeting HRS observed release criteria.

Ecosystem Toxicity/Persistence/Environmental Bioaccumulation Factor Value for cadmium and mercury = 5.0×10^8

4.1.4.2.2 Hazardous Waste Quantity

Source No.	Source Type	Source Hazardous Waste Quantity	Source Hazardous Constituent Quantity Complete?
Source 1	Pile	15,600	No
Source 2	Pile	Unknown, but greater than 0	No
Source 3	Contaminated Soil	0.494	No

Source No.	Source Type	Source Hazardous Waste Quantity	Source Hazardous Constituent Quantity Complete?
Total		15,600.494	

Sum of Values: The sum of the source hazardous waste quantities for the three sources (15,600) corresponds to a hazardous waste quantity factor value of 10,000 in Table 2-6 of the HRS (Ref. 1, Section 2.4.2.2 and 4.1.4.2.2). Therefore a hazardous waste quantity factor value of 10,000 is assigned for the surface water migration pathway.

Hazardous Waste Quantity Factor Value: 10,000
(Ref. 1, Table 2-6)

4.1.4.2.3 Waste Characteristics Factor Category Value

Cadmium and mercury, which are associated with all three sources (which have overland flow and flood containment factor values greater than 0), have an ecotoxicity/persistence factor value of 10,000 and a bioaccumulation potential factor value of 50,000. As shown above (Ref. 1, Section 4.1.4.2.1):

Ecosystem Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 10,000

Ecosystem Toxicity/Persistence Factor Value (10,000) x Hazardous Waste Quantity Factor Value (10,000) = 1×10^8 (Ref. 1, Section 4.1.4.2.3)

Ecosystem Toxicity/Persistence Factor Value (10,000) x Hazardous Waste Quantity Factor Value (10,000) x Environmental Bioaccumulation Factor Value (50,000) = Waste Characteristics Product value of 5×10^{12} (subject to a maximum value of 1×10^{12})

A Waste Characteristics Product value of 1×10^{12} is assigned a Waste Characteristics Factor Category Value of 1,000 (Ref.1, Section 4.1.4.2.3, Table 2-7).

Waste Characteristics Factor Category Value: 1,000
(Ref. 1, Table 2-7)

4.1.4.3 Environmental Threat - Targets

The zone of contamination (i.e., where an observed release by chemical analysis has been documented) along the surface water migration pathway, extends from the probable point of entry into an eligible surface water body as defined in the HRS (where the West Ditch 1 empties into the Old Cahokia Creek wetlands) to sample location SD-48 (Ref. 1, Section 4.1.1; Figure 8 of this HRS documentation record). Sampling location SD-48 is the furthest documented point of an observe release, and is located approximately 231 feet from of the Probable Point of Entry to the Surface Water Pathway (Figure 8 of this HRS documentation record; Ref. 11). This sample location is described as "cattails and sedges, about 1 of leaf matter over sed[iment]s" (Ref. 3, p. 626).

Utilizing other samples, SD-34D is located within the Freshwater Emergent wetland according to the National Wetland Inventory (NWI) map (Figure 8 of this HRS documentation record). This sample is 307 feet from the PPE (Figure 8 of this HRS documentation record; Ref. 11, p. 1) and also meets HRS observed release criteria and was collected from the West Ditch Outfall in Old Cahokia Creek Watershed (Ref. 3, p. 114; Figure 8 of this HRS documentation record). However, as this sample was collected from the edge of open water habitat it is not clear whether it was from an HRS-eligible wetland.

There are HRS-eligible wetlands along the zone of actual contamination, (Ref. 3, pp. 3887-3914) with the total wetland frontage considered to be subject to actual contamination being approximately 1261.6 feet (or 0.23 miles) (Ref. 1, Section 4.1.4.3.1, Table 4-24; Figure 8 of this HRS documentation record; Ref. 11, p. 1). There are no media-specific benchmarks for contaminated sediments, so the target wetlands are subject to Level II concentrations. (Ref. 1, Section 2.5, 4.1.4.3, and 4.1.4.3.1)

Wetland Samples which meet the HRS Observed Release Criteria				
Sample ID	**Distance to PPE**	**Hazardous Substance**	**Concentration (mg/kg)**	**Reference**
SD-46	170 feet	lead mercury zinc	590 0.320 23000	Ref. 11, p. 1; Ref. 3, Appendix L p. 3103; Figure 8 of this HRS documentation record
SD-48	231 feet	lead mercury zinc	670 0.360 26000	Ref. 11, p. 1; Ref. 3, Appendix L p. 3105; Figure 8 of this HRS documentation record

Notes:
PPE – probable point of entry
mg/kg – milligrams per kilogram

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

No Level I concentrations have been documented; therefore, Level I concentrations were not evaluated. A Level I concentrations factor value of 0 is assigned.

Level I Concentration Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

There are no media-specific benchmarks for contaminated sediments, so the target wetlands subject to actual contamination are subject to Level II concentrations (Ref. 1, Section 2.5, 4.1.4.3, and 4.1.4.3.1).

Sensitive Environments
There are currently no known sensitive environments other than wetlands that are considered as subject to Level II concentrations (Ref. 8; Figure 8 of this HRS documentation record; Ref. 1, Section 4.1.4.3).

Wetlands
There are HRS-eligible wetlands within the zone of contamination, and the total wetland frontage subject to actual contamination is approximately 1261.6 feet or 0.23 miles. The wetland perimeter subject to actual contamination was calculated by measuring the perimeter of HRS-eligible wetlands found within a circle with a radius based on the PPE and sample SD-48 (Ref. 8; Ref. 11, p. 1; Figures 5 and 8 of this HRS documentation record).

Wetlands subject to Level II Concentrations			
Wetland	**Wetland Frontage/ Perimeter (miles)**	**Wetland Rating Value HRS Table 4-24**	**References**
Old Cahokia Creek wetlands	0.23 miles	25	Figure 8 of this HRS documentation record; Ref. 11

Wetlands Value (Ref. 1, Table 4-24): 25
Sum of Level II Sensitive Environments Value + Wetlands Value: 25

Level II Concentrations Factor Value: 25

4.1.4.3.1.3 Potential Contamination

Other wetlands located within the 15 mile target distance limit are present (Ref. 8; Figures 4 and 5 of this HRS documentation record) but were not scored in this HRS documentation record due to the evaluation of these potential targets was not expected to contribute significantly to the HRS site score.