HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD COVER SHEET

Name of Site: Caney Residential Yards

EPA ID No.: KSN000703396

Contact Persons

Documentation Record:

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Pathways, Components, or Threats Not Scored

The ground water, surface water, and air migration pathways, and the subsurface intrusion component of the soil exposure and subsurface intrusion pathway were not scored in this Hazard Ranking System (HRS) documentation record because the soil exposure component of the soil exposure and subsurface intrusion pathway is sufficient to qualify the site for the National Priorities List (NPL). The ground water, surface water, and air migration pathways, and the subsurface intrusion component of the soil exposure and subsurface intrusion pathway are of concern to the U.S. Environmental Protection Agency (EPA) and may be considered during a future evaluation. At the time of the listing, the site score is sufficient without the pathways and component mentioned above.

Ground Water Migration Pathway: Groundwater use within 4 miles of the site is limited. No domestic or public water supply wells have been identified within one mile of the site. Fifteen domestic wells were identified within four miles of the site. Due to the limited use of ground water and to the source of the city's drinking water being a surface water intake, this migration pathway is not anticipated to contribute significantly to the overall site score.

Surface Water Migration Pathway: The city of Caney receives water for its public water supply from an intake located on the Little Caney River. This intake is located 0.5 mile upstream of the Caney Residential Yards area of observed contamination. Evaluation of the pathway is not anticipated to impact the overall site score.

Subsurface Intrusion Component, Soil Exposure and Subsurface Intrusion Pathway: Metals were detected in soil samples collected from residential yards. These metals are not volatile and would not be expected to pose a threat via vapor intrusion.

Air Migration Pathway: No air samples are known to have been collected to characterize the air migration pathway. The smelters in Caney last operated in the mid-1920s. No tailings piles or uncovered waste piles currently exist.

HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD

Name of Site:	Caney Residential Yards
EPA Region:	7
Date Prepared:	November 2019
Street Address of Site*:	Intersection of North Main Street and East 3rd Avenue in Caney, Kansas
City, County, State, Zip:	Caney, Montgomery County, Kansas 67333
General Location in the State:	Southeast portion of state
Topographic Maps:	Caney Kansas, 1984; Copan Kansas 1982
Latitude:	37° 00′ 47.29″ North
Longitude:	95° 56′ 05.60″ West

The coordinates above for Caney Residential Yards site was determined from the approximate center of the area of observed contamination (AOC A) as shown on Figure 2-O1 of this HRS documentation record and Reference 5. This approximate center is at the intersection of North Main Street and East 3rd Avenue in Caney, Kansas.

* 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, and 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 the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

Pathway	**Pathway Score**
Ground Water Migration[1]	Not Scored
Surface Water Migration	Not Scored
Soil Exposure and Subsurface Intrusion	100.00
Air Migration	Not Scored
HRS SITE SCORE	**50.00**

[1] "Ground water" and "groundwater" are synonymous; the spelling is different due to "ground water" being codified as part of the HRS, while "groundwater" is the modern spelling.

WORKSHEET FOR COMPUTING HRS SITE SCORE

	S Pathway	**S^2 Pathway**
1. Ground Water Migration Pathway Score (S_{gw})	NS	NS
2. Surface Water Migration Pathway Score (S_{sw})	NS	NS
3. Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi})	100	10,000
4. Air Migration Pathway Score (S_a)	NS	NS
5. $S^2_{gw} + S^2_{sw} + S^2_{sessi} + S^2_a$		10,000
HRS Site Score Divide the value on line 5 by 4 and take the square root		**50.00**

Notes:

NS = Not scored

TABLE 5-1 – SOIL EXPOSURE COMPONENT SCORESHEET

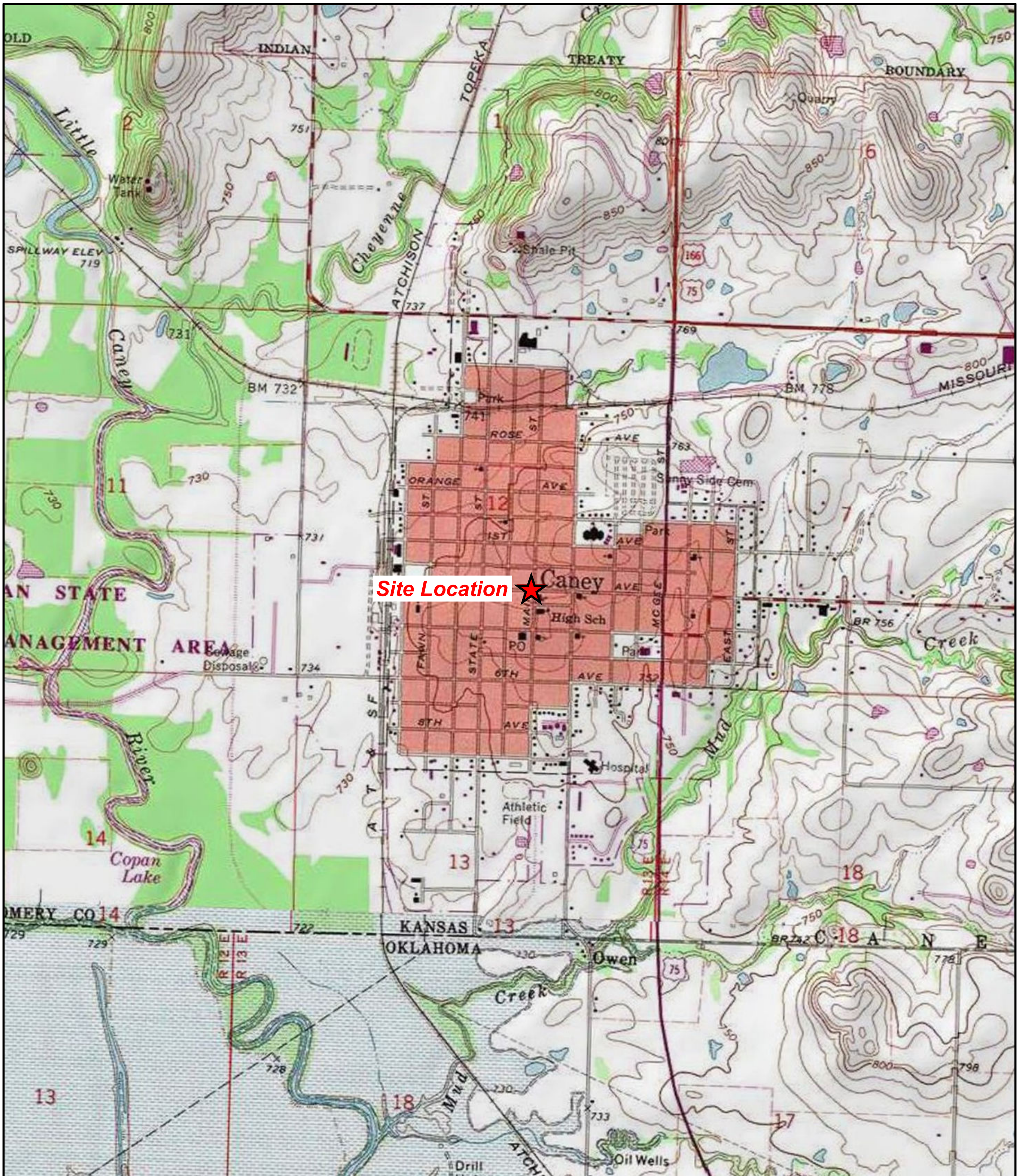
Factor Categories and Factors	Maximum value	Value assigned
Resident Population Threat		
Likelihood of Exposure:		
1. Likelihood of Exposure:	550	550
Waste Characteristics:		
2. Toxicity	(a)	10,000
3. Hazardous Waste Quantity	(a)	10
4. Waste Characteristics	100	18
Targets:		
5. Resident Individual	50	45
6. Resident Population:		
6a. Level I Concentrations	(b)	0
6b. Level II Concentrations	(b)	898.34
6c. Resident Population (lines 6a + 6b)	(b)	898.34
7. Workers	15	Not Evaluated
8. Resources	5	Not Scored
9. Terrestrial Sensitive Environments	(c)	Not Scored
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)	943.34
Resident Population Threat Score:		
11. Resident Population Threat (lines 1 x 4 x 10)	(b)	9,339,066
Nearby Population Threat		
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	Not Scored
13. Area of Contamination	100	Not Scored
14. Likelihood of Exposure	500	Not Scored
Waste Characteristics:		
15. Toxicity	(a)	Not Scored
16. Hazardous Waste Quantity	(a)	Not Scored
17. Waste Characteristics	100	Not Scored
Targets:		
18. Nearby Individual	1	Not Scored
19. Population Within 1 Mile	(b)	Not Scored
20. Targets (lines 18 + 19)	(b)	Not Scored
Nearby Population Threat Score:		
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)	Not Scored
Soil Exposure Component Score		
22. Soil Exposure Component Score[d] (S_{se}), (lines [11 + 21] / 82,500, subject to maximum of 100)	100	100.00

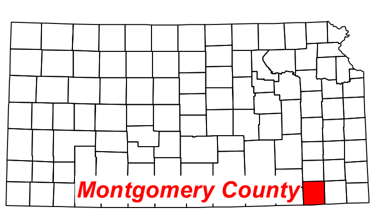
[a] Maximum value applies to waste characteristics category.

[b] Maximum value not applicable.

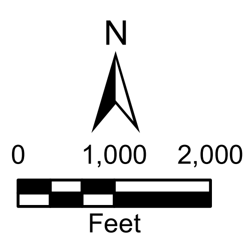
[c] No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to maximum of 60.

[d] Do not round to nearest integer.





Source: USGS Caney, KS 7.5 Minute Topo Quad, 1984;
USGS Copan, KS 7.5 Minute Topo Quad, 1982;
Ref. 5



Caney Residential Yards Site
Caney, Kansas

Figure 1
Site Location Map

TETRA TECH

Date: 9/27/19 | Drawn By: Nick Wiederholt | Project No: X903019F0092.000

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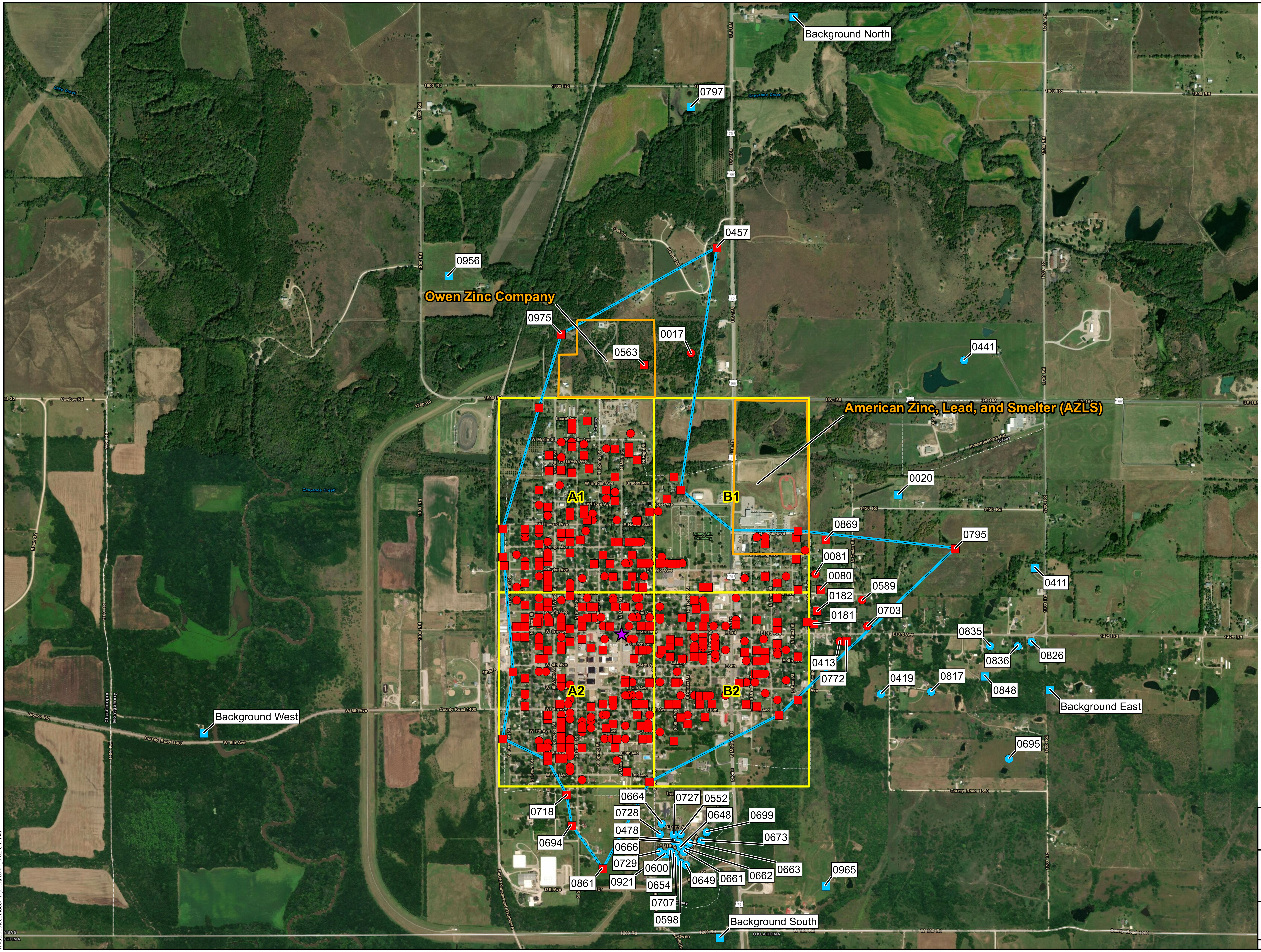

Legend

- Approximate Center of AOC-A
- Background Fixed Laboratory Sample Location
- Background XRF Screening Location
- Release Fixed Laboratory Sample Location
- Release XRF Screening Location
- AOC-A Boundary
- Former Smelter
- Map Index Boundary (A1, B1, A2, B2)

AOC Area of Contamination
XRF X-ray Fluorescence

N

0 1,000 2,000
Feet

Source: The source of this map image is Esri, used by EPA with Esri's permission.
Refs. 5; 16, p.28; 34; HRS Documentation Record Tables 1-6

Caney Residential Yards Site
Caney, Kansas

Figure 2-O1
Sample Location Map

TETRA TECH

Date: 9/17/19 Drawn By: Rose Micke Project No: X903019F0092.000


Legend
Background Fixed Laboratory Sample Location
Background XRF Screening Location
Release Fixed Laboratory Sample Location
Release XRF Screening Location
AOC-A Boundary
Former Smelter
Map Index Boundary (A1, B1, A2, B2)
AOC Area of Contamination
XRF X-ray Fluorescence
Area Locator
A1
B1
A2
B2
N
0 220 440
Feet
Source: The source of this map image is Esri, used by EPA with Esri's permission. Refs.16, p.28; 34; HRS Documentation Record Tables 1-6
Caney Residential Yards Site
Caney, Kansas
Figure 2-A1
Sample Location Map
TETRA TECH
Date: 7/26/19
Drawn By: Rose Micke
Project No: X903019F0092.000

Legend
Background Fixed Laboratory Sample Location
Background XRF Screening Location
Release Fixed Laboratory Sample Location
Release XRF Screening Location
AOC-A Boundary
Former Smelter
Map Index Boundary (A1, B1, A2, B2)
AOC Area of Contamination
XRF X-ray Fluorescence
American Zinc, Lead, and Smelting (AZLS)
B1
0895
0435
0247
0248
0526
0528
0522
0524
0056
0078
0072
0172
0187
0714
0186
0790
0201
0092
0093
0556
0555
0060
0700
0849
Area Locator
A1
B1
A2
B2
N
0 220 440
Feet
Source: The source of this map image is Esri, used by EPA with Esri's permission. Refs.16, p.28; 34; HRS Documentation Record Tables 1-6
Caney Residential Yards Site
Caney, Kansas
Figure 2-B1
Sample Location Map
TETRA TECH


Legend
Background Fixed Laboratory Sample Location
Background XRF Screening Location
Release Fixed Laboratory Sample Location
Release XRF Screening Location
AOC-A Boundary
Former Smelter
Map Index Boundary (A1, B1, A2, B2)
AOC Area of Contamination
XRF X-ray Fluorescence
Area Locator
A1
B1
A2
B2
N
0
220
440
Feet
Source: The source of this map image is Esri, used by EPA with Esri's permission. Refs.16, p.28; 34; HRS Documentation Record Tables 1-6
Caney Residential Yards Site
Caney, Kansas
Figure 2-A2
Sample Location Map
TETRA TECH
Date: 7/26/19
Drawn By: Rose Micke
Project No: X903019F0092.000
0271
0255
0228
0351
0216
0197
0254
0165
0352
0240
0735
0264
0220
0242
0958
0842
0306
0710
0789
0241
0909
0217
0112
0760
0813
0518
0470
0280
0829
0594
0218
0249
0232
0901
0899
0911
0233
0263
0223
0717
0846
0244
0369
0394
0533
0392
0231
0769
0237
0844
0396
0397
0437
0403
0906
0502
0360
0519
0915
0979
0711
0446
0493
0950
0310
0311
0321
0309
0365
0785
0786
0863
0905
0599
0638
0372
0313
0747
0353
0535
0734
0646
0322
0595
0374
0354
0560
0573
0355
0329
0802
0561
0515
0962
0327
0597
0679
0357
0475
0540
0333
0587
0549
0803
0368
0476
0579
0334
0383
0331
0537
0702
0918
0839
0607
0379
0832
0754
0538
0363
0812
0853
0418
0380
0984
0387
0606
0687
0757
0651
0484
0486
0840
0973
0841
0854
0685
0491
0480
0448
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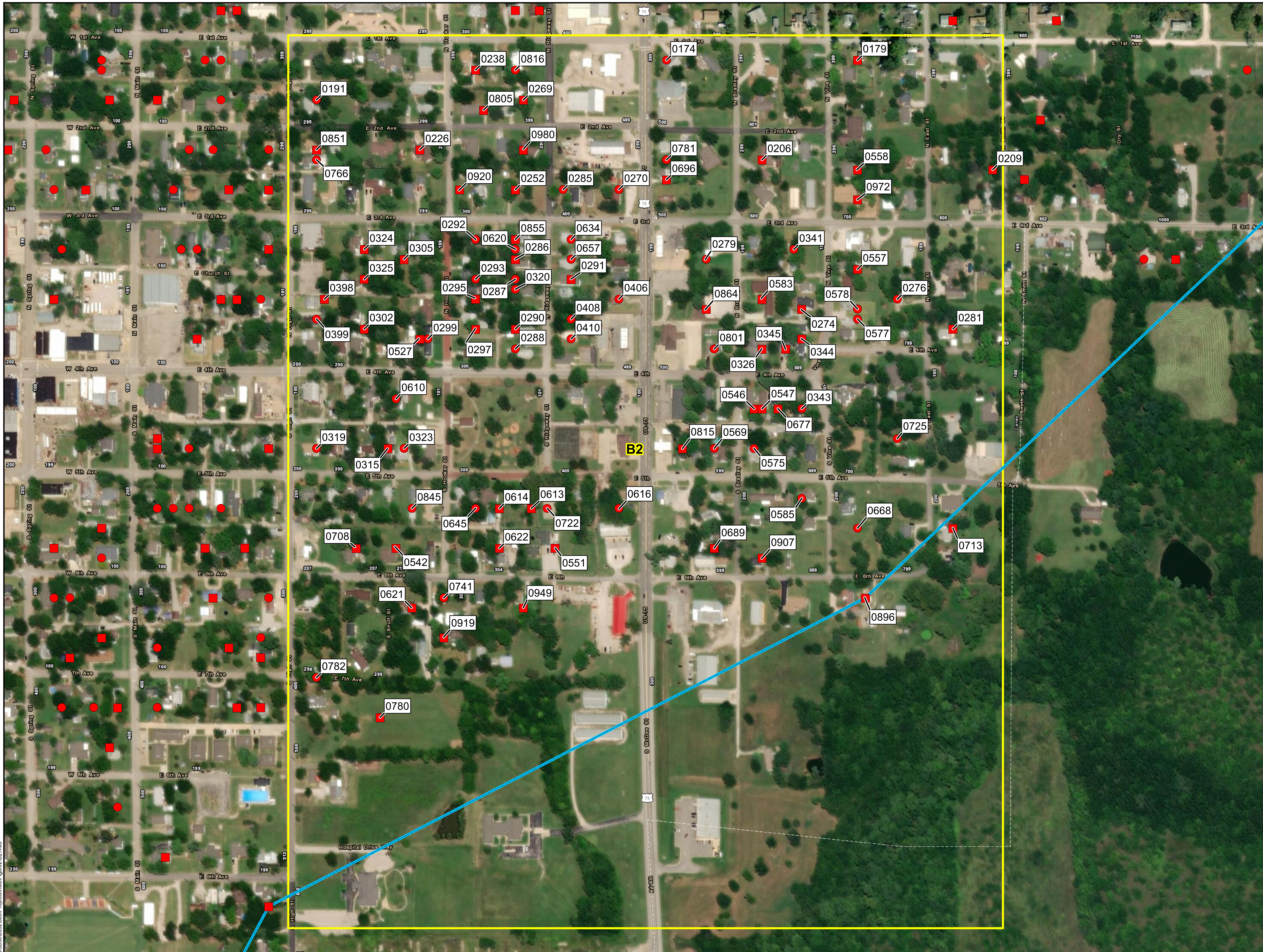
0482
0977
0743
0624



Legend

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- Release XRF Screening Location
- AOC-A Boundary
- Former Smelter
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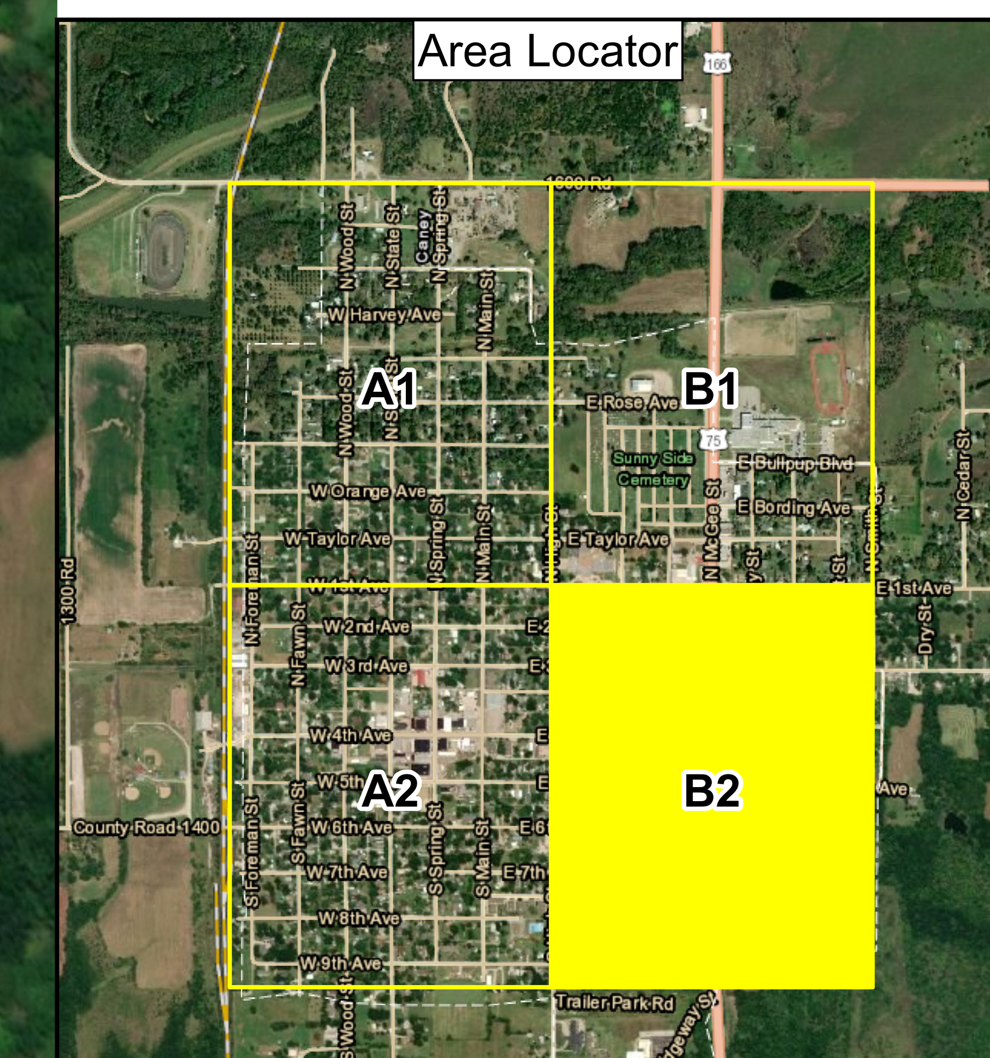
AOC Area of Contamination

XRF X-ray Fluorescence



N

0 220 440

Feet

Source: The source of this map image is Esri, used by EPA with Esri's permission. Refs.16, p.28; 34; HRS Documentation Record Tables 1-6

Caney Residential Yards Site
Caney, Kansas

Figure 2-B2
Sample Location Map

TETRA TECH

Date: 9/17/19 Drawn By: Rose Micke Project No: X903019F0092.000

REFERENCES

1. U.S. Environmental Protection Agency (EPA). Hazard Ranking System, Title 40 *Code of Federal Regulations* (CFR) Part 300, 55 Federal Register (FR) 51532. December 14, 1990. A complete copy is also available at: https://www.epa.gov/superfund/hrs-toolbox#HRS Rule. 136 Pages.

2. EPA. Addition of a Subsurface Intrusion Component to the Hazard Ranking System, Final Rule. 40 CFR Part 300, 82 FR 2760. January 9, 2017. Available on-line at: https://www.gpo.gov/fdsys/pkg/FR-2017-01-09/pdf/2016-30640.pdf. 48 Pages.

3. EPA. Superfund Chemical Data Matrix. Online query of SCDM. Query accessed on August 21, 2019. 3 Pages. The online Superfund Chemical Data Matrix is available at https://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query

4. U.S. Department of the Interior, U.S. Geological Survey (USGS). Caney, Kansas. 7.5 Minute Series (Topographic). Scale, 1:24,000. 1984. 1 Map. Note: Modified by Tetra Tech, Inc. (Tetra Tech) to show the approximate site location.

5. Tetra Tech. Project Note to File with Attachment. Subject: Latitude and Longitude for Caney Residential Yards site. January 19, 2018. 1 Page.

6. U.S. Environmental Protection Agency Region 7. Fact Sheet. Frequently Asked Questions Caney Residential Yards Superfund Site, Caney, Montgomery County, Kansas. September 2016. 2 Pages.

7. Kansas Department of Health and Environment, Bureau of Environmental Remediation/Remedial Section. A Short History of the Zinc Smelting Industry in Kansas. December 28, 2006. 16 Pages.

8. Kansas Department of Health and Environment, Bureau of Environmental Remediation. Preliminary Assessment. Former American Zinc, Lead and Smelting Company, Caney, Kansas. EPA Identification Number KSD984971986. September 1990. 65 Pages.

9. Kansas Department of Health and Environment, Bureau of Environmental Remediation. Screening Site Investigation. Former American Zinc, Lead and Smelting Company Site, Caney, Kansas. EPA Identification Number KSD984971986. September 1991. 120 Pages.

10. Kansas Department of Health and Environment, Division of Environment. Integrated Assessment Report. Caney Residential Yards Site, Caney, Kansas. State ID C3-063-73212. March 2015. 636 Pages.

11. Tetra Tech, Inc. Removal Assessment. Caney Residential Yards Site, Caney Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0099. January 28, 2016. 552 Pages.

12. Tetra Tech, Inc. Quality Assurance Project Plan for a Removal Assessment, Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0099. April 22, 2015. 19 Pages.

13. Tetra Tech Inc. Quality Assurance Project Plan, Addendum 1, Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0099. May 13, 2015. 5 Pages.

14. Tetra Tech, Inc. Quality Assurance Project Plan for a Site Inspection, Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0180. May, 22, 2017. 24 Pages.

15. Tetra Tech, Inc. Quality Assurance Project Plan, Addendum 1, Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0180. June, 13, 2017. 5 Pages.

16. Tetra Tech, Inc. Site Inspection, Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Order 0180. December 8, 2017. 99 Pages.

17. U.S. Geological Survey. Average concentration of elements in Montgomery County, Kansas. Mineral Resources On-line Spatial Data from the National Geochemical Survey Database. USGS Open File Report 2004-1001. Available on-line at: https://mrdata.usgs.gov/geochem/county.php?place=f20125&el=Pb&rf=central. Accessed February 19, 2018. 3 Pages.

18. Kansas Department of Health and Environment, Bureau of Environmental Remediation, Pre-Remedial Section. Preliminary Assessment. Former Owens Zinc Company, Caney, Kansas. EPA Identification Number KSD984971911. September 1990. 62 Pages.

19. U.S. Environmental Protection Agency. SW-846 Test Method 6200: Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment. Test Method available on-line at: https://www.epa.gov/sites/production/files/2015-12/documents/6200.pdf. 32 Pages.

20. U.S. Environmental Protection Agency, Region 7. Transmittal of Sample Analysis Results for ASR #: 7016. Project ID: MBDB7A3, Project Description: Caney Residential Yards sampling. January 20, 2016. 37 Pages.

21. Sanborn Map Company. Insurance Maps of Caney, Montgomery County, Kansas. Sheets 1 and 4. April 1905. 2 Pages.

22. Sanborn Map Company. Insurance Maps of Caney, Montgomery County, Kansas. Sheets 1, 10, and 11. January 1912. 3 Pages.

23. Sanborn Map Company. Insurance Maps of Caney, Montgomery County, Kansas. Sheets 1, 12, and 14. April 1917. 3 Pages.

24. Sanborn Map Company. Insurance Maps of Caney, Montgomery County, Kansas. Sheets 1 and 13. August 1927. 2 Pages.

25. Kansas Department of Health and Environment, Bureau of Environmental Remediation, Remedial Section, Site Assessment Unit. Expanded Site Inspection (ESI) and Preliminary Removal Evaluation/Removal Preliminary Assessment. Former Owen Zinc Site. Caney, Montgomery County, Kansas. EPA Identification Number KSD984971911. January 2001. 156 Pages.

26. U.S. Department of Agriculture Soil Conservation Service. Soil Survey of Montgomery County, Kansas. December 1980. 50 Pages.

27. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 6845. September 26, 2017. 7 Pages.

28. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7016. September 22, 2017. 12 Pages.

29. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7278. September 22, 2017. 5 Pages.

30. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7310. September 22, 2017. 8 Pages.

31. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7390. September 22, 2017. 8 Pages.

32. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7516. September 26, 2017. 31 Pages.

33. Tetra Tech, Inc. Removal Assessment and Removal Action Report. Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Orders 0099 and 0170. February 6, 2019. 1,263 Pages.

34. Tetra Tech, Inc. Removal Assessment and Removal Action Report, Appendix G Property Screening Forms. Caney Residential Yards Site, Caney, Kansas. Prepared for EPA Region 7 under contract EP-S7-13-06, Task Orders 0099 and 0170. February 6, 2019. 975 Pages.

35. U.S. Environmental Protection Agency. Signed Property Access Agreement Forms, Caney Residential Yards Site, Removal Site Evaluation. May 2015 through June 2017. 702 Pages.

36. U.S. Census Bureau. Quick Facts: Montgomery County, Kansas; United States. Families and Living Arrangements, Population Estimates, July 1, 2018. Accessed on July 3, 2019. Available on-line at: https://www.census.gov/quickfacts/fact/table/montgomerycountykansas/PST045218. 1 Page.

37. U.S. Environmental protection Agency, Office of Emergency and Remedial Response. Using Qualified Data to Document an Observed Release and Observed Contamination. Quick Reference Fact Sheet EPA-540-F-94-028. November 1996. 18 Pages.

38. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7218. April 30, 2019. 8 Pages.

39. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7470. April 30 2019. 12 Pages.

40. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7562. April 30 2019. 10 Pages.

41. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7733. April 30 2019. 5 Pages.

42. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7810. April 30 2019. 7 Pages.

43. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 7888. April 30 2019. 3 Pages.

44. U.S. Environmental Protection Agency, Region 7. HRS Analysis Results Supplement, ASR 8001. April 30 2019. 7 Pages.

45. Kansas Department of Health and Environment, Division of Environment. Integrated Assessment Report. Caney Smelter Complaint, Caney, Kansas. State ID C3-063-72810. March 2015. 154 Pages.

SITE SUMMARY

The Caney Residential Yards site comprises a commingled area of observed contamination (AOC) consisting of smelter-related cadmium, lead and zinc contamination, in surface soils on residential properties throughout the town of Caney, Montgomery County, Kansas (see Figure 1). The area of lead, cadmium and zinc contaminated soil came to be, at least in part, by the past operation of local smelters. Two former lead and zinc smelters operated in Caney, Kansas, prior to 1931—the Owen Zinc Smelter and the American Zinc, Lead, and Smelting Company (AZLSC) (Refs. 7, pp. 6, 9, 10, 11, 12; 8, pp. 6, 8; 10, pp. 4, 5, 18; 23, pp. 1 -3). The two former smelters, about 0.5 miles apart, each had at least one roasting furnace with brick stacks plus one 105- or 125-foot-tall concrete stack (Fig. 2-O1; Ref. 23, pp. 1-3). The former smelters were both on the northern side of the current developed area in the city; reported wind directions were generally from the south and the north across the town of Caney (Fig. 2-O1; Ref. 11, p. 23). Over time, lead particles and other heavy metal particles associated with the smelters' operations became airborne and settled onto area properties. It is also likely that yards became contaminated as residents transported waste materials from the smelters, in the form of cinders or other material, to homes and other locations for use as driveway paving, construction backfill and landscape material (Ref. 6, p. 1). In southeastern Kansas many municipalities used smelter waste and slag from abandoned smelter sites within the city as base material and fill for streets and sidewalks (Ref. 45, p. 8). Preliminary assessments (PAs) in 1990 and 1991 identified contamination at the former smelter facilities related to historical operations (Refs. 8, pp. 17, 18, 59-65; 10, pp. 5, 6; 18, pp. 9, 10, 12, 13, 57, 59). Subsequent investigations confirmed contamination at the smelter locations and at surrounding residential properties. Caney covers portions of Sections 1, 12, and 13 in Township 35 South, Range 13 East, and in portions of Sections 6, 7, and 8 in Township 35 South, Range 13 West (Refs. 4; 11, p. 6). Investigative efforts at the Caney Residential Yards site initially focused on properties nearest the two former smelters—the Owen Zinc smelter and the AZLSC smelter (Ref. 11, p. 11). The soil exposure component of the soil exposure and subsurface intrusion pathway was evaluated, as documented in Sections 5.0 and 5.0.1 of this HRS documentation record.

OPERATIONAL HISTORY OF LEAD AND ZINC SMELTERS IN KANSAS

Information on the historic smelting operations in Kansas was prepared by the Kansas Department of Health and Environment (KDHE) (Ref. 7) and is summarized as follows. The Tri-State Mining District (southeast Kansas, southwest Missouri, and northeast Oklahoma) was at one time the world's richest producer of lead and zinc ores (Ref. 7, p. 1). Southeast Kansas offered access to large quantities of fuels (coal and natural gas) (Ref. 7, pp. 1, 6, 7). The process of refining lead and zinc ores (smelting) required considerable fuel resources; therefore, southeast Kansas became a popular location for smelters. The first smelter in southeast Kansas was constructed in 1870 (Ref. 7, p. 1). In 1895, a large reserve of natural gas was discovered in Allen County, Kansas. The discovery of natural gas lead to expansion of smelting operations in southeast Kansas, including development of smelters in Caney (Refs. 7, pp. 6-7; 8, pp. 5, 6). The smelting process involved heating crushed zinc ore (known as sphalerite or blackjack, principally containing zinc sulfide [ZnS] with impurities such as iron, lead, and cadmium) in kilns for a period of time to oxidize the ore and drive off the sulfur (Ref. 7, pp. 3, 4). The roasted ore would be mixed with coke coal and loaded into clay cylinders called retorts where the mixture was superheated to 1975 degrees centigrade where the zinc would vaporize, move to a condenser to cool to liquid zinc (Ref. 7, p. 4). The smelting process generated a large amount of pollution including sulfur and nitrogen oxide and a large amount of soot. The soot was generally contaminated with elevated levels of arsenic, lead, cadmium, and zinc (Ref. 7, p. 5). In addition to the airborne pollution, the smelting operations left large volumes of solid waste including cinders, broken retorts, discarded building materials, and impure smelter slag (Ref. 7, pp. 5, 6). The following subsections describe the history at the two former lead and zinc smelters that operated in Caney, Kansas, prior to 1931.

American Zinc, Lead, and Smelting Company (AZLSC): In 1904, the Caney Zinc and Smelting Company constructed a smelter southeast of the present-day intersection of Highway 75 and 166 on the northeastern side of Caney (Refs. 9, pp. 6, 7; 21, pp. 1, 2). AZLSC purchased the smelter in 1907 from the Caney Zinc and Smelting Company and continued its operation (Refs. 9, p. 12). Adjacent facilities, the Cheyenne Glass Company and American Vitrified Brick Company, supplied retorts and fire bricks for smelting operations (Refs. 9, p. 12; 22, pp. 1 - 3). According to Sanborn Fire insurance maps, in 1917 the facility consisted of 10 retort furnaces, each with two stacks which extended 10 feet above the roof of the buildings, and 6 roasting furnaces with two 118 feet tall brick stacks and one 125 feet tall concrete stack (Ref. 23, p. 2). Smelting ceased in 1920, and roasting kilns and retort furnaces were demolished in 1922. The Weir Smelting Company purchased the property in 1927; however, no further operation of the smelter is believed to have occurred, and in 1931, Weir Smelting Company went bankrupt and the property was sold (Ref. 9, p. 12). The Caney School District purchased portions of the property and constructed the Caney Valley High School in 1972, directly southwest of the former retort smelting houses (Ref. 9, pp. 5, 8-10, 12).

Owen Zinc Company Smelter: The Owen Zinc Company smelter was constructed in 1915 at the location of the former Caney Brick Plant, in the northwestern portion of Caney, Kansas (Ref. 10, pp. 4, 18, 33). The smelter operated one ore roaster and three furnace buildings (Ref. 10, pp. 4, 96). According to Sanborn Fire insurance maps, in 1917 the facility consisted of 3 retort furnaces buildings, each with two furnaces and 4 brick stacks, and 1 roasting furnace with a 105-foot-high concrete stack (Ref. 23, pp. 1, 3). AZLSC leased the facility in 1915 and continued operation until 1918. In 1918, the smelter was purchased by Weir Smelting Company, which continued its operation (Ref. 10, p. 96). Development of a new smelting method, electrolytic smelting, combined with the Great Depression led to closure of the smelter in 1931 (Refs. 10, p. 4, 33; 7, p. 11).

PREVIOUS INVESTIGATIONS

Environmental investigations identified heavy metals contamination at the former smelter operations and surrounding areas. The following subsections describe previous investigations related to smelting operations.

American Zinc, Lead, and Smelting Company Investigation: The AZLSC investigation project is identified by State of Kansas Project Code C3-063-00190 and CERCLA ID KSD984971986. Investigations began at the former smelter in 1990, with a PA conducted by KDHE. The purpose of the PA was to determine if surface or subsurface contamination was present as a result of previous smelting operations. Notable concentrations of lead (629.230 - 4,555.832 milligrams per kilogram [mg/kg]), cadmium (37.187 - 309. 371 mg/kg), and zinc (4,222.19 - 42,440.00 mg/kg) were identified in three soil samples collected at the former smelter (Ref. 8, pp. 10 - 12, 60, 62, 64). The PA concluded that additional information would be required to accurately address the human health hazards (Ref. 8, pp. 18, 19).

KDHE conducted a Screening Site Investigation in 1991 to collect additional samples and further evaluate the area. Notable concentrations of lead (4,665.68 mg/kg), cadmium (154.065 mg/kg), and zinc (14,711.2 mg/kg) were identified in soil samples BB2 and BB4 at the former smelter (Ref. 9, pp. 17, 18, 21, 76, 77). Sampling confirmed noteworthy heavy metals contamination in the areas where smelter wastes mixed with soil and demolition debris. The Screening Site Investigation recommended (1) restricting access to exposed smelter wastes at portions of the former smelter property, (2) referring facility contamination information to health agencies, (3) identifying potentially responsible parties (PRP), and (4) performing further facility investigations (Ref. 9, p. 32).

Blue Tee Corporation (Blue Tee) was identified as a successor company for American Zinc, Lead, and Smelting Company, the owner/operator for the smelter facility (Ref. 10, p. 6). On September 25, 1995, EPA and Blue Tee entered into an Administrative Order on Consent (Ref. 11, pp 7, 8). The Administrative Order on Consent required a removal response action to include installation of a leachate collection system and groundwater barrier (Ref. 11, p. 8). Contaminated soils and smelter wastes were consolidated in an on-property repository and capped with an engineered low-permeability cover. In addition, contaminated soils were excavated from residential properties bordering the facility (Ref. 11, p. 8). Blue Tee completed the removal response action in April 2000 (Ref. 11, p. 8).

Owen Zinc Smelter Investigation: The Owen Zinc Smelter investigation project is identified by Kansas State Project Code C3-063-00193 and CERCLA ID KSD984971911. Investigations began at the former smelter in 1991, with a PA conducted by KDHE. The purpose of the PA was to determine if surface or subsurface contamination was present as a result of previous smelting operations (Ref. 18, p. 5). Notable concentrations of cadmium, lead, and zinc were identified in soils at the facility in the early 1990s (Ref. 10, pp. 5, 6, 95, 96, 97). During the PA, two soil samples and a background soil sample were collected on the property (Ref. 18, pp. 9, 10, 12). Lead, cadmium and zinc were found in the soil samples at maximum concentrations of 4,845.866, 186.326, and 32,210 mg/kg respectively (Ref. 18, pp. 13, 57, 59).

Subsequent investigations by KDHE included an Expanded Site Inspection/Preliminary Removal Site Evaluation in 2001 (Ref. 10, p. 5; 25). Investigation activities confirmed presence of elevated concentrations of lead, zinc, and cadmium at the facility (Ref. 25, pp. 18, 19). Maximum concentrations of lead cadmium and zinc reported in soil samples was 4,102.7, 748.8, and 86,104.4 mg/kg respectively (Ref. 25, pp. 9, 10, 53, 56).

In September 2001 Blue Tee was identified as a successor company for American Zinc, Lead, and Smelting Company, the Owen Zinc smelter operator (Ref. 10, pp. 6, 33). On April 23, 2004, KDHE and Blue Tee entered into a consent order (Ref. 10, pp. 6, 93, 113). The consent order required a Corrective Action (CA) to prevent continued release or threat of release of hazardous substances (Ref. 10, pp. 6, 98, 99). The CA, completed in August 2004, included excavating contaminated soils and smelter waste and consolidating them in an on-property waste cell (Ref. 10, pp. 6, 292, 293). The waste cell was capped, and a perimeter fence was added. An Environmental Use Control and Long-Term Care Agreement were recorded at the Montgomery County Register of Deeds office in February 2011 (Ref. 10, pp. 6, 292, 293; 16, pp. 8, 9). Blue Tee continues to conduct annual inspections to ensure integrity of the CA (Ref. 11, p. 8).

Caney Smelter (Waste) Complaint Investigation: The Caney Smelter (Waste) Complaint investigation project is identified by State Project Code C3-063-72810 and CERCLA ID KSN000706287 (Refs. 10, pp. 5, 18; 45, p. 1). The investigation, east of the AZLSC facility and located along the southern side of the same rail spur bisecting the neighboring AZLSC facility, was referred to the KDHE Site Assessment program in April 2010 after a resident of Caney informed KDHE of a potential area of smelter waste located on the northeastern edge of Caney (Refs. 10, pp. 5, 18; 45, pp. 4, 99). According to the informant, a smelter/brick facility that was also involved in glass glazing was located three-quarter miles east along the former railroad tracks north of the Caney High School (Ref. 45, pp. 99, 116, 117). That complaint investigation took place at the former location of the Cheyenne Window Glass Company and the Fredonia Window Glass Company (Ref. 45, p. 4). Very little historical information was available regarding the operational history of the former glass plants (Ref. 45, pp. 4, 5). Across the rail spur to the north of the former glassworks is the location of the former American Vitrified Brick Company works (Ref. 45, pp. 4-5). No documentation of the former glassworks property also being used for making bricks or smelting metals has been identified (Ref. 45, p. 100). As of 2011, foundations and structures, likely from the former glass company, were still present, and the property was littered with bricks and glass fragments (Ref. 45, p. 99). The investigated area included two residences at the time of the investigation in 2015 (Ref. 45, p. 5).

KDHE performed a Site Evaluation (SE) in 2011 (Ref. 45, p. 5). The SE identified elevated concentrations of lead, cadmium, and chromium in investigated soils (Ref. 45, p. 5). Elevated heavy metal concentrations were confirmed in soils, and a recommendation was offered to consider a removal action (Refs. 10, p. 18; 11, p. 9; 45, p. 9). KDHE concluded the high zinc concentrations near a rail spur to the AZLSC property may be indicative of waste from smelter operations (Ref. 45, pp. 10, 18).

Caney Residential Yards Site: In 2011 and 2012, KDHE was contacted by three residents in Caney who lived near the former Owen Zinc smelter who requested sampling at their properties after one owner noticed smelter waste on his property (Ref. 10, pp. 6, 7, 18). From June 2012 to July 2013, KDHE conducted Integrated Site Evaluations (ISE) at three residential properties in Caney. The ISEs were to determine if historical smelting practices at the Owen Zinc Smelter site had impacted surface soils at those residences. It is believed that these three properties were portions of what would become the Caney Residential Yards site as identified by EPA ID KSN000703396 (Refs. 10, pp. 1, 4, 9, 10; 11, p. 9) and scored in this HRS documentation record.

Residential Sampling: From June 2 to 5, 2014, ENTACT, LLC (ENTACT) conducted residential property sampling in Caney, Kansas, on behalf of Blue Tee. Sampling activities focused on 14 residential properties directly south of the Owen Zinc Smelter site. Sampling results indicated lead concentrations exceeding 400 mg/kg at five residences on either North Wood Street or North State Street. ENTACT estimated 1,650 cubic yards of affected soil at six properties (Refs. 10, pp. 557 – 580, 597; 11, p. 10).

EPA Removal Assessment Sampling: EPA removal assessment sampling began in May 2015 and concluded in September 2018 (Refs. 11, p. 11; 33, p. 12). Activities focused on sampling and screening surface and subsurface soils at residences near the two former smelters (Ref. 11, p. 11). In 2015 residential properties were targeted for sampling based on prevailing wind patterns and proximity to former smelting operations included the most likely impacted properties (Ref. 11, p. 11). During 2015 removal assessment activities, surface soil samples were collected from 279 properties (including four railroad easements) (Ref. 11, p. 14). Of those, 73 (26 percent) contained lead concentrations greater than the EPA removal action level (RAL) of 400 parts per million in a cell/area other than the drip zone or road easement (Ref. 11, p. 14). Between August 2016 and September 2018 additional samples from 713 properties were collected and processed (Ref. 33, p. 18). Of those, 248 (34.8 percent) contained lead concentrations greater than 400 parts per million in a cell/area other than the drip zone and 127 (17.8 percent) contained lead concentrations greater than 400 parts per million in a drip zone only (Ref. 33, p. 18). Removal actions at contaminated properties began in November 2016 and concluded in August 2018 (Ref. 33, p. 14). During the removal action, lead contaminated soil (exceeding the RAL of 400 ppm in at least one cell/area) was excavated at 309 properties (Ref. 33, p. 15).

This documentation record presents the results of the removal assessments conducted at the site. For HRS scoring purposes, the Caney Residential Yards site consists of properties where observed contamination has been documented by laboratory data or supported by X-ray Fluorescence (XRF) data (see section 5.1.1) and where removal actions have not occurred and properties where removal actions did occur, but the action did not address all soil which contains smelter related lead, cadmium and zinc contamination at concentrations below the RAL and above the observed contamination criteria of the HRS rule (Ref. 1, Table 2-3).

5.0 SOIL EXPOSURE AND SUBSURFACE INTRUSION PATHWAY

SOIL EXPOSURE COMPONENT

5.0.1 GENERAL CONSIDERATIONS

The Caney Residential Yards site consists of an area of cadmium, lead and zinc-contaminated surface soils meeting observed contamination criteria on residential properties throughout the town of Caney, Montgomery County, Kansas (see Figure 1 of this HRS documentation record). The area of observed contamination (AOC A) came to be, at least in part, by historical operations at two local smelters, the Owen Zinc Smelter and AZLSC (Refs. 7, pp. 6, 9, 10, 11, 12; 8, pp. 6, 8; 10, pp. 4, 5, 18; 23, pp. 1-3). During operations, lead particles and other heavy metal particles associated with the smelter's operations became airborne and settled onto area properties. It is also likely that yards became contaminated as residents transported waste materials from the smelters, in the form of cinders or other material, to homes and other locations for use as driveway and sidewalk paving, construction backfill and landscape material as was a common practice at the time (Refs. 6, p. 1; 45, p. 8).

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Letter by which this area is to be identified: A

Name of area: Residential Area Contaminated Soil

Location and description of area (with reference to a map of the site):

As shown on Figure 2-O1 of this HRS documentation record AOC A includes a multitude of residential property in town of Caney, Kansas. The area to the north of the city was not sampled extensively because the focus was on residential properties. The area is bounded by samples analyzed by a fixed laboratory meeting the observed contamination criteria of three times or more above the background concentrations for cadmium, lead, and/or zinc (Ref. 1, Table 2-3). According to EPA and KDHE, lead contamination of residential yards at the site is a result of local smelting operations that date back to about a century ago (Ref. 6, p. 1; 10, pp. 117, 118). The two former smelters, about 0.5 miles apart, each had at least one roasting furnace with brick stacks plus one 105- or 125-foot-tall concrete stack (Ref. 23, pp. 1-3; Fig. 2-O1). The former smelters were both on the northern side of the current developed area in the city; reported wind directions were generally from the south and north (Fig. 2-O1; Ref. 11, p. 23). The smelting process in Kansas generated a large amount of soot, which was generally contaminated with elevated levels of arsenic, lead, cadmium, and zinc (Ref. 7, p. 5). Over time, lead particles in the soot from those smelters and related operations became airborne and settled onto area properties. Also, it is likely that yards became contaminated as residents transported waste from the smelters, in the form of cinders and other material, to homes and other locations for use as driveway paving, construction backfill, and landscaping material (Ref. 6, p. 1).

This area of observed contamination includes sampling locations with observed contamination from the former smelters and the area lying between those locations, unless available information, such as analytical data, or field screening data, indicates otherwise (Ref. 1, Section 5.0.1). The inference of contaminated properties is supported by data (samples) collected from residential properties and analyzed by XRF spectrometer via EPA SW-846 Method 6200 (Ref. 19) as described below. The primary analyte of concern at the site driving removal program decisions is lead, and XRF data was reported only for lead. During the removal assessment (RA), samples collected and submitted to the EPA Region 7 laboratory were analyzed for cadmium, lead, and zinc by inductively coupled plasma atomic emission spectroscopy (ICP-AES) (Refs. 11, p. 122; 33, pp. 12, 13, 315, 383, 450, 517, 660, 746, 815, 896, 971, 1023). All samples collected as part of the RA have followed the procedures specified by the site-specific Quality Assurance Project Plan (QAPP) and addendum 1 to the QAPP (Refs. 11, p. 11; 12; 13; 33, p. 12). EPA initiated an SI in 2017. The intent of the SI was to collect background samples that were located outside potential influences of past activities at the two smelter sites in Caney, AZLSC and Owen Zinc, and to verify previously collected XRF results with fixed laboratory analyzed samples (Ref. 16, pp. 5, 13, 14, 28). This sampling was in accord with the site specific QAPP and QAPP addendum for the SI (Refs. 14; 15; 16, p. 13). For the SI, samples were analyzed for the full target analyte list of metals by ICP-AES methods (Refs. 15, p. 2; 16, p. 85).

- Background Concentrations:

The soil survey for Montgomery County, Kansas indicates that the town of Caney and land to the east is within the Bates-Dennis-Collinsville association (Ref. 26, p. 47). The association is defined as gently sloping to moderately steep, well drained and moderately well drained, loamy and silty soils on uplands (Ref. 26, p. 8). The association is about 35 percent Bates soils, 25 percent Dennis soils, 15 percent Collinsville soils, and 25 percent minor soils (Ref. 26, p. 8). The Bates, Dennis, and Collinsville soils are described as very dark brown to very dark grayish brown loam, silt loam or fine sandy loam soils with surface layers from 8 to 11 inches thick (Ref. 26, pp. 8, 36-38). To the west, north and south of Caney are soils in the Verdigras-Osage-Lanton association (Ref 26, p. 47). The association is defined as nearly level, moderately well drained to poorly drained, silty and clayey soils on bottom land (Ref. 26, p. 9). These bottomlands are associated with the Little Caney River to the west and Cheyenne Creek to the north (Refs 4; 26, p. 47). The association is about 42 percent Verdigris soils, 24 percent Osage soils, 22 percent Lanton soils, and 12 percent minor soils (Ref. 26, p. 9). The Verdigris, Osage, and Lanton soils are described as very dark brown, very dark gray to very dark grayish brown silt loam, silty clay and silty clay loam with surface layers from 6 to 12 inches thick (Ref. 26, pp. 9, 40, 42, 44).

According to the U.S. Geological Survey (USGS), the average concentrations of lead and zinc in Montgomery County, Kansas, are 23.226 parts per million and 69.898 ppm, respectively (Ref. 17, p. 1). In nine samples collected across the county, lead concentrations ranged from 5.085 to 34.525 ppm and zinc ranged from 34.102 to 144.328 ppm (Ref. 17, pp. 1, 2). USGS did not publish county averages for cadmium.

EPA sampling of residential properties in and around Caney were analyzed via field portable x-ray fluorescence spectrometry with laboratory confirmation of approximately 10 percent (%) of the samples for the determination of lead in soils. The USGS average concentrations of lead were used as background for XRF data comparison (Ref. 17, p. 1; see Table 1 of this HRS documentation record). The objective of the removal program sampling was to determine whether lead concentrations in residential yard exceeded removal action criteria of 400 parts per million (ppm) lead (Refs. 12, p. 8; 11, pp. 14, 16, 17). Initially the removal program focused efforts on residents based on prevailing wind patterns and proximity to former smelting operations to include the most likely impacted properties (Refs. 11, pp. 11, 23; 12, pp. 13, 19). A wind rose map is included on Figure 2 of the 2016 removal assessment report, and it indicated winds are primarily out of the south and north (Ref. 11, p. 23). Sampling was conducted as summarized below.

Unless otherwise specified, soil screening activities followed guidelines established in the Superfund Lead-Contaminated Residential Sites Handbook (Ref. 11, p. 11). In accordance with the site specific QAPP, all soil samples were dried, sieved, and screened for lead by use of an XRF spectrometer in accordance with EPA Method 6200 (Ref. 11, pp. 11, 12; 12, p. 8). A subset (10 percent) of the screened surface and deeper soil samples were sent to the EPA Region 7 laboratory for confirmation analysis for lead, cadmium, and zinc in soil by inductively coupled plasma atomic emission spectroscopy (ICP-AES) (Refs. 11, pp. 12, 122; 12, pp. 8, 14). The purpose of these confirmation samples was to determine XRF screening precision and accuracy. Laboratory data and XRF screening results for lead were compared to determine a site-specific data correlation. For this project, a regression coefficient (r^2) of at least 0.7 was required for the XRF results to be considered reliable for decision making regarding removal (Refs. 12, p. 14; 19, p. 15).

A signed access agreement from each property owner was obtained prior to initiation of sampling activities. After receiving access permission from the property owner, the property was divided into distinct areas or cells for screening purposes. While the maximum size of a cell is ideally 100 by 100 feet, actual sizes of cells were determined in the field based on site features. A cell extended from the circumference defined by the outer edge of the drip zone around the building or house in all directions 100 feet or to the property line (or inner edge of the road easement, as applicable), whichever distance is shorter. Additional areas screened outside of the cells included: the drip zone; fine-grained material if used for driveways, sidewalks, or under carports; road easements; vegetable gardens; and children's play areas at least 25 by 25 feet (Refs. 11, pp. 11, 12; 33, pp. 12, 13). "Cells" (numbered in Table 1 and discussions below) were generally yards (i.e., of conditions not meeting the additional specialized area descriptions, such as play areas or gardens). Not all residential properties contained all features, and properties typically had between two and five cells (e.g., C-1 through C-5). It should be noted that the drip zone and road easement screening and samples were not used to establish background and will not be used below to establish observed contamination at the properties. A composite sample consisting of nine aliquots, each from 0 to 2 inches bgs (to get below the root zone), was collected in each cell/area by use of a disposable stainless steel spoon or hand trowel, and placed in a labeled, sealed plastic bag. This procedure differs from EPA Region 7 SOP 4230.19, which specifies collection of samples from the top 1 inch of soil (Ref. 11, p. 11).

All soil and gravel samples were transported back to a sample preparation facility with their corresponding screening forms. At the sample preparation facility, each sample was transferred to a clean, dedicated paper tray. Because moisture content of a soil or gravel sample can adversely affect accuracy of XRF spectrometer readings for lead, the samples were allowed to completely air dry or were placed in ovens to heat and dry the samples. If used, ovens were not operated above a temperature of 350 degrees Fahrenheit (°F). Once dried, samples were homogenized, passed through a number 10 sieve (2-millimeter), and then screened for lead by use of an XRF spectrometer. XRF screening of soils followed EPA Method 6200. Three separate XRF readings were taken from each sample, and then the average of the three readings was calculated and recorded on the screening form (Refs. 11, pp. 11, 12; 33, pp. 12, 13). The following codes were used when referring to a sample's location:

C	Cell	LS	Landscape
DW	Driveway	DZ	Drip zone
GA	Garden	RE	Road easement
PA	Play Area		

After the samples were screening using the XRF, a subset of the processed samples were submitted to the EPA Region 7 laboratory for conventional fixed laboratory analysis. The initial phase of field work for the RA was conducted from late May to early December 2015. During that time, multiple cells/areas from 279 properties were screened with the XRF (Ref. 11, p. 14). As specified in the site-specific QAPP, XRF screened samples were selected at an approximate 10% frequency for laboratory confirmation analysis. A total of 173 soil samples (including 16 duplicate samples) were submitted to the EPA Region 7 laboratory under ASRs #6845 and #7016 for confirmation analysis. Confirmation samples were selected to represent a wide range of XRF lead concentrations (17 to 2,387 mg/kg). Comparison of XRF screening data and laboratory confirmation results was evaluated via least squares linear regression. Linear regression is used to model the relationship between two data sets, in this case XRF screening data and laboratory data from confirmation samples. Because the data spanned more than one order of magnitude, XRF screening values and laboratory data from confirmation analysis were log-transformed to standardize variance. Next, the least squares linear regression analysis was performed to calculate a coefficient of determination (r^2). Method 6200 requires an r^2 value equal to or greater than 0.7 for acceptable screening level data, while an r^2 value equal to or greater than 0.9 is statistically equivalent to a 99% confidence level (Ref. 19, p. 15). An r^2 value of 0.8709 was calculated for the XRF unit used in 2015 (Ref. 11, p. 16). This r^2 value indicates XRF #1543 data are acceptable screening level data. Linear regression data from the soil samples are in Appendix E of the RA report (Ref. 11, pp. 16, 545 -552). The r^2 value for samples collected from August 8, 2016 to September 4, 2018 was 0.9215 indicating the data as acceptable screening level data with a high confidence level (Ref. 33, pp. 12, 13). Linear regression data from the soil samples collected in 2016 through 2018 are presented in Appendix D of reference 33 (Ref. 33, pp. 239 – 256).

Initial sampling in 2015 focused on properties near the former smelters (Ref. 11, p. 11). Of the properties screened 48.8 percent of the properties contained lead concentrations in all cells/areas below the 400 mg/kg action level established by EPA for potential removal actions (Ref. 11, p. 14). Of these, one property, Property 20, contained lead concentrations that were about 2 times the published USGS county average of 23.226 parts per million lead in all cells/areas sampled (Refs. 11, pp. 90, 132; 17, p. 1; 34, p. 19). As shown of Figure 2-O1 of this documentation record, property 20, is east of the AZLSC property. In the four cells sampled, lead averaged 44.25 ppm and was not detected in the sample collected from the property's driveway (Ref. 34, p. 19).

As time progressed and properties were screened farther from the former smelter sites, many more properties were screened where lead concentrations were more in line with published average concentrations in the county.

Table 1 below presents another 27 properties screened from October 2016 to June 2017 whose lead concentrations were in line with county averages. The locations for these properties are presented on Figure 2-O1 of this documentation record. Also presented in Table 1 below are the average XRF derived lead concentrations by cell/area for all properties presented. Cell/area averages ranged from 21.3 ppm for play areas to 26.8 for samples collected from cell-5. At all properties, a sample was collected from both cell 1 and cell 2. These averaged 25.7 and 23.9 ppm, respectively. As mentioned above, according to the USGS, the average concentration of lead in Montgomery County, Kansas, is 23.226 parts per million (Ref. 17, p. 1). In nine samples collected across the county, lead concentrations ranged from 5.085 to 34.525 (Ref. 17, pp. 1, 2).

Table 1: 2015-2017 Background XRF Lead Concentrations

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0020	06/16/15	10/18/15	**49**	47	39	42		< 13						34, p. 19
0419	10/03/16	10/12/16	26	32	31	20		< 20				34		34, p. 414
0441	10/18/16	11/02/16	24	22	19	23	30				25	21		34, p. 436
0478	11/10/16	11/22/16	26	20						19		39	30	34, p. 472
0552	03/14/17	03/15/17	29	20				34			37	20	32	34, p. 545
0598	03/16/17	NR	33	18							18	16	29	34, p. 591
0600	04/18/17	04/26/17	22	29	25					21	21	26	32	34, p. 593
0648	04/18/17	05/10/17	26	23	34							22	64	34, p. 639
0649	04/20/17	05/11/17	18	16	20						< 11.9	88	41	34, p. 640
0654	04/20/17	05/11/17	21	27							19	13	34	34, p. 645
0661	04/24/17	05/11/17	24	25	35						29	22	31	34, p. 652
0662	04/20/17	05/11/17	25	19	26				24			15	45	34, p. 653
0663	01/20/17	05/11/17	21	28	13							14	54	34, p. 654
0664	04/24/17	05/11/17	21	16								17	24	34, p. 655
0666	04/25/17	05/11/17	24	23								16	25	34, p. 657
0673	04/25/17	05/11/17	18	30				< 14.7				15	32	34, p. 664
0695	04/26/17	05/12/17	25	24	23	26		< 12.5		24		22	21	34, p. 684
0699	04/25/17	05/16/17	26	25	25	29						21	67	34, p. 688
0707	04/18/17	05/23/17	24	26	23						23	20	28	34, p. 696
0727	04/26/17	05/18/17	16	< 14.0				< 17.6			< 14.0	< 13.2	24	34, p. 715
0728	04/27/17	05/18/17	20	24				44		20		45	**454**	34, p. 716; 33, p. 1236
0729	04/27/17	05/18/17	39	20				< 17.8			17	24	269	34, p. 717
0797	05/09/17	05/31/17	24	31	26	28	17	28	28	19	34	33	84	34, p. 786
0817	05/25/17	06/14/17	25	15	28	23	22	< 14.7						34, p. 805
0826	05/10/17	06/01/17	35	28	19					25	22	43	26	34, p. 814
0835	05/22/17	06/01/17	28	21	20	20	41	28				31		34, p. 824
0836	05/29/17	06/06/17	24	22	26	35	24				23	21		34, p. 825
Average by cell/area			**25.7**	**23.9**	**25.4**	**27.3**	**26.8**	**22.2**	**26**	**21.3**	**22.6**	**26.0**	**68.9**	

Notes:
Bolded XRF result and a shaded table cell indicates a cell/area or portion of a property where a removal action has occurred (Ref. 33, pp. 1225-1241).
< Less than XRF instruments reporting level

C	cell	NR	Not reported
DW	Driveway	PA	Play area
DZ	Drip zone	RE	Road easement
GA	Garden area	XRF	X-ray fluorescence spectrometer
LS	Landscape feature	ppm	Parts per million

During the SI conducted in 2017, background soil samples were collected, processed, and screened in the same fashion as samples collected during the RA (Ref. 16, p. 13). XRF screening indicated background north contained 17 ppm lead, background south contained 27 ppm lead, background east contained 39 ppm lead and background west contained 15 ppm lead (Ref. 16, pp. 30 – 33).

As mentioned above, approximately 10% of the screened cells/areas were submitted for fixed laboratory analysis to aid in determining the precision and accuracy of the XRF readings. Fixed laboratory analysis included analysis for lead plus cadmium and zinc by ICP-AES. Confirmation samples were selected to represent a wide range of XRF lead concentrations. Background lead, zinc and cadmium concentrations from properties 20 (collected in June 2015) and 411 (collected in October 2016) were selected as representative from samples collected and submitted for fixed lab analysis from the RA (Refs. 11, p. 90; 33, pp. 357-360; 34, pp. 19, 406). As shown in Tables 2 and 3 below, the fixed laboratory confirmation samples from these properties contained lead and zinc concentrations in line with the uppermost USGS average levels for the county (Ref 17, pp. 1-2). These residential soil locations are both east of Caney, as shown on Figure 2-O1, and side gradient of predominant wind direction (Ref. 11, p. 23).

During a 2017 site inspection (SI), four additional background locations were sampled that were located north, south, east, and west of the town of Caney. The purpose of collecting additional soil samples during the SI was to identify typical background concentrations of cadmium, lead, and zinc in areas not impacted by former smelting processes at the Owen Zinc Company smelter and the AZLSC smelter. Four background samples were collected within presumably uncontaminated areas in the four cardinal directions on the outskirts of Caney. The samples were collected from undisturbed soil in wooded areas (Ref. 16, p. 13). Background west and south would have been collected from the Verdigris-Osage-Lanton soil association and background north and east were collected from the Bates-Dennis-Collinsville association (Refs. 16, p. 28; 26, p. 47). A composite sample consisting of nine aliquots, each collected within 0 to 2 inches bgs, was collected at each sample location and placed in a labeled, sealed plastic bag (Ref. 16, p. 13). All samples were transported to the sample preparation facility and placed in clean, dedicated aluminum pie pans. As with all other samples collected, the samples were dried completely, homogenized, passed through a sieve, screened for lead by use of an XRF spectrometer, and placed in labeled 8-ounce jars (Ref. 16, p. 13). All soil samples were submitted to the EPA Region 7 laboratory for confirmation analyses for Target Analyte List (TAL) metals (Ref. 16, p. 13). Analysis was by ICP-AES (Ref. 16, p. 85). Locations of the samples submitted to the laboratory are illustrated on Figure 2 of the SI report (Ref. 16, p. 28) and on Figure 2-O1 of this documentation record. Sample locations are summarized in Table 2.

Removal assessment activities continued between August 2016 and September 2018 (Ref 33, p. 12). Additional parcels (0797, 0848, 0921, 0956, 0965) were sampled in May 2017, November 2017, and February, March and August 2018 where XRF concentrations indicated lead concentrations that were in line with county average concentrations (Refs. 17, pp. 1-2; 34, pp. 786, 837, 905, 939, 948). As shown on Figure 2-O1 of this documentation record, these locations are located north of Caney (0797), east of Caney (0848) south of Caney (0921 and 0965), and northwest of Caney (0956). As shown in Table 2 below six cells/areas from property 0797, one cell from property 0848, one cell (two samples) from property 0921, one cell from property 0956 and eight cells (two samples from one cell) from property 0965 were submitted for confirmation analysis. These samples were analyzed for cadmium, lead and zinc by ICP-AES (Ref. 33, pp. 383, 746, 815, 896, 1023).

Table 2: Background Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
6845-31	0020, C-2	Soil	0 – 2	06/18/2015	11, pp. 11, 55, 90, 275, 547; 34, p. 19
7278-23	0411, C-1	Soil	0 – 2	10/31/2016	33, pp. 12, 330, 357, 381; 34, p. 406
7278-23-FD	0411, C-1	Soil	0 – 2	10/31/2016	33, pp. 12, 330, 358, 381; 34, p. 406
7278-24	0411, C-2	Soil	0 – 2	10/31/2016	33, pp. 12, 330, 359, 381; 34, p. 406
7278-25	0411, C-3	Soil	0 – 2	10/31/2016	33, pp. 12, 330, 360, 381; 34, p. 406
7516-1	Bkgd N	Soil	0 – 2	07/18/2017	16, pp. 13, 14, 28, 30
7516-2	Bkgd S	Soil	0 – 2	07/18/2017	16, pp. 13, 14, 28, 31
7516-3	Bkgd E	Soil	0 – 2	07/18/2017	16, pp. 13, 14, 28, 32
7516-4	Bkgd W	Soil	0 – 2	07/18/2017	16, pp. 13, 14, 28, 33
7562-37	0797, C3	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 722, 744; 34, p. 786
7562-38	0797, C4	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 723, 744; 34, p. 786
7562-39	0797, C5	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 725, 744; 34, p. 786
7562-39-FD	0797, C5	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 724, 744; 34, p. 786
7562-40	0797, DW	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 726, 745; 34, p. 786

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7562-42	0797, GA	Soil	0 – 2	05/31/2017	33, pp. 12, 680, 728, 745; 34, p. 786
7733-17	0848, C4	Soil	0 – 2	11/28/2017	33, pp. 12, 762, 782, 813; 34, p. 837
7810-24	0921, C-3	Soil	0 – 2	2/28/2018	33, pp. 12, 829, 856, 894; 34, p. 905
7810-24-FD	0921, C-3	Soil	0 – 2	2/28/2018	33, pp. 12, 829, 857, 894; 34, p. 905
7810-32	0956, C-2	Soil	0 – 2	3/09/2018	33, pp. 12, 829, 865, 894; 34, p. 939
8001-101-FD	0965 – C1	Soil	0 – 2	8/10/2018	33, pp. 12, 976, 999, 1022; 34, p. 948
8001-102	0965 – C2	Soil	0 – 2	8/10/2018	33, pp. 12, 976, 1000, 1022; 34, p. 948
8001-103	0965 – C3	Soil	0 – 2	8/10/2018	33, pp. 12, 976, 1001, 1022; 34, p. 948
8001-104	0965 – C4	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1002, 1022; 34, p. 948
8001-105	0965 – C5	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1003, 1022; 34, p. 948
8001-106	0965 – C6	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1004, 1022; 34, p. 948
8001-107	0965 – C7	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1005, 1022; 34, p. 948
8001-107-FD	0965 – C7	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1006, 1022; 34, p. 948
8001-108	0965 - DW	Soil	0 – 2	8/10/2018	33, pp. 12, 977, 1007, 1022; 34, p. 948

Notes:

Bkgd	Background	N	North
C	Cell	S	South
DW	Driveway	E	East
FD	Field Duplicate	W	West
GA	Garden Area		

Table 3: Analytical Results for Background Soil Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
6845-31	Cadmium Lead Zinc	0.78 38.1 196 J[1]/ (294)	0.43 0.86 5.1	11, pp. 118 - 120, 122, 132; 27, pp. 1, 4; 37
7278-23	Cadmium Lead Zinc	0.87 U 66.4 199	0.44 0.87 5.2	33, pp. 379 - 381, 383, 390; 29, pp. 1, 3;
7278-23-FD	Cadmium Lead Zinc	0.82 U 50.8 185	0.71 1.4 8.5	33, pp. 379 - 381, 383, 390; 29, pp. 1, 3;
7278-24	Cadmium Lead Zinc	0.71 U 47.2 192	0.41 0.83 5.0	33, pp. 379 - 381, 383, 391; 29, pp. 1, 3, 4;
7278-25	Cadmium Lead Zinc	0.52 U 34.1 135	0.46 0.93 5.6	33, pp. 379 - 381, 383, 391; 29, pp. 1, 4;
7516-1	Cadmium Lead Zinc	1.1 U 15.0 193 J[2] / (193)	1.1 5.3 5.3	16, pp. 82, 83, 85 – 87; 32, p. 1;
7516-2	Cadmium Lead Zinc	1.1 U 23.7 122	1.1 5.6 5.6	16, pp. 82, 83, 85 – 87; 32, pp. 1, 2;
7516-3	Cadmium Lead Zinc	1.1 U 39.6 134	1.1 5.3 5.3	16, pp. 82, 83, 85 – 87; 32, pp. 1, 2;
7516-4	Cadmium Lead Zinc	1.1 U 11.3 63.3	1.1 5.6 5.6	16, pp. 82, 83, 85 – 87; 32, pp. 1, 3;
7562-37	Cadmium Lead Zinc	1.1 U 14.5 95.2	1.1 5.3 5.3	33, pp. 742 - 744, 757; 40, pp. 1, 7
7562-38	Cadmium Lead Zinc	1.0 U 18.0 129	1.0 5.2 5.2	33, pp. 742 – 744, 757; 40, pp. 1, 7
7562-39	Cadmium Lead Zinc	1.1 U 10.4 77.8	1.12 5.3 5.3	33, pp. 742 – 744, 757; 40, pp. 1, 7
7562-39-FD	Cadmium Lead Zinc	1.1 U 10.6 77.6	1.0 5.2 5.2	33, pp. 742 – 744, 757; 40, pp. 1, 7
7562-40	Cadmium Lead Zinc	1.0 U 15.4 120	1.0 5.2 5.2	33, pp. 742, 743, 745, 758; 40, pp. 1, 7, 8
7562-42	Cadmium Lead Zinc	1.0 U 16.3 123	1.0 5.1 5.1	33, pp. 742, 743, 745, 758; 40, pp. 1, 8

Table 3: Analytical Results for Background Soil Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7733-17	Cadmium Lead Zinc	0.60 39.2 142	0.5 1.0 6.0	33, pp. 811, 813, 820; 41, pp. 1, 2, 3
7810-24	Cadmium Lead Zinc	0.81 20.7 94.5	0.48 0.96 5.8	33, pp. 892, 894, 903; 42, pp. 1, 3
7810-24-FD	Cadmium Lead Zinc	0.85 21.6 95.4	0.49 0.98 5.9	33, pp. 892, 894, 903; 42, pp. 1, 3
7810-32	Cadmium Lead Zinc	1.0 57.3 177	0.51 1.0 6.1	33, pp. 892, 894, 905; 42, pp. 1, 4
8001-101-FD	Cadmium Lead Zinc	1.0 U 34.6 125	1.0 5.0 5.0	33, pp. 1020 – 1022, 1030; 44, pp. 1, 4
8001-102	Cadmium Lead Zinc	1.0 U 24.9 93.1	1.0 5.0 5.0	33, pp. 1020 – 1022, 1030; 44, pp. 1, 4
8001-103	Cadmium Lead Zinc	1.0 U 32.7 118	1.0 5.0 5.0	33, pp. 1020 – 1022, 1030; 44, pp. 1, 4
8001-104	Cadmium Lead Zinc	1.0 U 41.4 201	1.0 5.0 5.0	33, pp. 1020 – 1022, 1031; 44, pp. 1, 4
8001-105	Cadmium Lead Zinc	1.0 U 46.8 106	1.0 5.0 5.0	33, pp. 1020 – 1022, 1031; 44, pp. 1, 5
8001-106	Cadmium Lead Zinc	1.0 U 42.5 98.8	1.0 5.0 5.0	33, pp. 1020 – 1022, 1031; 44, pp. 1, 5
8001-107	Cadmium Lead Zinc	1.0 U 37.8 166	1.0 5.0 5.0	33, pp. 1020 – 1022, 1031; 44, pp. 1, 5
8001-107-FD	Cadmium Lead Zinc	1.0 U 34.8 163	1.0 5.0 5.0	33, pp. 1020 – 1022, 1032; 44, pp. 1, 5
8001-108	Cadmium Lead Zinc	1.0 U 16.6 18.3	1.0 5.0 5.0	33, pp. 1020 – 1022, 1032; 44, pp. 1, 5

Notes:

*The reporting limit in this table takes into account any dilution factor, volume adjustment, and percent solids for the sample and is sometimes called the sample quantitation limit or SQL (Refs. 27, p. 1; 29, p. 1; 32, p. 1; 40, p. 1; 41, p. 1; 42, p. 1; 44, p. 1).

mg/kg Milligrams per kilogram
FD Field Duplicate

J[1] The identification of the analyte is acceptable; the reported value is an estimate. The quantitation is an estimate due to low recovery of this analyte in a laboratory matrix spike. The actual concentration for this analyte may be higher than the reported value (Ref. 11, p. 122). The value presented parenthetically is the concentration obtained by applying EPA fact sheet *Using Qualified Data to Document an Observed Release and Observed Contamination* (November 1996) (Ref. 37, pp. 8, 18).

J[2] The identification of the analyte is acceptable; the reported value is an estimate. The quantitation is an estimate due to high recovery of this analyte in a laboratory matrix spike. The actual concentration for this analyte may be lower than the reported value (Ref. 16, pp 85, 86). The value presented parenthetically is the concentration obtained by applying EPA fact sheet *Using Qualified Data to Document an Observed Release and Observed Contamination* (November 1996) (Ref. 37, pp. 8, 18).

U The analyte was not detected at or above the reporting limit (Refs. 16, p. 82; 33, pp. 312, 743, 1021).

Eleven properties presented above were sampled to represent background concentrations of cadmium, lead and zinc. Samples from multiple cells/areas from residential properties 0411, 0797, 0921, and 0965 were submitted for analysis. Of the 11 locations outside of the influence of the Owen Zinc and AZLSC smelters and considered representative of background concentrations a total of 28 samples were submitted for laboratory analysis (including 5 duplicate samples). The highest concentration detected for each analyte was used as the background level. Background concentrations for samples analyzed by fixed laboratory are 294 mg/kg (adjusted concentration) for zinc, 1.0 mg/kg for cadmium and 66.4 mg/kg for lead (see Table 3). For the XRF lead data, multiple readings were recorded from cells/areas at 27 properties. The highest lead reading from all the cells/areas measured (49 ppm from cell 1 at property 20) will be used as background for XRF data comparison. It should be noted that the drip zone readings were not used to establish background and will not be used below to establish observed contamination at the properties. Road easement samples are not used to establish background concentration, because of the higher potential of lead contamination due to vehicle emissions. However, there is the possibility that waste smelter material such as slag was used as road bed and thus higher metals concentrations could still be site-related (Refs. 6, p. 1; 45, p. 8).

- Contaminated Samples

Table 4 below lists samples collected from residential properties throughout Caney that were analyzed by a fixed laboratory. All the samples contain a concentration of lead, zinc, and/or cadmium at a concentration that is at least three times higher than the most elevated background concentration for the elements. As described above, highest background concentrations for samples analyzed by fixed laboratory are 294 mg/kg for zinc, 1.0 mg/kg for cadmium and 66.4 mg/kg for lead. The locations of these samples are shown on property screening forms (Ref. 34), the locations of the properties are shown on Figures 2-O1, 2-A1, 2-B1, 2-A2 and 2-B2 of the documentation record. The property numbers in the table below can be cross referenced from the field sheet to the screening forms to show the location of the sample. Most field sheets will list the property number and cell/area location under the field "Location Desc". Others may list the street address with the cell/area location but will indicate the property number under the "Sample Comments" field of the field sheet. The property screening forms (Ref. 34) contain a sketch of the property which indicates where field screening XRF samples, and subsequent fixed lab confirmation samples were collected with respect to the property. Comparison of the property locations shown on Figures 2-O1, 2-A1, 2-B1, 2-A2 and 2-B2 with the USDA soil association map (Ref, 26, p. 47) indicates all release samples were collected from either the Bates-Dennis-Collinsville association or the Verdigras-Osage-Lanton association. None of the samples below are from cells/areas where a Removal action has occurred (Ref. 33, pp. 1225 – 1263).

Area Letter: A

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
6845-20	0072 C-3	Soil	0 – 2	06/18/2015	11, pp. 11, 54, 77; 34, p. 72
6845-21	0060 C-2	Soil	0 – 2	06/18/2015	11, pp. 11, 54, 78; 34, p. 60
6845-24	0040 C-2	Soil	0 – 2	06/18/2015	11, pp. 11, 55, 81; 34, p. 40
6845-26	0001 C-3	Soil	0 – 2	05/28/2015	11, pp. 11, 55, 83; 34, p. 1
6845-29	0012 C-2	Soil	0 – 2	05/29/2015	11, pp. 11, 55, 87; 34, p. 12
6845-29-FD					11, pp. 11, 55, 88; 34, p. 12
6845-30	0013 C-3	Soil	0 – 2	06/03/2015	11, pp. 11, 55, 89; 34, p. 13
6845-33	0032 C-4	Soil	0 – 2	06/04/2015	11, pp. 11, 55, 92; 34, p. 33
6845-33-FD					11, pp. 11, 55, 93; 34, p. 33
6845-34	0033, C-4	Soil	0 – 2	06/04/2015	11, pp. 11, 55, 94; 34, p. 34
6845-35	0048 C-2	Soil	0 – 2	06/03/2015	11, pp. 11, 55, 95; 34, p. 48
6845-36	0050 RE	Soil	0 – 2	06/04/2015	11, pp. 11, 55, 96; 34, p. 50

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
6845-38	0056, C-4	Soil	0 – 2	06/04/2015	11, pp. 11, 55, 99; 34, p. 56
6845-40	0080 C-5	Soil	0 – 2	06/23/2015	11, pp. 11, 55, 101; 34, p. 80
6845-47	0027 C-2	Soil	0 – 2	06/04/2015	11, pp. 11, 56, 108; 34, p. 26
7016-1	0101, C-1	Soil	0 – 2	10/29/2015	11, pp. 11, 141, 146; 34, p. 101
7016-1-FD					11, pp. 11, 141, 147; 34, p. 101
7016-2	0104, C-4	Soil	0 – 2	10/29/2015	11, pp. 11, 141, 148; 20, p. 3; 34, p. 104
7016-4	0107, C2	Soil	0 – 2	10/29/2015	11, pp. 11, 141, 150; 20, p. 3; 34, p. 107
7016-5	0108, C2	Soil	0 – 2	10/29/2015	11, pp. 11, 141, 151; 20, p. 3; 34, p. 108
7016-6	0109, C3	Soil	0 – 2	11/02/2015	11, pp. 11, 141, 152; 20, p. 3; 34, p. 109
7016-9	0113, C1	Soil	0 – 2	10/29/2015	11, pp. 11, 141, 155; 20, p. 3; 34, p. 113
7016-11	0116, C4	Soil	0 – 2	11/03/2015	11, pp. 11, 141, 157; 20, p. 3; 34, p. 116
7016-11-FD					11, pp. 11, 141, 158; 20, p. 3; 34, p. 116
7016-13	0118, GA	Soil	0 – 2	10/30/2015	11, pp. 11, 141, 160; 20, p. 3; 34, p. 118
7016-14	0118, RE	Soil	0 – 2	10/30/2015	11, pp. 11, 141, 161; 20, p. 3; 34, p. 118
7016-17	0122, C2	Soil	0 – 2	11/03/2015	11, pp. 11, 141, 164; 20, p. 3; 34, p. 122
7016-20	0133, C1	Soil	0 – 2	11/04/2015	11, pp. 11, 141, 167; 20, p. 3; 34, p. 133
7016-30	0148, C2	Soil	0 – 2	11/05/2015	11, pp. 11, 142, 178; 20, p. 3; 34, p. 148
7016-33	0153, C2	Soil	0 – 2	11/10/2015	11, pp. 11, 142, 181; 20, p. 3; 34, p. 153
7016-35	0161, RE	Soil	0 – 2	11/10/2015	11, pp. 11, 142, 183; 20, p. 3; 34, p. 161
7016-35-FD					11, pp. 11, 142, 184; 20, p. 3; 34, p. 161
7016-37	0163, LS	Soil	0 – 2	11/09/2015	11, pp. 11, 142, 186; 20, p. 3; 34, p. 163
7016-38	0164, C2	Soil	0 – 2	11/09/2015	11, pp. 11, 142, 187; 20, p. 3; 34, p. 164
7016-41	0169, C1	Soil	0 – 2	11/10/2015	11, pp. 11, 142, 190; 20, p. 4; 34, p. 169
7016-41-FD					11, pp. 11, 142, 191; 20, p. 4; 34, p. 169
7016-43	0170, C2	Soil	0 – 2	11/19/2015	11, pp. 11, 142, 193; 20, p. 4; 34, p. 170
7016-45	0173, C1	Soil	0 – 2	11/09/2015	11, pp. 11, 143, 195; 20, p. 4; 34, p. 173
7016-47	0179, C1	Soil	0 – 2	11/10/2015	11, pp. 11, 143, 197; 20, p. 4; 34, p. 179
7016-48	0181, C1	Soil	0 – 2	11/10/2015	11, pp. 11, 143, 198; 20, p. 4; 34, p. 181
7016-51	0182, C1	Soil	0 – 2	11/10/2015	11, pp. 11, 143, 201; 20, p. 4; 34, p. 182
7016-53	0187, C3	Soil	0 – 2	11/11/5015	11, pp. 11, 143, 203; 20, p. 4; 34, p. 186
7016-53-FD					11, pp. 11, 143, 204; 20, p. 4; 34, p. 186
7016-55	0190, G2	Soil	0 – 2	11/10/2015	11, pp. 11, 143, 206; 20, p. 4; 34, p. 189
7016-59	0201, C1	Soil	0 – 2	11/13/2015	11, pp. 11, 143, 210; 20, p. 4; 34, p. 199

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7016-61	0202, C2	Soil	0 – 2	11/11/2015	11, pp. 11, 143; 20, p. 4; 34, p. 200
7016-61-FD					11, pp. 11, 143, 212; 20, p. 4; 34, p. 200
7016-62	0203, C2	Soil	0 – 2	11/11/2015	11, pp. 11, 143, 213; 20, p. 4; 34, p. 201
7016-63	0206, C2	Soil	0 – 2	11/12/2015	11, pp. 11, 143, 214; 20, p. 4; 34, p. 204
7016-64	0209, DW	Soil	0 – 2	11/17/2015	11, pp. 11, 143, 215; 20, p. 4; 34, p. 207
7016-65	0212, C1	Soil	0 – 2	11/12/2015	11, pp. 11, 143, 216; 20, p. 4; 34, p. 210
7016-67	0215, C1	Soil	0 – 2	11/12/2015	11, pp. 11, 144, 218; 20, p. 4; 34, p. 213
7016-69	0218, C1	Soil	0 – 2	11/13/2015	11, pp. 11, 144, 220; 20, p. 4; 34, p. 215
7016-70	0220, C1	Soil	0 – 2	11/16/2015	11, pp. 11, 144, 221; 20, p. 4; 34, p. 218
7016-72	0226, C1	Soil	0 – 2	11/16/2015	11, pp. 11, 144, 223; 20, p. 4; 34, p. 224
7016-72-FD					11, pp. 11, 144, 224; 20, p. 4; 34, p. 224
7016-75	0233, C2	Soil	0 – 2	11/18/2015	11, pp. 11, 144, 227; 20, p. 4; 34, p. 231
7016-77	0237, C1	Soil	0 – 2	11/17/2015	11, pp. 11, 144, 229; 20, p. 4; 34, p. 235
7016-79	0238, C1	Soil	0 – 2	11/18/2015	11, pp. 11, 144, 231; 20, p. 4; 34, p. 236
7016-80	0240, C1	Soil	0 – 2	11/18/2015	11, pp. 11, 144, 232; 20, p. 4; 34, p. 238
7016-81	0241, C2	Soil	0 – 2	11/17/2015	11, pp. 11, 144, 233; 20, p. 5; 34, p. 239
7016-83	0244, C1	Soil	0 – 2	11/17/2015	11, pp. 11, 144, 235; 20, p. 5; 34, p. 242
7016-83-FD					11, pp. 11, 144, 236; 20, p. 5; 34, p. 242
7016-86	0247, C1	Soil	0 – 2	11/18/2015	11, pp. 11, 144, 239; 20, p. 5; 34, p. 245
7016-88	0249, C2	Soil	0 – 2	11/18/2015	11, pp. 11, 145, 241; 20, p. 5; 34, p. 247
7016-90	0252, C1	Soil	0 – 2	11/19/2015	11, pp. 11, 145, 243; 20, p. 5; 34, p. 250
7016-92	0258, C2	Soil	0 – 2	11/20/2015	11, pp. 11, 145, 246; 20, p. 5; 34, p. 255
7016-94	0259, C1	Soil	0 – 2	11/19/2015	11, pp. 11, 145, 248; 20, p. 5; 34, p. 256
7016-96	0263, C1	Soil	0 – 2	12/01/2015	11, pp. 11, 145, 250; 20, p. 5; 34, p. 260
7016-97	0264, C1	Soil	0 – 2	11/20/2015	11, pp. 11, 145, 251; 20, p. 5; 34, p. 261
7016-99	0269, C2	Soil	0 – 2	11/19/2015	11, pp. 11, 145, 253; 20, p. 5; 34, p. 266
7016-102	0271, RE	Soil	0 – 2	11/20/2015	11, pp. 11, 145, 257; 20, p. 5; 34, p. 268
7016-105	0274, C2	Soil	0 – 2	12/01/2015	11, pp. 11, 145, 260; 20, p. 5; 34, p. 271
7016-106	0281, C2	Soil	0 – 2	12/02/2015	11, pp. 11, 145, 472, 552; 20, p. 5; 34, p. 278
7218-2	0286, C2	Soil	0 – 2	08/18/2016	33, pp. 12, 258, 262, 313; 34, p. 283
7218-4	0290, C2	Soil	0 – 2	08/11/2016	33, pp. 12, 258, 264, 313; 34, p. 287
7218-6	0291, C1	Soil	0 – 2	08/10/2016	33, pp. 12, 258, 266, 313; 34, p. 288
7218-8	0295, C2	Soil	0 – 2	08/18/2016	33, pp. 12, 258, 268, 313; 34, p. 292
7218-9	0297, C4	Soil	0 – 2	08/18/2016	33, pp. 12, 258, 269, 313; 34, p. 294

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7218-15	0302, DW	Soil	0 – 2	08/29/2016	33, pp. 12, 258, 275, 313; 34, p. 299
7218-17	0305, C1	Soil	0 – 2	08/29/2016	33, pp. 12, 258, 277, 313; 34, p. 302
7218-22	0310, C2	Soil	0 – 2	08/30/2016	33, pp. 12, 258, 282, 313; 34, p. 307
7218-24	0313, C2	Soil	0 – 2	08/30/2016	33, pp. 12, 258, 284, 313; 34, p. 310
7218-27	0321, C2	Soil	0 – 2	09/01/2016	33, pp. 12, 259, 287, 313; 34, p. 318
7218-28	0324, C2	Soil	0 – 2	09/01/2016	33, pp. 12, 259, 288, 313; 34, p. 321
7218-30	0326, C3	Soil	0 – 2	09/01/2016	33, pp. 12, 259, 290, 313; 34, p. 323
7218-31	0329, C2	Soil	0 – 2	09/01/2016	33, pp. 12, 259, 291, 313; 34, p. 326
7218-41	0352, RE	Soil	0 – 2	09/14/2016	33, pp. 12, 259, 301, 313; 34, p. 348
7218-42	0355, C2	Soil	0 – 2	09/14/2016	33, pp. 12, 259, 302, 313; 34, p. 351
7218-43	0357, RE	Soil	0 – 2	09/15/2016	33, pp. 12, 259, 303, 313; 34, p. 353
7218-44	0360, C1	Soil	0 – 2	09/15/2016	33, pp. 12, 259, 304, 313; 34, p. 356
7218-46	0363, C2	Soil	0 – 2	09/16/2016	33, pp. 12, 259, 306, 314; 34, p. 359
7218-48	0365, C2	Soil	0 – 2	09/07/2016	33, pp. 12, 259, 308, 314; 34, p. 361
7218-50	0369, C1	Soil	0 – 2	09/07/2016	33, pp. 12, 260, 310, 314; 34, p. 365
7278-4	0379, GA	Soil	0 – 2	10/12/2016	33, pp. 12, 329, 334, 381; 34, p. 375
7278-7	0379, RE	Soil	0 – 2	10/12/2016	33, pp. 12, 329, 337, 381; 34, p. 375
7278-8	0392, GA	Soil	0 – 2	09/29/2016	33, pp. 12, 329, 338, 381; 34, p. 388
7278-8-FD					33, pp. 12, 329, 339, 381; 34, p. 388
7278-9	0392, LS	Soil	0 – 2	09/29/2016	33, pp. 12, 329, 340, 381; 34, p. 388
7278-11	0394, C-2	Soil	0 – 2	09/29/2016	33, pp. 12, 329, 342, 381; 34, p. 390
7278-15	0394, GA	Soil	0 – 2	09/29/2016	33, pp. 12, 329, 349, 381; 34, p. 390
7278-19	0435, C-2	Soil	0 – 2	10/13/2016	33, pp. 12, 329, 353, 381; 34, p. 430
7278-34	0436, RE	Soil	0 – 2	10/31/2016	33, pp. 12, 330, 369, 381; 34, p. 431
7278-36	0403, C-2	Soil	0 – 2	11/02/2016	33, pp. 12, 330, 371, 381; 34, p. 398
7278-37	0403, RE	Soil	0 – 2	11/02/2016	33, pp. 12, 330, 372, 381; 34, p. 398
7278-38	0437, C-3	Soil	0 – 2	11/02/2016	33, pp. 12, 330, 373, 381; 34, p. 432
7278-39	0437, RE-1	Soil	0 – 2	11/02/2016	33, pp. 12, 330, 374, 381; 34, p. 432
7278-40	0437, RE-2	Soil	0 – 2	11/02/2016	33, pp. 12, 330, 375, 382; 34, p. 432
7278-41	0448, C-3	Soil	0 – 2	11/03/2016	33, pp. 12, 330, 376, 382; 34, p. 443
7278-43	0448, LS	Soil	0 – 2	11/03/2016	33, pp. 12, 330, 378, 382; 34, p. 443
7310-5	0467, C2	Soil	0 – 2	11/10/2016	33, pp. 12, 396, 404, 448; 34, p. 461
7310-7	0467, C4	Soil	0 – 2	11/10/2016	33, pp. 12, 396, 406, 448; 34, p. 461
7310-10	0467, LS	Soil	0 – 2	11/10/2016	33, pp. 12, 396, 409, 448; 34, p. 461

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7310-11	0467, RE	Soil	0 – 2	11/10/2016	33, pp. 12, 396, 410, 448; 34, p. 461
7310-12	0457, C1	Soil	0 – 2	11/22/2016	33, pp. 12, 396, 411, 448; 34, p. 451
7310-12-FD					33, pp. 12, 396, 412, 448; 34, p. 451
7310-13	0457, C2	Soil	0 – 2	11/22/2016	33, pp. 12, 396, 413, 448; 34, p. 451
7310-13-FD					33, pp. 12, 396, 414, 448; 34, p. 451
7310-15	0457, C4	Soil	0 – 2	11/22/2016	33, pp. 12, 396, 416, 448; 34, p. 451
7310-15-FD					33, pp. 12, 396, 417, 448; 34, p. 451
7310-19	0480, C2	Soil	0 – 2	11/22/2016	33, pp. 12, 396, 421, 448; 34, p. 474
7310-21	0480, RE	Soil	0 – 2	11/22/2016	33, pp. 12, 397, 423, 448; 34, p. 474
7310-24	0483, C2	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 426, 448; 34, p. 477
7310-26	0483, RE	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 428, 448; 34, p. 477
7310-27	0485, C1	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 429, 448; 34, p. 479
7310-28	0485, C2	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 430, 448; 34, p. 479
7310-30	0486, C1	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 432, 448; 34, p. 480
7310-33	0488, C1	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 435, 448; 34, p. 482
7310-36	0493, C2	Soil	0 – 2	12/08/2016	33, pp. 12, 397, 438, 448; 34, p. 487
7390-6	0519, C2	Soil	0 – 2	02/20/2017	33, pp. 12, 463, 470, 515; 34, p. 513
7390-9	0527, RE	Soil	0 – 2	02/20/2017	33, pp. 12, 463, 473, 515; 34, p. 520
7390-12	0533, C4	Soil	0 – 2	02/21/2017	33, pp. 12, 463, 476, 515; 34, p. 526
7390-12-FD					33, pp. 12, 463, 477, 515; 34, p. 526
7390-15	0538, C1	Soil	0 – 2	02/22/2017	33, pp. 12, 463, 480, 515; 34, p. 531
7390-16	0538, RE	Soil	0 – 2	02/22/2017	33, pp. 12, 463, 481, 515; 34, p. 531
7390-21	0542, C4	Soil	0 – 2	02/21/2017	33, pp. 12, 463, 486, 515
7390-21-FD					33, pp. 12, 463, 487, 515
7390-25	0546, C2	Soil	0 – 2	02/22/2017	33, pp. 12, 464, 491, 515; 34, p. 539
7390-26	0547, C1	Soil	0 – 2	02/22/2017	33, pp. 12, 464, 492, 515; 34, p. 540
7390-26-FD					33, pp. 12, 464, 493, 515; 34, p. 540
7390-28	0550, C1	Soil	0 – 2	02/03/2017	33, pp. 12, 464, 495, 515; 34, p. 543
7390-29	0551, C2	Soil	0 – 2	02/22/2017	33, pp. 12, 464, 496, 515; 34, p. 544
7390-32	0555, C3	Soil	0 – 2	03/01/2017	33, pp. 12, 464, 499, 515; 34, p. 548
7390-36	0560, C1	Soil	0 – 2	02/23/2017	33, pp. 12, 464, 503, 515; 34, p. 553
7390-37	0560, C2	Soil	0 – 2	02/23/2017	33, pp. 12, 464, 504, 515; 34, p. 553
7390-38	0561, C1	Soil	0 – 2	03/01/2017	33, pp. 12, 464, 505, 515; 34, p. 554
7390-42	0557, RE	Soil	0 – 2	03/01/2017	33, pp. 12, 464, 510, 516; 34, p. 550

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7390-43	0558, RE	Soil	0 – 2	03/01/2017	33, pp. 12, 464, 511, 516; 34, p. 551
7470-2	0502, C2	Soil	0 – 2	01/13/2017	33, pp. 12, 582, 585, 658; 34, p. 496
7470-3	0563, C3	Soil	0 – 2	04/26/2017	33, pp. 12, 582, 586, 658; 34, p. 556
7470-4	0563, C4	Soil	0 – 2	04/26/2017	33, pp. 12, 582, 587, 658; 34, p. 556
7470-4-FD					33, pp. 12, 582, 588, 658; 34, p. 556
7470-8	0583, RE	Soil	0 – 2	05/10/2017	33, pp. 12, 582, 592, 658; 34, p. 576
7470-8-FD					33, pp. 12, 582, 593, 658; 34, p. 576
7470-13	0594, C1	Soil	0 – 2	05/04/2017	33, pp. 12, 582, 598, 658; 34, p. 587
7470-14	0594, C2	Soil	0 – 2	05/04/2017	33, pp. 12, 582, 599, 658; 34, p. 587
7470-16	0599, C1	Soil	0 – 2	04/26/2017	33, pp. 12, 582, 601, 658; 34, p. 592
7470-17	0599, C3	Soil	0 – 2	04/26/2017	33, pp. 12, 582, 602, 658; 34, p. 592
7470-31	0605-C2	Soil	0 – 2	04/26/2017	33, pp. 12, 581, 617, 658; 34, p. 598
7470-31-FD					33, pp. 12, 581, 618, 658; 34, p. 598
7470-32	0605, C3	Soil	0 – 2	04/26/2017	33, pp. 12, 581, 619, 658; 34, p. 598
7470-34	0605, RE	Soil	0 – 2	04/26/2017	33, pp. 12, 581, 621, 658; 34, p. 598
7470-36	0609, C2	Soil	0 – 2	05/04/2017	33, pp. 12, 581, 623, 658; 34, p. 602
7470-38	0609, RE1	Soil	0 – 2	05/04/2017	33, pp. 12, 581, 625, 658; 34, p. 602
7470-39	0609, RE2	Soil	0 – 2	05/04/2017	33, pp. 12, 581, 626, 658; 34, p. 602
7470-40	0621, C1	Soil	0 – 2	05/10/2017	33, pp. 12, 581, 627, 658; 34, p. 614
7470-43	0621, RE1	Soil	0 – 2	05/10/2017	33, pp. 12, 581, 630, 659; 34, p. 614
7470-43-FD					33, pp. 12, 581, 631, 659; 34, p. 614
7470-44	0624, C3	Soil	0 – 2	04/27/2017	33, pp. 12, 583, 632, 659; 34, p. 617
7470-46	0630, C2	Soil	0 – 2	05/10/2017	33, pp. 12, 583, 634, 659; 34, p. 623
7470-47	0630, C3	Soil	0 – 2	05/10/2017	33, pp. 12, 583, 635, 659; 34, p. 623
7470-49	0630, RE	Soil	0 – 2	05/10/2017	33, pp. 12, 583, 637, 659; 34, p. 623
7470-54	0689, C2	Soil	0 – 2	05/10/2017	33, pp. 12, 583, 643, 659; 34, p. 678
7470-54-FD					33, pp. 12, 583, 644, 659; 34, p. 678
7470-60	0694, C1	Soil	0 – 2	05/03/2017	33, pp. 12, 583, 650, 659; 34, p. 683
7470-63	0733, C1	Soil	0 – 2	05/08/2017	33, pp. 12, 583, 653, 659; 34, p. 720
7516-5	0760-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 34; 34, p. 747
7516-6	0614-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 35; 34, p. 607
7516-7	0802-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 36; 34, p. 790
7516-8	0854-C5	Soil	0 – 2	07/18/2017	16, pp. 15, 37; 34, p. 842
7516-9	0851-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 38; 34, p. 840

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7516-10	0613-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 39; 34, p. 606
7516-11	0754-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 40; 34, p. 741
7516-12	0855-C3	Soil	0 – 2	07/18/2017	16, pp. 15, 41; 34, p. 843
7516-13	0795-C4	Soil	0 – 2	07/18/2017	16, pp. 15, 42; 34, p. 784
7516-14	0815-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 43; 34, p. 803
7516-15	0849-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 44; 34, p. 838
7516-16	0853-C3	Soil	0 – 2	07/18/2017	16, pp. 15, 45; 34, p. 841
7516-17	0834-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 46; 34, p. 823
7516-18	0813-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 47; 34, p. 801
7516-19	0841-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 48; 34, p. 830
7516-20	0812-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 49; 34, p. 800
7516-21	0805-C4	Soil	0 – 2	07/18/2017	16, pp. 15, 50; 34, p. 793
7516-22	0736-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 51; 34, p. 723
7516-24	0747-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 53; 34, p. 734
7516-25	0758-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 54; 34, p. 745
7516-26	0638-C3	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 55; 34, p. 630
7516-27	0686-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 56; 34, p. 675
7516-29	0631-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 58; 34, p. 624
7516-30	0622-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 59; 34, p. 615
7516-31	0714-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 60; 34, p. 703
7516-32	0749-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 61; 34, p. 736
7516-33	0637-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 62; 34, p. 629
7516-34	0685-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 63; 34, p. 674
7516-35	0700-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 64; 34, p. 689
7516-36	0635-C3	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 65; 34, p. 628
7516-38	0702-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 67; 34, p. 691
7516-39	0734-C2	Soil	0 – 2	07/18/2017	16, pp. 15. 16, 68; 34, p. 721
7516-40	0718-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 69; 34, p. 707
7516-41	0735-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 70; 34, p. 722
7516-42	0677-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 71; 34, p. 666
7516-43	0717-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 72; 34, p. 706
7516-45	0713-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 74; 34, p. 702
7516-47	0696-C2	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 76; 34, p. 685
7516-49	0772-C3	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 78; 34, p. 761

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7516-50	0750-C1	Soil	0 – 2	07/18/2017	16, pp. 15, 16, 79; 34, p. 737
7562-4	0629, RE	Soil	0 – 2	04/14/2017	33, pp. 12, 679, 685, 744; 34, p. 622
7562-18	0708, RE	Soil	0 – 2	05/26/2017	33, pp. 12, 679, 701, 744; 34, p. 697
7562-26	0711, LS	Soil	0 – 2	05/26/2017	33, pp. 12, 680, 709, 744; 34, p. 700
7562-30	0767, C3	Soil	0 – 2	05/30/2017	33, pp. 12, 680, 714, 744; 34, p. 756
7562-31	0780, C1	Soil	0 – 2	05/30/2017	33, pp. 12, 680, 715, 744; 34, p. 769
7562-32	0780, C3	Soil	0 – 2	05/30/2017	33, pp. 12, 680, 716, 744; 34, p. 769
7562-34	0780, RE	Soil	0 – 2	05/30/2017	33, pp. 12, 680, 718, 744; 34, p. 769
7562-45	0805, C2	Soil	0 – 2	06/05/2017	33, pp. 12, 681, 731, 745; 34, p. 793
7562-47	0805, RE2	Soil	0 – 2	06/05/2017	33, pp. 12, 681, 733, 745; 34, p. 793
7562-49	0811, RE1	Soil	0 – 2	06/02/2017	33, pp. 12, 681, 735, 745; 34, p. 799
7562-50	0811, RE2	Soil	0 – 2	06/02/2017	33, pp. 12, 681, 736, 745; 34, p. 799
7733-1	0872, C3	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 764, 813; 34, p. 860
7733-5	0859, C2	Soil	0 – 2	11/21/2017	33, pp. 12, 762, 768, 813; 34, p. 847
7733-5-FD					33, pp. 12, 762, 769, 813; 34, p. 847
7733-6	0872, C1	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 770, 813; 34, p. 860
7733-11	0869, C2	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 775, 813; 34, p. 857
7733-16	0861, C3	Soil	0 – 2	12/12/2017	33, pp. 12, 762, 780, 813; 34, p. 849
7733-16-FD					33, pp. 12, 762, 781, 813; 34, p. 849
7733-18	0872, RE3	Soil	0 – 2	12/13/2017	33, pp. 12, 762, 783, 813; 34, p. 860
7733-20	0872, RE1	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 785, 813; 34, p. 860
7733-21	0872, C2	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 786, 813; 34, p. 860
7733-22	0872, RE2	Soil	0 – 2	12/20/2017	33, pp. 12, 762, 787, 813; 34, p. 860
7733-24	0863, C1	Soil	0 – 2	01/10/2018	33, pp. 12, 763, 789, 813; 34, p. 851
7733-27	0874, RE3	Soil	0 – 2	01/10/2018	33, pp. 12, 763, 792, 813; 34, p. 862
7733-27-FD					33, pp. 12, 763, 793, 813; 34, p. 862
7733-31	0863, C2	Soil	0 – 2	01/10/2018	33, pp. 12, 763, 797, 813; 34, p. 851
7733-40	0869, C6	Soil	0 – 2	12/20/2017	33, pp. 12, 763, 807, 813; 34, p. 857
7810-1	0181, C6	Soil	0 – 2	02/27/2018	33, pp. 12, 828, 831, 894; 34, p. 181
7810-2	0871, RE1	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 832, 894; 34, p. 859
7810-2-FD					33, pp. 12, 828, 833, 894; 34, p. 859
7810-3	0871, C2	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 834, 894; 34, p. 859
7810-7	0871, C4	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 838, 894; 34, p. 859
7810-8	0871, C6	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 839, 894; 34, p. 859

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7810-9	0880, C2	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 840, 894; 34, p. 868
7810-10	0871, RE2	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 841, 894; 34, p. 859
7810-15	0880, RE4	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 846, 894; 34, p. 868
7810-16	0895, C5	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 847, 894; 34, p. 879
7810-18	0880, RE3	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 849, 894; 34, p. 868
7810-18-FD					33, pp. 12, 828, 850, 894; 34, p. 868
7810-19	0880, RE1	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 851, 894; 34, p. 868
7810-20	0880, C5	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 852, 894; 34, p. 868
7810-21	0880, C8	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 853, 894; 34, p. 868
7810-22	0895, RE1	Soil	0 – 2	02/28/2018	33, pp. 12, 828, 854, 894; 34, p. 879
7810-23	0895, C3	Soil	0 – 2	02/28/2018	33, pp. 12, 829, 855, 894; 34, p. 879
7810-25	0919, RE2	Soil	0 – 2	02/28/2018	33, pp. 12, 829, 858, 894; 34, p. 903
7810-26	0959, RE1	Soil	0 – 2	03/09/2018	33, pp. 12, 829, 859, 894; 34, p. 942
7810-27	0950, C2	Soil	0 – 2	03/08/2018	33, pp. 12, 829, 860, 894; 34, p. 934
7810-31	0526, C5	Soil	0 – 2	03/08/2018	33, pp. 12, 829, 864, 894; 34, p. 519
7810-33	0984, C4	Soil	0 – 2	03/08/2018	33, pp. 12, 829, 866, 894; 34, p. 967
7810-34	0958, RE1	Soil	0 – 2	03/09/2018	33, pp. 12, 829, 867, 894; 34, p. 941
7810-37	0957, RE1	Soil	0 – 2	03/09/2018	33, pp. 12, 829, 871, 894; 34, p. 940
7810-39	0909, RE1	Soil	0 – 2	01/12/2018	33, pp. 12, 829, 873, 894; 34, p. 893
7810-40	0907, C2	Soil	0 – 2	01/12/2018	33, pp. 12, 829, 874, 894; 34, p. 891
7810-41	0901, C1	Soil	0 – 2	01/12/2018	33, pp. 12, 829, 875, 895; 34, p. 885
7810-43	0915, DW	Soil	0 – 2	01/25/2018	33, pp. 12, 829, 877, 895; 34, p. 899
7810-45	0911, C2	Soil	0 – 2	01/25/2018	33, pp. 12, 830, 879, 895; 34, p. 895
7810-46	0918, C1	Soil	0 – 2	01/25/2018	33, pp. 12, 830, 880, 895; 34, p. 902
7810-46-FD					33, pp. 12, 830, 881, 895; 34, p. 902
7810-47	0913, RE3	Soil	0 – 2	01/25/2018	33, pp. 12, 830, 882, 895; 34, p. 897
7810-49	0899, RE1	Soil	0 – 2	01/11/2018	33, pp. 12, 830, 884, 895; 34, p. 883
7810-50	0906, DW	Soil	0 – 2	01/12/2018	33, pp. 12, 830, 885, 895; 34, p. 890
7810-51	0896, DW4	Soil	0 – 2	01/11/2018	33, pp. 12, 830, 886, 895; 34, p. 880
7810-53	0910, C4	Soil	0 – 2	01/25/2018	33, pp. 12, 830, 889, 895; 34, p. 894
7810-54	0912, C2	Soil	0 – 2	01/25/2018	33, pp. 12, 830, 890, 895; 34, p. 896
7888-1	0962, C3	Soil	0 – 2	04/11/2018	33, pp. 12, 953, 954, 970; 34, p. 945
7888-2	0962, RE2	Soil	0 – 2	04/11/2018	33, pp. 12, 953, 955, 970; 34, p. 945
7888-6	0972, C2	Soil	0 – 2	04/10/2018	33, pp. 12, 953, 960, 970; 34, p. 955

Table 4: Observed Contamination Fixed Laboratory Samples

Sample Identification	Property Number and Cell/ Area ID	Sample Medium	Depth (inches)	Date	References
7888-7	0973, C4	Soil	0 – 2	04/10/2018	33, pp. 12, 953, 961, 970; 34, p. 956
7888-8	0975, DW2	Soil	0 – 2	04/12/2018	33, pp. 12, 953, 962, 970; 34, p. 958
7888-10	0977, RE2	Soil	0 – 2	04/10/2018	33, pp. 12, 953, 964, 970; 34, p. 960
7888-11	0979, C1	Soil	0 – 2	04/10/2018	33, pp. 12, 953, 965, 970; 34, p. 962
7888-11-FD					33, pp. 12, 953, 966, 970; 34, p. 962
7888-12	0980, RE2	Soil	0 – 2	04/10/2018	33, pp. 12, 953, 967, 970; 34, p. 963
8001-115	0897 – C3	Soil	0 – 2	07/25/2018	33, pp. 12, 977, 1014, 1022; 34, p. 881
8001-116	0897 – C6	Soil	0 – 2	07/25/2018	33, pp. 12, 977, 1015, 1022; 34, p. 881
8001-119	0991 – C1	Soil	0 – 2	08/16/2018	33, pp. 12, 977, 1018, 1022; 34, p. 974

Notes:

C Cell
DW Driveway
FD Field Duplicate
GA Garden
LS Landscape
RE Road Easement

The soil samples listed in Table 5 below were collected from June 2015 through August 2018 during the RA and SI. The analyte concentrations are all three times the highest background concentrations presented in Table 3 of this documentation record. The highest background concentrations for samples analyzed by fixed laboratory are 294 mg/kg for zinc, 1.0 mg/kg for cadmium and 66.4 mg/kg for lead. Three times these concentrations are 882 mg/kg for zinc, 3.0 mg/kg for cadmium and 199.2 mg/kg for lead. All fixed laboratory samples below were submitted to the EPA Region 7 laboratory for analysis. The EPA Region 7 laboratory provided reporting limits (RL) in a supplement that is equivalent to the sample quantitation limit (SQL) and takes into account any dilution factors, volume adjustments, or percent solids in the analysis (Refs. 27, p. 1; 28, p. 1; 29, p. 1; 30, p. 1; 31, p. 1; 32, p. 1; 38, p. 1; 39, p. 1; 40, p. 1; 41, p. 1; 42, p. 1; 43, p. 1; 44, p. 1).

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
6845-12	Cadmium Lead Zinc	14.2 571 5,360	0.48 9.7 58.2	11, pp. 119, 120, 127; 27, pp. 1, 2
6845-20	Cadmium Lead Zinc	5.8 291 1,440	0.44 0.87 15.7	11, pp. 119, 120, 129; 27, pp. 1, 3

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
6845-21	Cadmium Lead Zinc	5.0 278 1,680	0.44 0.88 15.8	11, pp. 119, 120, 129; 27, pp. 1, 3
6845-24	Cadmium Zinc	6.5 1,150	0.43 10.4	11, pp. 119, 120, 130; 27, pp. 1, 3
6845-26	Cadmium Lead Zinc	14.7 219 2,630	0.50 0.99 29.8	11, pp. 119, 120, 130; 27, pp. 1, 3
6845-29	Cadmium Zinc	5.0 1,640	0.48 17.1	11, pp. 119, 120, 131; 27, pp. 1, 4
6845-29-FD	Cadmium Zinc	4.6 1,520	0.52 18.6	11, pp. 119, 120, 131; 27, pp. 1, 4
6845-30	Cadmium Zinc	6.7 1,080	0.45 10.8	11, pp. 119, 120, 132; 27, pp. 1, 4
6845-33	Cadmium Lead	3.6 240	0.55 1.1	11, pp. 119, 120, 132; 27, pp. 1, 4
6845-33-FD	Cadmium Lead	3.4 243	0.54 1.1	11, pp. 119, 120, 133; 27, pp. 1, 4
6845-34	Cadmium	3.8	0.36	11, pp. 119, 120, 133; 27, pp. 1, 4
6845-35	Cadmium Lead Zinc	7.7 293 2,780	0.47 0.94 28.2	11, pp. 119, 120, 133; 27, pp. 1, 4
6845-36	Cadmium Zinc	5.0 1,740	0.39 23.4	11, pp. 119, 120, 133; 27, pp. 1, 5
6845-38	Cadmium Lead Zinc	11.2 385 2,410	0.51 1.0 30.4	11, pp. 119, 120, 134; 27, pp. 1, 5

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
6845-40	Cadmium Lead Zinc	4.7 225 1,670	0.43 0.85 15.3	11, pp. 119, 121, 135; 27, pp. 1, 5
6845-45	Cadmium Lead Zinc	11.3 594 2,260	0.55 3.3 19.9	11, pp. 119, 121, 136; 27, pp. 1, 5, 6
6845-47	Cadmium Zinc	7.0 1,650	0.49 11.7	11, pp. 119, 121, 136; 27, pp. 1, 6
7016-1	Cadmium Lead Zinc	3.5 235 1,120	0.39 0.78 9.4	20, pp. 1, 3, 7; 28, p. 1
7016-1-FD	Cadmium Lead Zinc	3.2 206 1,070	0.46 0.92 11.0	20, pp. 1, 3, 7; 28, p. 1
7016-2	Cadmium Lead Zinc	10.4 303 2,210	0.42 0.83 15.0	20, pp. 1, 3, 7; 28, p. 1
7016-4	Cadmium Lead Zinc	8.8 295 1,940	0.43 0.85 15.4	20, pp. 1, 3, 8; 28, p. 1
7016-5	Cadmium Lead Zinc	5.3 325 1,400	0.40 0.80 9.6	20, pp. 1, 3, 8; 28, p. 1
7016-6	Cadmium Lead Zinc	6.7 236 1,680	0.50 1.0 12.0	20, pp. 1, 3, 8; 28, p. 1
7016-9	Cadmium Zinc	4.0 1,070	0.44 10.5	20, pp. 1, 3, 9; 28, pp. 1, 2
7016-11	Cadmium Lead Zinc	6.3 261 1,690	0.45 0.90 16.2	20, pp. 1, 3, 9; 28, pp. 1, 2
7016-11-FD	Cadmium Lead Zinc	6.6 250 1,790	0.40 0.79 14.3	20, pp. 1, 3, 10; 28, pp. 1, 2
7016-13	Cadmium Lead Zinc	4.6 275 1,400	0.48 0.96 11.6	20, pp. 1, 3, 10; 28, pp. 1, 2
7016-17	Cadmium	4.5	0.48	20, pp. 1, 3, 11; 28, pp. 1, 2, 3
7016-20	Cadmium Lead Zinc	14.2 372 3,140	0.53 1.1 31.7	20, pp. 1, 3, 12; 28, pp. 1, 3
7016-30	Cadmium Lead Zinc	5.3 212 1,090	0.36 0.72 8.7	20, pp. 1, 3, 15; 28, pp. 1, 4
7016-33	Cadmium Lead	4.2 296	0.43 0.86	20, pp. 1, 3, 15; 28, pp. 1, 4

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
	Zinc	1,040	10.3	
7016-37	Lead	321	0.99	20, pp. 1, 3, 17; 28, pp. 1, 5
7016-38	Lead	235	0.88	20, pp. 1, 3, 17; 28, pp. 1, 5
7016-41	Lead	294	0.94	20, pp. 1, 4, 18; 28, pp. 1, 5
7016-41-FD	Lead	266	0.73	20, pp. 1, 4, 18; 28, pp. 1, 5
7016-43	Cadmium	3.4	0.46	20, pp. 1, 4, 18; 28, pp. 1, 5
7016-45	Cadmium Lead Zinc	4.7 320 1,120	0.43 0.85 10.3	20, pp. 1, 4, 19; 28, pp. 1, 5, 6
7016-47	Cadmium Zinc	4.4 1,190	0.47 11.3	20, pp. 1, 4, 19; 28, pp. 1, 6
7016-48	Cadmium Lead Zinc	8.0 250 1,670	0.39 0.77 13.9	20, pp. 1, 4, 20; 28, pp. 1, 6
7016-51	Cadmium Zinc	3.2 962	0.43 10.3	20, pp. 1, 4, 20; 28, pp. 1, 6
7016-53	Cadmium Lead Zinc	4.0 309 985	0.40 0.81 9.7	20, pp. 1, 4, 21; 28, pp. 1, 6
7016-53-FD	Cadmium Lead Zinc	3.8 306 997	0.42 0.85 10.2	20, pp. 1, 4, 21; 28, pp. 1, 6
7016-55	Lead Zinc	274 907	0.89 10.7	20, pp. 1, 4, 22; 28, pp. 1, 7
7016-59	Cadmium Lead Zinc	9.4 242 1,600	0.41 0.83 14.9	20, pp. 1, 4, 23; 28, pp. 1, 7
7016-61	Cadmium Lead	3.1 204	0.44 0.88	20, pp. 1, 4, 23; 28, pp. 1, 7
7016-61-FD	Cadmium Lead	3.2 216	0.42 0.84	20, pp. 1, 4, 23; 28, pp. 1, 7
7016-62	Lead	235	0.80	20, pp. 1, 4, 24; 28, pp. 1, 7
7016-63	Cadmium Zinc	5.1 1,090	0.47 11.3	20, pp. 1, 4, 24; 28, pp. 1, 7
7016-64	Cadmium Lead Zinc	6.9 242 2,000	0.37 0.74 22.1	20, pp. 1, 4, 24; 28, pp. 1, 8
7016-65	Cadmium Lead Zinc	8.0 348 2,000	0.43 0.87 15.6	20, pp. 1, 4, 24; 28, pp. 1, 8
7016-67	Cadmium Lead Zinc	7.1 216 1,580	0.50 1.0 18.1	20, pp. 1, 4, 25; 28, pp. 1, 8
7016-69	Cadmium Lead	3.6 270	0.50 0.99	20, pp. 1, 4, 25; 28, pp. 1, 8

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	**Hazardous Substance**	**Concentration (mg/kg)**	**Reporting Limit* (mg/kg)**	**References**
7016-70	Cadmium Lead	3.6 240	0.50 1.0	20, pp. 1, 4, 26; 28, pp. 1, 8
7016-72	Cadmium Lead	3.1 202	0.45 0.90	20, pp. 1, 4, 26; 28, pp. 1, 8
7016-72-FD	Lead	200	0.85	20, pp. 1, 4, 26; 28, pp. 1, 8
7016-75	Cadmium Lead Zinc	3.9 279 930	0.40 0.81 9.7	20, pp. 1, 4, 27; 28, pp. 1, 9
7016-77	Cadmium Lead Zinc	5.1 270 1,570	0.49 0.98 5.9	20, pp. 1, 4, 28; 28, pp. 1, 9
7016-79	Cadmium Lead Zinc	8.4 254 1,860	0.48 0.96 17.2	20, pp. 1, 4, 28; 28, pp. 1, 9
7016-80	Cadmium Lead Zinc	6.8 251 1,870	0.44 0.88 26.4	20, pp. 1, 4, 28; 28, pp. 1, 9
7016-81	Cadmium Zinc	3.8 1,150	0.43 10.2	20, pp. 1, 5, 29; 28, pp. 1, 9
7016-83	Cadmium Lead Zinc	3.6 353 927	0.39 0.78 9.4	20, pp. 1, 5, 29; 28, pp. 1, 9, 10
7016-83-FD	Cadmium Lead	3.1 374	0.49 0.98	20, pp. 1, 5, 29; 28, pp. 1, 10
7016-86	Cadmium Lead Zinc	4.1 216 1,010	0.42 0.83 10	20, pp. 1, 5, 30; 28, pp. 1, 10
7016-88	Lead	203	0.77	20, pp. 1, 5, 31; 28, pp. 1, 10
7016-90	Cadmium	3.1	0.49	20, pp. 1, 5, 31; 28, pp. 1, 10
7016-92	Cadmium Lead Zinc	4.6 216 1,530	0.48 0.95 17.1	20, pp. 1, 5, 32; 28, pp. 1, 11
7016-94	Cadmium Lead Zinc	3.8 241 1,150	0.38 0.76 9.1	20, pp. 1, 5, 32; 28, pp. 1, 11
7016-96	Cadmium	3.2	0.48	20, pp. 1, 5, 33; 28, pp. 1, 11
7016-97	Lead	264	0.82	20, pp. 1, 5, 33; 28, pp. 1, 11
7016-99	Cadmium	3.2	0.44	20, pp. 1, 5, 34; 28, pp. 1, 11
7016-105	Cadmium Lead Zinc	4.4 270 1,240	0.40 0.81 9.7	20, pp. 1, 5, 35; 28, pp. 1, 12
7016-106	Cadmium Zinc	5.3 927	0.44 10.5	20, pp. 1, 5, 36; 28, pp. 1, 12
7218-2	Lead Zinc	350 989	5.4 5.4	33, p. 316; 38, p. 1

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7218-4	Cadmium Lead Zinc	10.5 247 1,380	1.1 5.5 5.5	33, p. 316; 38, p. 1
7218-6	Cadmium Lead Zinc	3.0 252 1,030	1.1 5.3 5.3	33, p. 317; 38, pp. 1, 2
7218-8	Cadmium Lead Zinc	4.8 297 1,140	1.1 5.4 5.4	33, p. 317; 38, pp. 1, 2
7218-9	Lead	237	5.5	33, p. 318; 38, pp. 1, 2
7218-15	Cadmium Zinc	11.1 2,930	1.0 5.1	33, p. 319; 38, pp. 1, 3
7218-17	Lead Zinc	313 988	5.2 5.2	33, p. 320; 38, pp. 1, 3
7218-22	Lead	254	5.2	33, p. 321; 38, pp. 1, 4
7218-24	Cadmium Lead Zinc	3.0 271 1,110	1.1 5.3 5.3	33, p. 321; 38, pp. 1, 4
7218-27	Lead	258	5.1	33, p. 322; 38, pp. 1, 5
7218-28	Lead	209	5.2	33, p. 322; 38, pp. 1, 5
7218-30	Lead	243	5.1	33, p. 323; 38, pp. 1, 5
7218-31	Lead	314	5.2	33, p. 323; 38, pp. 1, 5
7218-42	Lead Zinc	213 997	5.2 5.2	33, p. 326; 38, pp. 1, 7
7218-44	Lead	242	5.1	33, p. 326; 38, pp. 1, 7
7218-46	Cadmium Lead Zinc	5.8 379 2,120	1.1 5.3 5.3	33, p. 327; 38, pp. 1, 8
7218-48	Lead	204	5.2	33, p. 327; 38, pp. 1, 8
7218-50	Cadmium Zinc	5.1 1,020	1.0 5.2	33, p. 328; 38, pp. 1, 8

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7278-4	Cadmium Lead Zinc	8.0 200 1,220	0.40 0.79 4.8	33, pp. 379, 381, 384; 29, p. 1
7278-8	Cadmium Lead Zinc	5.7 332 2,090	0.52 1.0 6.2	33, pp. 379, 381, 385; 29, p. 1
7278-8-FD	Cadmium Lead Zinc	6.3 322 1,660	0.50 0.99 5.9	33, pp. 379, 381, 386; 29, pp. 1, 2
7278-9	Cadmium	3.0	0.47	33, pp. 379, 381, 386; 29, pp. 1, 2
7278-11	Cadmium Lead	3.2 332	0.46 0.92	33, pp. 379, 381, 387; 29, pp. 1, 2
7278-15	Cadmium Lead Zinc	3.1 316 972	0.48 0.97 5.8	33, pp. 379, 381, 388; 29, pp. 1, 2, 3
7278-19	Cadmium Zinc	4.4 1,630	0.49 5.9	33, pp. 379, 381, 389; 29, pp. 1, 3
7278-34	Cadmium Lead Zinc	10.2 332 2,810	0.52 1.0 6.3	33, pp. 379, 381, 393; 29, pp. 1, 4
7278-36	Cadmium Lead	4.4 290	0.49 0.99	33, pp. 379, 381, 394; 29, pp. 1, 5
7278-37	Cadmium Lead Zinc	4.5 201 1,190	0.45 0.89 5.4	33, pp. 379, 381, 394; 29, pp. 1, 5
7278-38	Cadmium Lead Zinc	6.8 316 1,140	0.46 0.91 5.5	33, pp. 379, 381, 394; 29, pp. 1, 5
7278-39	Cadmium Lead Zinc	5.7 296 1,680	0.43 0.86 5.1	33, pp. 379, 381, 394; 29, pp. 1, 5
7278-40	Cadmium Lead Zinc	4.5 415 1,170	0.48 0.96 5.8	33, pp. 379, 382, 395; 29, pp. 1, 5
7278-41	Lead	240	0.89	33, pp. 379, 382, 395; 29, pp. 1, 5
7278-43	Cadmium Lead	3.1 468	0.51 1.0	33, pp. 379, 382, 395; 29, pp. 1, 5
7310-5	Cadmium	4.9	1.1	33, pp. 446, 448, 452; 30, pp. 1, 2
7310-7	Cadmium Zinc	5.7 1,280	1.0 5.2	33, pp. 446, 448, 453; 30, pp. 1, 2
7310-10	Cadmium Zinc	3.7 1,300	1.2 6.1	33, pp. 446, 448, 453; 30, pp. 1, 2
7310-12	Cadmium	5.8	1.0	33, pp. 446, 448, 454; 30, pp. 1, 3
7310-12-FD	Cadmium	5.0	1.0	33, pp. 446, 448, 454; 30, pp. 1, 3
7310-13	Cadmium	5.8	1.0	33, pp. 446, 448, 454; 30, pp. 1, 3

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7310-13-FD	Cadmium	6.0	1.0	33, pp. 446, 448, 455; 30, pp. 1, 3
7310-15	Cadmium	6.6	1.0	33, pp. 446, 448, 455; 30, pp. 1, 3, 4
7310-15-FD	Cadmium	7.2	1.1	33, pp. 446, 448, 455; 30, pp. 1, 4
7310-19	Cadmium	4.3	1.0	33, pp. 446, 448, 456; 30, pp. 1, 4
7310-24	Cadmium	4.1	1.0	33, pp. 446, 448, 458; 30, pp. 1, 5
7310-27	Cadmium Zinc	4.9 933	1.0 4.8	33, pp. 446, 448, 452; 30, pp. 1, 5, 6
7310-28	Cadmium	4.2	1.0	33, pp. 446, 448, 459; 30, pp. 1, 6
7310-30	Cadmium Lead Zinc	8.7 345 1,680	1.0 4.9 4.9	33, pp. 446, 448, 459; 30, pp. 1, 6
7310-33	Cadmium Zinc	5.1 918	1.0 5.1	33, pp. 446, 448, 460; 30, pp. 1, 6
7310-36	Cadmium Lead Zinc	6.2 273 1,220	1.0 5.0 5.0	33, pp. 446, 448, 461; 30, pp. 1, 7
7390-6	Lead	225	4.9	33, pp. 513, 515, 519; 31, pp. 1, 2
7390-12	Lead Zinc	241 1,190	6.4 6.4	33, pp. 513, 515, 520; 31, pp. 1, 2
7390-12-FD	Lead Zinc	224 1,110	5.7 5.7	33, pp. 513, 515, 521; 31, pp. 1, 3
7390-15	Lead	229	5.4	33, pp. 513, 515, 521; 31, pp. 1, 3
7390-21	Lead	204	5.1	33, pp. 513, 515, 523; 31, pp. 1, 4
7390-21-FD	Lead	206	5.2	33, pp. 513, 515, 523; 31, pp. 1, 4
7390-25	Lead	256	5.0	33, pp. 513, 515, 524; 31, pp. 1, 5
7390-26	Lead Zinc	271 920	5.1 5.1	33, pp. 513, 515, 524; 31, pp. 1, 5
7390-26-FD	Lead Zinc	277 955	5.2 5.2	33, pp. 513, 515, 525; 31, pp. 1, 5

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7390-28	Lead Zinc	209 1,470	5.2 5.2	33, pp. 513, 515, 525; 31, pp. 1, 5
7390-29	Zinc	1,050	5.0	33, pp. 513, 515, 525; 31, pp. 1, 6
7390-32	Lead Zinc	202 910	5.9 5.9	33, pp. 513, 515, 526; 31, pp. 1, 6
7390-36	Lead	376	5.4	33, pp. 513, 515, 527; 31, pp. 1, 7
7390-37	Lead	279	5.3	33, pp. 513, 515, 527; 31, pp. 1, 7
7390-38	Lead	215	5.3	33, pp. 513, 515, 528; 31, pp. 1, 7
7470-2	Cadmium	3.6	1.0	33, pp. 656, 658, 661; 39, p. 1
7470-3	Cadmium Zinc	6.8 1,220	1.0 5.1	33, pp. 656, 658, 661; 39, p. 1
7470-4	Cadmium	5.7	1.1	33, pp. 656, 658, 661; 39, p. 1
7470-4-FD	Cadmium	6.6	1.1	33, pp. 656, 658, 662; 39, p. 1
7470-13	Cadmium	3.8	1.0	33, pp. 656, 658, 664; 39, pp. 1, 3
7470-14	Cadmium Lead Zinc	7.1 370 1,440	1.1 5.3 5.3	33, pp. 656, 658, 664; 39, pp. 1, 3
7470-16	Cadmium	3.5	1.1	33, pp. 656, 658, 665; 39, pp. 1, 3
7470-17	Cadmium	3.6	1.1	33, pp. 656, 658, 665; 39, pp. 1, 3
7470-31	Cadmium Zinc	6.0 1,110	1.0 5.2	33, pp. 656, 658, 669; 39, pp. 1, 6
7470-31-FD	Cadmium Lead Zinc	6.2 215 1,150	1.0 5.1 5.1	33, pp. 656, 658, 669; 39, pp. 1, 6
7470-32	Cadmium Lead Zinc	8.1 260 1,480	1.1 5.3 5.3	33, pp. 656, 658, 669; 39, pp. 1, 6
7470-36	Cadmium Zinc	4.1 884	1.1 5.3	33, pp. 656, 658, 670; 39, pp. 1, 7
7470-40	Cadmium	5.1	1.1	33, pp. 656, 658, 671; 39, pp. 1, 7
7470-44	Cadmium Lead Zinc	4.7 276 1,140	1.2 6.0 6.0	33, pp. 656, 659, 673; 39, pp. 1, 8
7470-46	Cadmium	4.3	1.1	33, pp. 656, 659, 673; 39, pp. 1, 8
7470-47	Cadmium	5.1	1.0	33, pp. 656, 659, 673; 39, pp. 1, 9
7470-54	Cadmium Lead Zinc	5.7 464 978	1.1 5.7 5.7	33, pp. 656, 659, 675; 39, pp. 1, 10
7470-54-FD	Cadmium Lead	4.8 344	1.1 5.4	33, pp. 656, 659, 676; 39, pp. 1, 10
7470-60	Cadmium Zinc	4.9 1,020	1.0 5.1	33, pp. 656, 659, 677; 39, pp. 1, 11
7470-63	Cadmium Lead Zinc	8.0 225 1,480	1.1 5.5 5.5	33, pp. 656, 659, 678; 39, pp. 1, 11

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7516-5	Lead Zinc	293 988	5.3 5.3	16, pp. 17, 82, 83, 86, 88; 32, pp. 1, 3
7516-6	Cadmium Lead	3.3 260	1.0 5.2	16, pp. 17, 82, 83, 86, 88; 32, pp. 1, 4
7516-7	Lead	227	5.5	16, pp. 17, 82, 83, 86, 88; 32, pp. 1, 5
7516-8	Lead	220	5.4	16, pp. 17, 82, 83, 86, 88; 32, pp. 1, 5
7516-9	Cadmium Lead Zinc	5.5 340 1,670	1.1 5.4 5.4	16, pp. 17, 82, 83, 86, 89; 32, pp. 1, 6
7516-10	Lead	235	5.1	16, pp. 17, 82, 83, 86, 89; 32, pp. 1, 6, 7
7516-11	Lead Zinc	286 1,040	5.1 5.1	16, pp. 17, 82, 83, 86, 89; 32, pp. 1, 7
7516-12	Lead	240	5.5	16, pp. 17, 82, 83, 86, 89; 32, pp. 1, 8
7516-13	Zinc	1,690	5.1	16, pp. 17, 82, 83, 86, 90; 32, pp. 1, 8
7516-14	Cadmium Lead Zinc	4.1 235 1,020	1.0 5.1 5.1	16, pp. 17, 82, 83, 86, 90; 32, pp. 1, 9
7516-15	Cadmium Lead Zinc	6.8 367 2,640	1.0 5.2 5.2	16, pp. 17, 82, 83, 86, 90; 32, pp. 1, 9, 10
7516-16	Lead	207	5.4	16, pp. 17, 82, 83, 86, 90; 32, pp. 1, 10
7516-17	Cadmium Lead Zinc	3.6 304 1,260	1.0 5.0 5.0	16, pp. 17, 82, 83, 86, 91; 32, pp. 1, 11
7516-18	Cadmium Lead Zinc	3.1 312 929	1.0 5.2 5.2	16, pp. 17, 82, 83, 86, 91; 32, pp. 1, 11
7516-19	Cadmium Lead Zinc	4.4 203 1,220	1.1 5.5 5.5	16, pp. 17, 82, 83, 86, 91; 32, pp. 1, 12
7516-20	Cadmium Lead Zinc	16.0 291 1,430	1.1 5.4 5.4	16, pp. 17, 82, 83, 86, 91; 32, pp. 1, 13
7516-21	Cadmium Zinc	3.8 1,250	1.1 5.3	16, pp. 17, 82, 32, 86, 92; 32, pp. 1, 13
7516-22	Lead Zinc	308 967	5.0 5.0	16, pp. 17, 82, 83, 86, 92; 32, pp. 1, 14
7516-24	Cadmium Lead Zinc	5.3 310 988	1.1 5.5 5.5	16, pp. 17, 82, 83, 86, 92; 32, pp. 1, 15
7516-25	Cadmium Lead	3.9 286	1.1 5.5	16, pp. 17, 82, 83, 86, 93; 32, pp. 1, 16

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7516-26	Lead	229	5.0	16, pp. 17, 82, 83, 86, 93; 32, pp. 1, 16
7516-27	Cadmium Lead Zinc	5.0 363 1,310	1.1 5.6 5.6	16, pp. 17, 82, 83, 86, 93; 32, pp. 1, 17
7516-29	Cadmium Zinc	4.3 1,670	1.0 5.2	16, pp. 17, 82, 83, 86, 94; 32, pp. 1, 18
7516-30	Lead	239	5.1	16, pp. 17, 82, 83, 86, 94; 32, pp. 1, 19
7516-31	Cadmium Lead Zinc	3.4 265 947	1.1 5.4 5.4	16, pp. 17, 82, 83, 86, 94; 32, pp. 1, 19
7516-32	Cadmium Lead	4.3 239	1.0 5.1	16, pp. 17, 82, 83, 86, 94; 32, pp. 1, 20
7516-33	Lead	293	5.0	16, pp. 17, 82, 83, 86, 95; 32, pp. 1, 20, 21
7516-34	Cadmium Lead Zinc	5.7 216 1,030	1.1 5.3 5.3	16, pp. 17, 82, 83, 86, 95; 32, pp. 1, 21
7516-35	Cadmium Zinc	4.5 1,220	1.1 5.4	16, pp. 17, 82, 83, 86, 95; 32, pp. 1, 22
7516-36	Cadmium Lead Zinc	5.7 252 1,480	1.0 5.0 5.0	16, pp. 17, 82, 83, 86, 95; 32, pp. 1, 22
7516-38	Cadmium Lead Zinc	3.4 267 999	1.1 5.6 5.6	16, pp. 17, 82, 83, 86, 96; 32, pp. 1, 24
7516-39	Cadmium Lead Zinc	3.2 294 1,030	1.1 5.3 5.3	16, pp. 17, 82, 83, 86, 96; 32, pp. 1, 24
7516-40	Cadmium Lead Zinc	4.5 201 891	1.1 5.4 5.4	16, pp. 18, 82, 83, 86, 96; 32, pp. 1, 25
7516-41	Cadmium Lead Zinc	4.2 311 1,090	1.1 5.4 5.4	16, pp. 18, 82, 83, 86, 97; 32, pp. 1, 25
7516-42	Cadmium Lead Zinc	3.1 334 988	1.1 5.3 5.3	16, pp. 18, 82, 83, 86, 97; 32, pp. 1, 26
7516-43	Lead	259	5.0	16, pp. 18, 82, 83, 86, 97; 32, pp. 1, 27
7516-45	Lead	215	5.4	16, pp. 18, 82, 84, 86, 98; 32, pp. 1, 28
7516-47	Cadmium Lead Zinc	10.4 278 1,670	1.0 5.2 5.2	16, pp. 18, 82, 84, 86, 98; 32, pp. 1, 29

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7516-49	Lead	202	5.4	16, pp. 18, 82, 84, 86, 99; 32, pp. 1, 30
7516-50	Lead	208	5.3	16, pp. 18, 82, 84, 86, 99; 32, pp. 1, 31
7562-26	Lead Zinc	398 1,010	5.0 5.0	33, pp. 742, 744, 753; 40, pp. 1, 5
7562-30	Cadmium Lead Zinc	6.0 286 1,520	1.1 5.3 5.3	33, pp. 742, 744, 755; 40, pp. 1, 6
7562-31	Lead	354	5.4	33, pp. 742, 744, 755; 40, pp. 1, 6
7562-32	Lead Zinc	200 989	5.2 5.2	33, pp. 742, 744, 755; 40, pp. 1, 6
7562-45	Zinc	1,270	5.2	33, pp. 742, 745, 759; 40, pp. 1, 8
7733-1	Cadmium Lead Zinc	12.8 473 3,440	0.48 0.96 28.7	33, pp. 811, 813, 816; 41, p. 1
7733-5	Cadmium	4.5	0.44	33, pp. 811, 813, 817; 41, p. 1
7733-5-FD	Cadmium	5.9	0.42	33, pp. 811, 813, 817; 41, p. 1
7733-6	Cadmium Lead Zinc	43.2 1,410 6,170	0.46 4.6 55.5	33, pp. 811, 813, 817; 41, p. 1
7733-11	Cadmium	5.6	0.47	33, pp. 811, 813, 818; 41, pp. 1, 2
7733-16	Cadmium Lead Zinc	3.7 225 1,030	0.47 0.94 11.2	33, pp. 811, 813, 820; 41, pp. 1, 2
7733-16-FD	Cadmium Lead Zinc	4.1 218 1,070	0.49 0.98 11.8	33, pp. 811, 813, 820; 41, pp. 1, 2
7733-21	Cadmium Lead Zinc	30.1 569 5,680	0.43 8.6 51.5	33, pp. 811, 813, 821; 41, pp. 1, 3
7733-24	Cadmium Lead Zinc	4.3 305 1,020	0.49 0.99 11.8	33, pp. 811, 813, 822; 41, pp. 1, 3
7733-31	Lead	210	0.91	33, pp. 811, 813, 824; 41, pp. 1, 4
7733-40	Cadmium Lead Zinc	8.4 343 1,350	0.53 1.1 12.7	33, pp. 811, 813, 826; 41, pp. 1, 5
7810-1	Cadmium Lead Zinc	5.6 264 1,440	0.50 1.0 18.1	33, pp. 892, 894, 897; 42, p. 1
7810-3	Cadmium Lead Zinc	7.5 332 1,120	0.52 1.0 6.2	33, pp. 892, 894, 897; 42, p. 1

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7810-7	Cadmium Zinc	5.4 993	0.80 9.6	33, pp. 892, 894, 898; 42, p. 1
7810-8	Cadmium Lead Zinc	8.0 303 1,220	0.51 1.0 6.1	33, pp. 892, 894, 899; 42, pp. 1, 2
7810-9	Cadmium	3.6	0.50	33, pp. 892, 894, 899; 42, pp. 1, 2
7810-10	Cadmium Zinc	4.6 1,260	0.52 6.2	33, pp. 892, 894, 899; 42, pp. 1, 2
7810-15	Cadmium Zinc	5.8 1,420	0.50 6.0	33, pp. 892, 894, 900; 42, pp. 1, 2
7810-20	Cadmium Lead Zinc	10.4 284 1,630	0.52 1.0 6.2	33, pp. 892, 894, 902; 42, pp. 1, 3
7810-21	Cadmium Lead Zinc	11.7 235 2,050	0.55 1.1 19.8	33, pp. 892, 894, 902; 42, pp. 1, 3
7810-22	Cadmium Zinc	7.0 1,110	0.52 6.3	33, pp. 892, 894, 902; 42, pp. 1, 3
7810-23	Cadmium Zinc	5.4 1,040	0.51 6.1	33, pp. 892, 894, 903; 42, pp. 1, 3
7810-27	Cadmium Zinc	7.9 1,240	0.49 5.8	33, pp. 892, 894, 904; 42, pp. 1, 4
7810-31	Cadmium	5.8	0.54	33, pp. 892, 894, 905; 42, pp. 1, 4
7810-33	Cadmium Lead Zinc	22.3 860 2,390	0.49 0.99 17.7	33, pp. 892, 894, 905; 42, pp. 1, 4
7810-40	Cadmium	4.8	0.51	33, pp. 892, 894, 907; 42, pp. 1, 5
7810-41	Cadmium Zinc	4.6 1,220	0.49 0.98	33, pp. 892, 895, 908; 42, pp. 1, 5
7810-43	Cadmium Lead	6.1 218	0.49 0.98	33, pp. 892, 895, 908; 42, pp. 1, 5
7810-45	Cadmium Lead	3.8 302	0.52 1.0	33, pp. 892, 895, 909; 42, pp. 1, 5
7810-46	Cadmium Lead Zinc	5.3 370 1,180	0.56 1.1 6.7	33, pp. 892, 895, 909; 42, pp. 1, 5, 6
7810-46-FD	Cadmium Lead Zinc	5.3 315 1,220	0.52 1.0 6.2	33, pp. 892, 895, 909; 42, pp. 1, 6
7810-50	Cadmium	3.5	0.49	33, pp. 892, 895, 910; 42, pp. 1, 6
7810-51	Cadmium	4.3	0.47	33, pp. 892, 895, 910; 42, pp. 1, 6
7810-53	Cadmium	4.1	0.54	33, pp. 892, 895, 911; 42, pp. 1, 6
7810-54	Cadmium Zinc	4.2 920	0.51 6.1	33, pp. 892, 895, 911; 42, pp. 1, 6
7888-1	Lead	223	5.1	33, pp. 968, 970, 972; 43, p. 1

Table 5: Analytical Results for Fixed Laboratory Observed Contamination Samples

Sample Identification	Hazardous Substance	Concentration (mg/kg)	Reporting Limit* (mg/kg)	References
7888-6	Cadmium Lead Zinc	5.9 383 1,400	1.0 5.0 5.0	33, pp. 968, 970, 973; 43, pp. 1, 2
7888-7	Cadmium Zinc	4.7 976	1.0 5.0	33, pp. 968, 970, 973; 43, pp. 1, 2
7888-8	Cadmium Zinc	9.1 1,220	1.0 5.0	33, pp. 968, 970, 974; 43, pp. 1, 2
7888-11	Cadmium Lead Zinc	4.0 224 1,090	1.0 5.0 5.0	33, pp. 968, 970, 974; 43, pp. 1, 2
7888-11-FD	Cadmium Lead Zinc	4.0 203 1,040	1.0 5.0 5.0	33, pp. 968, 970, 975; 43, pp. 1, 3
8001-115	Cadmium Lead Zinc	15.9 991 2,880	1.0 5.0 5.0	33, pp. 1020, 1022, 1034; 44, pp. 1, 6
8001-116	Cadmium Lead Zinc	7.6 365 1,760	1.0 5.0 5.0	33, pp. 1020, 1022, 1034; 44, pp. 1, 6
8001-119	Cadmium Lead	3.9 199	1.0 5.0	33, pp. 1020, 1022, 1035; 44, pp. 1, 7

Notes:

*The reporting limit in this table takes into account any dilution factor, volume adjustment, and percent solids for the sample and is sometimes called the sample quantitation limit or SQL (Refs. 27, p. 1; 28, p. 1; 29, p. 1; 30, p. 1; 31, p. 1; 32, p. 1; 38, p. 1; 39, p. 1; 40, p. 1; 41, p. 1; 42, p. 1; 43, p. 1; 44, p. 1).

mg/kg Milligrams per kilogram

The following Table 6 presents XRF screening results from properties throughout Caney and within the boundaries of AOC A where one or more cells/areas exceeded the background XRF concentration by at least three times. Bolded values (pre-removal action) and shaded cells/areas represent those areas where removal actions have occurred (Ref. 33, pp. 1225 - 1241). EPA initiated removal actions at properties where one or more cell/area exceeds the removal action limit of 400 parts per million (ppm) lead. Access to conduct removal activities had be approved by the property owner. Once access was granted, then all cells/areas that exceed 400 ppm were excavated, and if the drip zone of the building was also contaminated above 400 ppm, then it was removed as well. A drip zone above 400 ppm alone, with no other cell/area above 400 ppm, did not initiate a removal action at the property. As shown in the table below, not all cells/areas at a property that meet or exceed three times the background XRF readings were subject to removal actions.

Table 1 of this documentation record presents background XRF spectrometer measurement from properties considered representative of background lead concentrations. For the XRF lead data, multiple readings were recorded from cells/areas at 27 properties. The highest lead reading from all the cells/areas measured (49 ppm from cell 1 at property 20) is used as background for XRF data comparison. XRF readings from the four background samples collected during the SI ranged in concentrations from 15 to 39 ppm (Ref. 16, pp. 30 – 33). Three times the highest background XRF measurement of 49 ppm is 147 ppm. In Table 6 below, only cells/areas with XRF spectrometer readings at or above 147 ppm are presented, except that all readings from road easements are presented. If more than one driveway, garden area, play area, landscape or road easement sample were collected from a property, then the highest value is presented in the table below.

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0001	05-27-15	05-28-15	259		219							452		34, p. 1
0003	05-27-15	05-28-15	**451**		226									34, p. 3; 33, p. 1225
0004	05-27-15	05-28-15	341		292	284						224		34, p. 4
0008	05-27-15	05-28-15			228			210				278		34, p. 8
0011	05-27-15	06-09-15	**1,074**	**671**	233									34, p. 11; 33, p. 1225
0012	05-27-15	05-29-15	254									363		34, p. 12
0013	06-02-15	06-03-15						397						34, p. 13
0016	06-02-15	06-04-15	350	381										34, p. 15
0017	05-16-15	06-17-15	224					**432**						34, p. 16; 33, p. 1225
0019	05-03-15	06-04-15	200					215						34, p. 18
0021	06-16-15	06-17-15	269	349	319	**713**						**854**		34, p. 20; 33, p. 1225
0022	06-16-15	06-18-15	**750**	**423**			190	**3,850**						34, p. 21; 33, p. 1225
0023	06-11-15	06-23-15		256	249									34, p. 22
0026	06-01-15	06-03-15		375								2,278	199	34, p. 25
0028	06-03-15	06-04-15	243						309			201	134	34, p. 27
0030	06-02-15	06-04-15		270	192	248		377						34, p. 29
0032	06-03-15	06-04-15			211	243			321					34, p. 33
0034	05-12-15	06-23-15	219											34, p. 35
0035	06-12-15	06-23-15	240		**618**	298						398		34, p. 36; 33, p. 1225
0038	05-09-15	06-09-15	**733**	325	366	256						**429**		34, p. 39; 33, p. 1225
0040	06-16-15	06-18-15	255	195										34, p. 40
0041	06-16-15	06-17-15	304	**804**	**546**	**568**								34, p. 41; 33, p. 1225
0042	06-15-15	06-18-15	**477**	201	296	398		201						34, p. 42; 33, p. 1225
0043	06-07-15	06-10-15			262									34, p. 43
0044	06-12-15	06-23-15	214	255	340	295	218							34, p. 44
0045	06-01-15	06-03-25		272								501	192	34, p. 45

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0046	06-16-15	06-17-15	220	207									175	34, p. 46
0048	06-01-15	06-03-15	260	293	232			277				2,679	138	34, p. 48
0049	06-03-15	06-04-15		300	**594**	261		**673**					169	34, p. 49; 33, p. 1225
0054	06-02-15	06-03-15	**438**	**778**									349	34, p. 54; 33, p. 1225
0055	06-03-15	06-09-15	**727**	356	338	**599**		245		416			**1,863**	34, p. 55; 33, p. 1225
0056	06-02-15	06-04-15		272	**495**	385							386	34, p. 56; 33, p. 1225
0057	06-02-15	06-04-15			206								**834**	34, p. 57; 33, p. 1225
0058	06-08-15	06-18-15		255										34, p. 58
0060	05-16-15	06-18-15	275	278								434	335	34, p. 60
0062	06-08-15	06-11-15		253									**513**	34, p. 62; 33, p. 1225
0063	06-05-15	06-11-15	315	265	241								252	34, p. 63
0064	06-03-15	06-04-15	266	**1,100**	284	**659**		**1,796**				**1,397**	**1,090**	34, p. 64; 33, p. 1226
0065	06-03-15	06-04-15						258					**1,134**	34, p. 65; 33, p. 1226
0066	06-17-15	06-18-15	235	244	196								**1,117**	34, p. 66; 33, p. 1226
0067	06-04-15	06-04-15	**699**	**731**	228				**504**				**1,197**	34, p. 67; 33, p. 1226
0068	06-05-15	06-11-15	214	218	298								394	34, p. 68
0069	06-05-15	NR	280	203	373								102	34, p. 69
0070	06-16-15	06-23-15	297	222								323	155	34, p. 70
0071	05-16-15	06-17-15	263	254									208	34, p. 71
0072	06-17-15	06-18-15	307	367	291	315								34, p. 72
0078	06-10-15	06-23-15	262	343	373								148	34, p. 78
0080	06-16-15	06-23-15				232	392						58	34, p. 80
0081	06-16-15	06-18-15			346	208							68	34, p. 81
0086	06-16-15	06-23-15	387	285										34, p. 86
0087	06-16-15	06/17/15	354	237	287	**578**						**1,466**		34, p. 87; 33, p. 1226
0090	06-16-15	06-23-15	256		233	209							238	34, p. 90
0091	06-15-15	06-23-15	341	**401**	336				**485**			**983**		34, p. 91; 33, p. 1226
0092	06-16-15	06-18-15		364	281	**410**			200				210	34, p. 92; 33, p. 1226
0093	06-16-15	06-18-15	**574**										275	34, p. 93; 33, p. 1226
0100	10-24-15	11-15-15		290								293	230	34, p. 100
0101	10-29-15	11-07-15	235									777	315	34, p. 101
0102	10-29-15	11-14-15		228								340	212	34, p. 102
0103	11-03-15	11-05-15	224					**935**				**1,200**	241	34, p. 103; 33, p. 1226

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0104	10-29-15	11-04-15	**668**	312	379	303			304			**408**	208	34, p. 104; 33, p. 1226
0106	10-29-15	11-04-15	297	251	259							409	375	34, p. 106
0107	10-29-15	11-03-15	342	295	**930**							**418**	**406**	34, p. 107; 33, p. 1226
0108	10-29-15	11-04-15	250	325									219	34, p. 108
0109	11-02-15	11-05-15	**1,199**	**669**	326							366	281	34, p. 109; 33, p. 1226
0110	10-29-15	11-04-15	265	201								247	231	34, p. 110
0111	10-29-15	11-04-15	224										**823**	34, p. 111; 33, p. 1226
0112	11-02-15	11-05-15	314	231								2,615	160	34, p. 112
0113	10-29-15	11-04-15		214									238	34, p. 113
0114	10-29-15	08-05-15		228								389	221	34, p. 114
0116	11-03-15	11/05-15	331			261			**490**				116	34, p. 116; 33, p. 1226
0117	11-02-15	11-08-15	281	252				**454**				**406**	109	34, p. 117; 33, p. 1226
0118	10-30-15	11-05-15			249			**612**	275			**572**	205	34, p. 118; 33, p. 1227
0119	10-30-15	11-05-15	333	**979**							265	**919**	215	34, p. 119; 33, p. 1227
0121	10-29-15	11-04-15			284	**3,500**						**2,345**	138	34, p. 121; 33, p. 1227
0123	11-02-15	11-09-15	208	204								1,306	211	34, p. 123
0126	11-03-15	11-05-15			300			263				2,215	180	34, p. 126
0130	11-03-15	11-05-15	215									559	180	34, p. 130
0131	11-03-15	11-05-15										813	237	34, p. 131
0132	11-03-15	11-05-15			342			277					168	34, p. 132
0133	11-04-15	11-06-15	372	217	**575**			385				**656**	273	34, p. 133; 33, p. 1227
0136	11-04-15	11-06-15		202								573	242	34, p. 136
0139	11-05-15	11-06-15	220	**720**								217	221	34, p. 139; 33, p. 1227
0144	11-05-15	11-10-15	260	275								441	100	34, p. 144
0147	11-04-15	11-06-15	212	204								1,090	212	34, p. 147
0148	11-05-15	11-10-15		212					1,487			292	144	34, p. 148
0149	11-04-15	11-06-15	**462**									307	262	34, p. 149; 33, p. 1227
0150	11-05-15	NR	239									412	237	34, p. 150
0152	11-05-15	11-12-15		**431**								**515**	100	34, p. 152; 33, p. 1227
0153	11-10-15	11-12-15	306	296								632	172	34, p. 153
0155	11-06-15	11-12-15	299	195								1,515	153	34, p. 155
0156	11-06-15	11-12-15	237	194		282						491	196	34, p. 156
0157	11-09-15	11-12-15	250									1,816	184	34, p. 157
0158	11-06-15	11-10-15		253				347				4,360	193	34, p. 158
0160	11-10-15	11-12-15				281					357	203	221	34, p. 160

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0161	11-10-15	11-12-15	257	225								2,127	279	34, p. 161
0163	11-09-15	11-12-15			333						245	1,178	80	34, p. 163
0165	11-09-15	11-12-15	388	559								2,339	240	34, p. 165
0169	11-10-15	11-13-15	264	309								1,323	173	34, p. 169
0172	11-10-15	11-13-15	301	356								325	156	34, p. 172
0174	11-09-15	11-13-15		265	227	211							192	34, p. 174
0178	11-10-15	11-17-15	198	207								224	168	34, p. 178
0181	11-10-15	11-13-15	250	344	**1,340**	**527**		285				268	263	34, p. 181; 33, p. 1227
0186	11-11-15	11-17-15	289	235	202			254				393	186	34, p. 185
0189	11-10-15	11-17-15	216									2,708	163	34, p. 188
0191	11-11-15	11-17-15		266								508	289	34, p. 190
0197	11-11-15	11-17-15	**552**		319							373	124	34, p. 195; 33, p. 1227
0202	11-11-15	11-18-15	**580**	216								**3,420**	213	34, p. 200; 33, p. 1227
0203	11-11-15	11-18-15	191	235				498				819	192	34, p. 201
0209	11-17-15	11-19-15	264					270				554	343	34, p. 207
0213	11-12-15	11-18-15	320	275								937	266	34, p. 211
0216	11-12-15	11-18-15	225	289				**500**					103	34, p. 214; 33, p. 1227
0217	11-13-15	11-18-15			317								239	34, p. 215
0218	11-13-15	11-20-15	270								361	3,697	273	34, p. 216
0223	11-16-15	11-19-15	319									2,589	252	34, p. 221
0228	11-17-15	11-30-15			269	266							248	34, p. 226
0229	11-18-15	11-30-15	253									3,007	213	34, p. 227
0230	11-17-15	11-20-15		204								206	316	34, p. 228
0231	11-17-15	11-20-15	371		378								**524**	34, p. 229; 33, p. 1228
0232	11-17-15	11-17-15		291				210					**406**	34, p. 230; 33, p. 1228
0233	11-18-15	11-20-15		279	275							685	254	34, p. 231
0238	11-18-15	11-30-15	254		**418**								261	34, p. 236; 33, p. 1228
0242	11-17-15	11-20-15	315	**417**							335	263	663	34, p. 240; 33, p. 1228
0244	11-17-15	11-20-15	374	344								4,278	221	34, p. 242
0248	11-18-15	11-30-15									379	1,123	84	34, p. 246
0249	11-18-15	12-01-15	314	203	317				**423**		216	**838**	234	34, p. 247; 33, p. 1228
0254	11-20-15	12-01-15	199		200	265						918	117	34, p. 251
0255	11-19-15	12-02-15	281	267								650	275	34, p. 252
0257	11-18-15	12-02-15	267	272								**430**	**430**	34, p. 254; 33, p. 1228
0258	11-20-15	12-02-15		221					**633**				209	34, p. 255; 33, p. 1228
0260	11-19-15	12-02-15	342	340	216								208	34, p. 257
0261	12-01-15	12-02-15	223			225	319	240	318			474	212	34, p. 258

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0262	11-19-15	12-02-15	320	303								455	246	34, p. 259
0263	12-01-15	12-02-15	198		201	378						668	289	34, p. 260
0270	12-01-15	12-03-15	299					234			283		245	34, p. 267
0271	11/20/15	12/03/15	218									226	218	34, p. 268
0272	11-19-15	12-03-15	306	**417**	**537**	**1,032**		331				**1,112**	247	34, p. 269; 33, p. 1228
0276	12-02-15	12-03-15		274									85	34, p. 273
0279	12-02-15	12-03-15		244	359								232	34, p. 276
0280	12-02-15	12-03-15	284	339								**956**	**493**	34, p. 277; 33, p. 1228
0281	12-02-15	12-03-15	191					710					176	34, p. 278
0285	08-08-16	08-10-16	358									1,387	144	34, p. 282
0286	08-10-16	08-18-16	349	307							219	924	165	34, p. 283
0287	08-09-16	08-10-16	262	234	**457**			368				**2,136**	272	34, p. 284; 33, p. 1228
0288	08-09-16	08-11-16	279	318	240				202				255	34, p. 285
0290	08-10-16	08-11-16	264	220							194	725	236	34, p. 287
0292	08-18-16	NR	221	**405**	328	**449**						**1,923**	231	34, p. 289; 33, p. 1229
0293	08-10-16	08-12-16	287									1,923	144	34, p. 290
0299	08-18-16	08-29-16	320								391	714	159	34, p. 296
0302	08-16-16	08-29-16	313	281	213	339					251	986	185	34, p. 299
0304	8-16-16	8-29-16	281	208	**423**						**602**	**923**	**542**	34, p. 301; 33, p. 1229
0305	08-16-16	08-29-16	316										366	34, p. 302
0310	08-17-16	08-30-16		254								629	156	34, p. 307
0311	08-17-16	08-30-16	**406**									**945**	144	34, p. 308; 33, p. 1229
0317	08-18-16	08-31-16	210	380							**555**		**542**	34, p. 314; 33, p. 1229
0319	06-15-17	06-22-17	206	303	210								**549**	34, p. 316; 33, p. 1229
0320	08-19-16	06-01-16	371	345								876	235	34, p. 317
0321	08-19-16	09-01-16	**1,157**	251								**4,454**	118	34, p. 318; 33, p. 1230
0322	08-19-16	09-01-16	252								364	756	139	34, p. 319
0323	08-22-16	NR	**400**	**442**				248				**1,002**	253	34, p. 320; 33, p. 1230
0324	08-22-16	09-01-16	274	211								1,367	331	34, p. 321
0325	08-22-16	09-01-16	**467**	211										34, p. 322; 33, p. 1230
0327	08-24-16	09-01-16	322		343	291						402	185	34, p. 324
0329	08-24-16	NR	300	308	200	242			228		486	1,889	119	34, p. 326
0331	08-24-16	09-08-16	366	290	380	230						1,652	205	34, p. 328
0333	08-30-16	09-08-16		394									144	34, p. 330
0341	08-23-16	09-08-16	**915**	314				312				**1,760**	275	34, p. 338; 33, p. 1230
0343	08-30-16	09-08-16	282					215				2,876	227	34, p. 340

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0351	09-01-16	09-14-16	237	273								716	186	34, p. 347
0353	09-01-16	09-14-16	252	348								1,793	197	34, p. 349
0354	09-01-16	09-14-16	362		279						638	1,762	238	34, p. 350
0357	09-02-16	09-15-16	367		328							9,344	173	34, p. 353
0360	08-22-16	09-15-16	238	373								1,700	161	34, p. 356
0361	08-25-16	09-15-16	258	466	264			321				487	**844**	34, p. 357; 33, p. 1230
0363	09-07-16	09-16-16	221	259	467							433	231	34, p. 359
0368	09-06-16	09-20-16	315	323				**768**				**2,343**	184	34, p. 364; 33, p. 1231
0372	09-07-16	09-20-16	203								364	804	95	34, p. 368
0374	09-09-16	09-21-16	221	262								5,573	258	34, p. 370
0380	10-18-16	10-19-16	360	227								1,852	210	34, p. 376
0383	09-13-16	09-21-16	260	358									346	34, p. 379
0384	09-14-16	09-21-16			397							551	127	34, p. 380
0385	09-13-16	09-21-16			**436**	378						**769**	155	34, p. 381; 33, p. 1231
0386	09-13-16	09-21-16		192	202	265						3,252	123	34, p. 382
0387	09-13-16	09-21-16	230	309						238			116	34, p. 383
0388	09-13-16	09-21-16	291									1,802	213	34, p. 384
0392	09-15-16	09-29-16		200	263				313			1,373	288	34, p. 388
0393	09-14-16	09-29-16		200	239							230	**413**	34, p. 389; 33, p. 1231
0396	09-22-16	10-12-16	298									**490**	**461**	34, p. 392; 33, p. 1231
0397	09-21-16	10-12-16	301	254								3,672	348	34, p. 393
0399	09-19-16	09-29-16	309					221				790	309	34, p. 394
0406	09-20-16	09-30-16	239	377	210	287						440	201	34, p. 401
0408	09-20-16	09-30-16	212	222								1,685	213	34, p. 403
0410	09-21-16	09-30-16	288	250								1,568	290	34, p. 405
0413	10-03-16	10-12-16	389			201							171	34, p. 408
0418	09-22-16	09-30-16	**402**	342				341				**5,967**	205	34, p. 413; 33, p. 1231
0437	10-18-16	11-02-16	**457**	**437**	253							**2,500**	380	34, p. 432; 33, p. 1232
0446	10-20-16	11-02-16		247	231				256	203	345	1,197	275	34, p. 441
0448	10-20-16	11-03-16	214		200						369	704	223	34, p. 443
0463	11-03-16	11-10-16									367	1,287	140	34, p. 457
0466	11-03-16	11-10-16	217	225							367		164	34, p. 460
0470	11-08-16	11-10-16	232		353			369	194			**625**	**530**	34, p. 464; 33, p. 1232
0471	10-19-16	11-03-16									323	614	140	34, p. 465
0475	11-09-16	11-10-16	325	242		194						2,705	334	34, p. 469
0476	11-09-16	11-10-16	**539**	255									119	34, p. 470; 33, p. 1232
0482	11-15-16	11-23-16	291									904	213	34, p. 476
0484	11-15-16	11-23-16	375	200								763	178	34, p. 478
0486	11-15-16	12-08-16	357									621	158	34, p. 480

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0489	11-16-16	11-22-16	300	299								329	315	34, p. 483
0491	11-16-16	11-30-16	**481**	**478**								1,320	163	34, p. 485
0493	11-16-16	12-08-16		258	**555**							**473**	205	34, p. 487; 33, p. 1233
0492	02-06-17	02-10-17		278	270							678	260	34, p. 492
0493	12-20-16	01-13-17	191	249								957	291	34, p. 493
0512	02-01-17	02-02-17	387						254				111	34, p. 506
0515	02-07-17	02-21-17		284							**484**	**424**	**454**	34, p. 509; 33, p. 1233
0518	02-08-17	02-21-17	313	346	345								304	34, p. 512
0524	02-09-17	02-20-17	**544**	**617**	355	**460**							**684**	34, p. 517; 33, p. 1234
0527	02-09-17	02-20-17	268	386								1,325	243	34, p. 520
0528	02-09-17	NR	**831**	**450**	352	**626**							270	34, p. 521; 33, p. 1234
0535	02-09-17	02-22-17	323	368				292				1,268	164	34, p. 528
0536	02-10-17	02-22-17	348	223								1,030	394	34, p. 529
0537	02-14-17	02-22-17	**462**	350								**1,042**	**439**	34, p. 530; 33, p. 1234
0538	02-14-17	02-22-17	228			**438**						**1,351**	212	34, p. 531; 33, p. 1234
0540	02-14-17	02-22-17	**497**	334	263	**429**			292			**679**	351	34, p. 533; 33, p. 1234
0543	02-14-17	02-21-17	379		262								216	34, p. 535
0547	02-15-17	02-22-17	269	300									202	34, p. 540
0551	02-15-17	02-22-17	202	200		298		**458**					171	34, p. 544; 33, p. 1234
0555	02-17-17	03-01-17	339	255		266						**446**	**419**	34, p. 548; 33, p. 1234
0556	03-09-17	03-13-17	257	215	280	334							127	34, p. 549
0557	02-17-17	03-01-17	**452**	306								**778**	231	34, p. 550; 33, p. 1234
0558	02-17-17	03-01-17		207				218				414	299	34, p. 551
0560	02-15-17	02-23-17	371	302	**457**							**586**	200	34, p. 553; 33, p. 1234
0569	02-15-17	12-12-17	241	**541**	268					267	**435**	240	291	34, p. 562; 33, p. 1235
0573	03-14-17	03-15-17		307								638	137	34, p. 566
0575	03-15-17	NR	329	313								1,213	397	34, p. 568
0576	03-02-17	03-03-17		**409**	259	360							165	34, p. 569; 33, p. 1235
0579	04-18-17	04-26-17	**519**	302	312			**502**				**1,162**	75	34, p. 572; 33, p. 1235
0585	04-18-17	05-05-17	390	194	288							1,505	138	34, p. 578
0589	04-19-17	05-04-17			382						1,194	1,508	129	34, p. 582
0595	04-19-17	04-26-17	225		333							844	117	34, p. 588
0596	04-19-17	04-26-17	381	288	193						328	1,563	161	34, p. 589
0597	03-14-17	03-15-17		274		290		191			338		193	34, p. 590

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0599	04-18-17	04-26-17		235							**973**	**2,207**	126	34, p. 592; 33, p. 1235
0605	04-18-17	NR	395		240							747	160	34, p. 598
0606	05-02-17	05-11-17			396					223			**924**	34, p. 599; 33, p. 1235
0607	04-20-17	05-04-17				311	240					2,008	296	34, p. 600
0610	04-19-17	04-25-17	370	213								423	259	34, p. 603
0613	04-19-17	06-05-17	270	245								1,483	130	34, p. 606
0614	04-19-17	NR	310			197						801	95	34, p. 607
0616	04-19-17	05-04-17	**403**	362	217	278	241					**966**	168	34, p. 609; 33, p. 1235
0620	04-20-17	05-11-17	284	**533**								**946**	191	34, p. 613; 33, p. 1235
0622	04-19-17	05-11-17	225	266								580	262	34, p. 615
0628	04-20-17	05-11-17	257	**465**									280	34, p. 621; 33, p. 1235
0631	04-20-17	05-11-17	208					199				526	235	34, p. 624
0633	04-20-17	05-11-17	199										312	34, p. 626
0634	04-19-17	05-05-17	331	374	255							611	263	34, p. 627
0635	04-19-17	05-11-17	355	347	331	**630**						**805**	242	34, p. 628; 33, p. 1236
0637	04-19-17	05-11-17		256	318			256			198		103	34, p. 629
0638	04-20-17	05-11-17	318		300							1,119	200	34, p. 630
0645	04-20-17	05-05-17	210	242				242			**505**	**4,336**	102	34, p. 637; 33, p. 1236
0646	04-18-17	05-05-17			388								300	34, p. 638
0651	04-17-17	04-27-17	**438**	**571**	268								273	34, p. 642; 33, p. 1236
0668	04-24-17	05-04-17		329		261		353					130	34, p. 659
0677	04-18-17	05-12-17	**400**	343				**403**				**996**	274	34, p. 666; 33, p. 1236
0679	04-18-17	NR		309							217		238	34, p. 667
0682	04-25-17	05-12-17	222	228								201	189	34, p. 670
0685	04-25-17	05-12-17	223	534									315	34, p. 674
0686	04-24-17	05-12-17	301	**471**								**649**	277	34, p. 675; 33, p. 1236
0689	04-24-17	05-10-17		314				203	284				102	34, p. 678
0696	04-25-17	05-16-17	392	300								820	289	34, p. 685
0698	04-25-17	05-03-17	226	241								372	246	34, p. 687
0702	04-26-17	05-22-17	292									851	166	34, p. 691
0703	NR	05-11-17										245	131	34, p. 692
0704	04-26-17	05-23-17		219	325								175	34, p. 693
0705	04-18-17	05-01-17	336	330	**531**								340	34, p. 694; 33, p. 1236
0711	04-27-17	05-26-17	201							298	353	335	97	34, p. 700
0713	04-19-17	05-17-17	203		222							265	72	34, p. 702
0714	04-27-17	05-17-17	191	270				254				2,448	195	34, p. 703
0717	05-01-17	08-18-17	282	219								1,018	149	34, p. 706

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0718	04-27-17	05-18-17	**547**	190									367	34, p. 707; 33, p. 1236
0722	04-26-17	05-18-17	328										211	34, p. 711
0725	04-27-17	05-18-17		275							248		142	34, p. 714
0734	04-27-17	05-19-17		275								639	321	34, p. 721
0735	04-27-17	05-17-17	249									555	361	34, p. 722
0736	04-27-17	05-17-17	301									246	250	34, p. 723
0737	04-26-17	05-17-17	225	231	238						**469**	**2,079**	287	34, p. 724; 33, p. 1237
0740	04-27-17	06-13-17			193							218	118	34, p. 727
0741	04-27-17	05-03-17	370	**421**								**750**	313	34, p. 728; 33, p. 1237
0742	05-02-17	05-18-17	392									948	206	34, p. 729
0747	04-26-17	05-19-17	**454**	268								**1,283**	189	34, p. 734; 33, p. 1237
0749	04-27-17	05-19-17	191	228							**647**	**1,196**	315	34, p. 736; 33, p. 1237
0750	04-27-17	05-19-17	226					232				529	208	34, p. 737
0754	04-17-17	05-16-17	277									363	262	34, p. 741
0757	04-22-17	05-16-17	**445**	224									358	34, p. 744; 33, p. 1237
0758	04-27-17	05-16-17	265	227								3,605	147	34, p. 745
0760	05-02-17	05-16-17	236	329	**778**	**470**		336	**1,180**			**3,046**	167	34, p. 747; 33, p. 1237
0761	05-02-17	05-16-17	319	220									**684**	34, p. 748; 33, p. 1237
0766	05-04-17	05-26-17	285	**546**	330							**2,386**		34, p. 755; 33, p. 1237
0767	05-04-17	05-26-17	288	224	282								286	34, p. 756
0768	05-04-17	05-31-17	198	242								11,800	172	34, p. 757
0769	05-04-17	05-31-17	**686**	217								**3,538**	383	34, p. 758; 33, p. 1237
0772	05-03-17	05-17-17		**403**	219					380	**608**	368	228	34, p. 761; 33, p. 1237
0780	05-08-17	05-30-17	337	357	204	205						956	295	34, p. 769
0781	05-04-17	05-18-17	384	204							242	**592**	**501**	34, p. 770; 33, p. 1237
0782	05-04-17	05-17-17	**1,043**	**485**	**600**	298						**1,006**	**480**	34, p. 771; 33, p. 1237
0785	05-04-17	05-31-17		259							**747**	**877**	245	34, p. 774; 33, p. 1237
0786	05-03-17	05-31-17	215	256	**430**	**481**						**701**	333	34, p. 775; 33, p. 1238
0789	05-04-17	05-31-17	254	227		295							**494**	34, p. 778; 33, p. 1238
0790	05-09-17	05-30-17			324				360				247	34, p. 779
0793	05-09-17	05-31-17		212	**434**		211						328	34, p. 782; 33, p. 1238

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0801	05-04-17	05-19-17	**525**	331							282	**441**	**662**	34, p. 789; 33, p. 1238
0802	06-15-17	06-20-17	269	219	**407**	**412**	**512**				**977**	**4,598**	242	34, p. 790; 33, p. 1238
0805	05-09-17	06-05-17				206							262	34, p. 793
0812	05-23-17	06-05-17	284	299								1,308	181	34, p. 800
0813	05-23-17	06-05-17	328	247								643	128	34, p. 801
0815	05-23-17	06-06-17	238	233								1,555	64	34, p. 803
0816	05-09-17	05-30-17	283	233	327								387	34, p. 804
0829	05-29-17	06-06-17	385	**551**	**458**			213			**480**	**1,379**	**410**	34, p. 818; 33, p. 1238
0832	05-08-17	06-06-17	**482**	**678**				375				**1,914**	**737**	34, p. 821; 33, p. 1238
0834	05-24-17	06-05-17	199	294									169	34, p. 823
0837	05-25-17	06-06-17	**646**	243	**546**								**448**	34, p. 826; 33, p. 1238
0838	05-25-17	06-06-17	231	250								641	178	34, p. 827
0839	05-15-17	06-20-17		371								627		34, p. 828
0840	06-15-17	06-22-17	345									1,066	207	34, p. 829
0841	06-26-17	06-29-17		206								802	131	34, p. 830
0842	05-25-17	06-06-17	244									784	341	34, p. 831
0844	05-25-17	06-06-17	322	379								309	**417**	34, p. 833; 33, p. 1238
0845	NR	06-29-17	226	345									114	34, p. 834
0846	06-15-17	06-22-17		367	360						197	834	169	34, p. 835
0849	06-27-17	06-29-17	**567**	386								**1,498**	**600**	34, p. 838; 33, p. 1238
0851	06-27-17	06-30-17	285	344	227			233				346	277	34, p. 840
0853	NR	06-29-17			209			**1,165**				**6,438**	**688**	34, p. 841; 33, p. 1239
0854	NR	06-29-17					202	227				**955**	**491**	34, p. 842; 33, p. 1239
0855	06-27-17	06-29-17	**424**	257	278							**3,210**	242	34, p. 843; 33, p. 1239
0858	11-15-17	12-18-17			246	259						483	223	34, p. 846
0860	11-15-17	1-3-18			207	377					**536**	**510**	64	34, p. 848; 33, p. 1239
0861	11-17-17	12-12-17	257	**457**	230	326		283				336		34, p. 849; 33, p. 1239
0863	11-16-17	1-10-18	333	207		**494**						**1,097**	245	34, p. 851; 33, p. 1239
0865	11-17-17	12-5-17	236	332	**580**						260	**524**		34, p. 853; 33, p. 1239
0870	12-13-17	12-20-17	224			267						899	138	34, p. 858
0876	11-16-17	12-12-17		339								338		34, p. 864
0885	12-14-17	12-20-17	251	245	212	**510**					**540**	**614**	172	34, p. 873; 33, p. 1239

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0886	12-19-17	1-10-18	386	210		363					**650**	506	293	34, p. 874; 33, p. 1239
0887	12-19-17	1-11-18		243	219							638	197	34, p. 875
0896	12-21-17	1-11-18			254								78	34, p. 880
0897	12-18-17	1-11-18	**658**	285	261	306						**1,977**	380	34, p. 881; 33, p. 1239
0898	1-31-18	2-20-18	**739**	229	238	270						364	298	34, p. 882; 33, p. 1240
0902	12-18-17	1-12-18	355	**421**								301	187	34, p. 886; 33, p. 1240
0906	12-17-17	1-12-18	269					195				337	**951**	34, p. 890; 33, p. 1240
0907	12-19-17	1-12-18		198	**1,052**	276						**424**	125	34, p. 891; 33, p. 1240
0908	12-20-17	1-12-18	210	277	**1,368**	**1,467**	336	**4,970**				263	148	34, p. 892; 33, p. 1240
0909	12-19-17	1-12-18	217	314			337	313				**1,209**	**495**	34, p. 893; 33, p. 1240
0910	12-20-17	1-25-18	343			215						**1,386**	**701**	34, p. 894; 33, p. 1240
0911	12-20-17	1-25-18	**2,505**	351	264	**449**						**1,889**	298	34, p. 895; 33, p. 1240
0913	12-20-17	1-25-18	198	222								750	361	34, p. 897
0914	12-20-17	1-25-18		**641**								**1,836**	207	34, p. 898; 33, p. 1240
0915	12-21-17	1-25-18	292		225	221		259					215	34, p. 899
0916	12-6-17	2-20-18	204									1,871	349	34, p. 900
0917	1-3-18	2-20-18	214	219								315	386	34, p. 901
0918	12-20-17	1-25-18	358	320				**890**			**1,225**	**2,845**	180	34, p. 902; 33, p. 1240
0919	1-3-18	2-20-18	215			506		215				292	205	34, p. 903
0922	1-3-18	2-21-18		261	**1,128**	**1,203**						**1,156**	274	34, p. 906; 33, p. 1240
0923	12-20-17	1-25-18	263	360	216								183	34, p. 907
0927	1-4-18	2-21-18	382									955	220	34, p. 911
0928	1-4-18	2-21-18		299	**968**			293				**1,187**	170	34, p. 912; 33, p. 1240
0929	1-3-18	2-21-18		368								861	96	34, p. 913
0931	2-8-18	2-22-18				**561**							314	34, p. 915; 33, p. 1240
0934	1-29-18	2-21-18			291							497	227	34, p. 918
0935	1-31-18	2-21-18	**506**	192	264							**1,067**	262	34, p. 919; 33, p. 1240
0937	1-31-18	2-22-18	301									564	327	34, p. 921
0938	2-5-18	2-22-18	244		223						356	500	127	34, p. 922
0939	2-5-18	2-22-18	327		207								209	34, p. 923
0942	1-4-18	2-22-18			326	**447**	352					**1,353**	287	34, p. 926; 33, p. 1240

Table 6: Properties Sampled by XRF Used to Infer Contamination in AOC A*

Property ID	Date Collected	Date Analyzed	XRF Lead Measurement (in ppm) and Sample Location											Reference
			C-1	C-2	C-3	C-4	C-5	DW	GA	PA	LS	DZ	RE	
0944	2-7-18	2-22-18	238	311	195	297	221					1,843	93	34, p. 928
0945	02-05-18	02-22-18	360	248									325	34, p. 929
0946	01-30-18	02-22-18	242									984	134	34, p. 930
0947	02-09-18	02-22-18	208	272		279						369	346	34, p. 931
0948	02-06-18	02-22-18	289		199	360		217				285	303	34, p. 932
0949	03-01-18	03-08-18		**477**	252	**1,407**					**1,350**	**1,102**	136	34, p. 933; 33, p. 1241
0950	02-28-18	03-08-18		194						217		3,175	127	34, p. 934
0951	02-28-18	03-08-18	326										153	34, p. 935
0954	NR	03-09-18	229	219								926	357	34, p. 937
0957	02-26-18	03-09-18		303								1,435	297	34, p. 940
0958	02-26-18	03-06-18	241							358		324	180	34, p. 941
0960	02-29-18	03-09-18	395	326									**478**	34, p. 943; 33, p. 1241
0962	04-11-18	04-27-18	327	337	244							578	268	34, p. 945
0963	04-10-18	04-27-18	367	234	209							305	629	34, p. 946
0966	04-10-18	04-27-18	351	239	**885**							**1,185**	391	34, p. 949; 33, p. 1241
0973	04-10-18	04-27-18		388			221					1,021	205	34, p. 956
0976	04-09-18	05-04-18	201	365								1,107	145	34, p. 959
0986	07-24-18	07-27-18				205						272	194	34, p. 969
0988	08-10-18	08-15-18	248	196		216						490	187	34, p. 971
0990	08-10-18	08-12-18				194							213	34, p. 973
0991	08-15-18	NR	215										201	34, p. 974

Notes:
* Drip zone samples are not used to establish contamination by inference.
Bolded XRF result and a shaded table cell indicates a cell/area or portion of a property where a removal action has occurred (Ref. 33)

C	cell	NR	Not reported
DW	Driveway	PA	Play area
DZ	Drip zone	RE	Road easement
GA	Garden area	XRF	X-ray fluorescence spectrometer
LS	Landscape feature	ppm	Parts per million

Additional Supporting Data

All samples collected during the SI were analyzed for the target analyte list (TAL) metals by the EPA Region 7 laboratory (Ref. 16, pp. 13, 15, 85). Table 7 below summarizes the results of all analytes by background samples and residential properties. Background samples were designated as samples 7516-1 through 7516-4, and residential properties were designated as samples 7516-5 through 7516-50 (Ref. 16, pp. 14-16, 83-84).

Table 7: Expanded List of Metals Results from Site Inspection Sampling

Analyte	Background Samples: Concentration Range (mg/kg)	Background Samples: Observed Contamination Concentration[1] (mg/kg)	Residential Property Samples: Concentration Range (mg/kg)	Residential Property Samples: Number of Samples Meeting Observed Contamination Criteria	Residential Property Samples: 7516-Series Samples Meeting Observed Contamination Criteria
Mercury	0.0191 – 0.0460	0.138	0.0325 - 0.407	**22**	5, 7, 9, 11, 12, 17, 18, 19, 20, 23, 24, 25, 26, 30, 32, 34, 36, 38, 39, 42, 46, 49
Aluminum	8,810 – 13,000	39,000	6,380 – 16,300	0	
Antimony	2.1 U – 2.2 U	≥ Reporting Limit	2.0 U – 2.2 U	0	
Arsenic	5.3 U – 5.6 U	≥ Reporting Limit	5.0 U - 18	**37**	5, 6, 8, 9, 10, 11, 13, 14, 15, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 38, 39, 41, 42, 44, 45, 46, 47, 48, 49, 50
Barium	59.6 - 105	315	58.3 – 299	0	
Beryllium	All 1.1 U	≥ Reporting Limit	1.0 U – 1.1 U	0	
Cadmium	All 1.1 U	≥ Reporting Limit	1.0 U - 16	**45**	5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Calcium	2,580 – 16,200 J[2]	48,600	3,360 – 67,400	**1**	37
Chromium	20.8 – 32.7	98.1	15.9 – 43.7	0	
Cobalt	2.2 - 6.3	18.9	1.9 – 11.9	0	
Copper	6.7 – 12.6	37.8	20.8 - 120	**18**	8, 9, 11, 15, 17, 18, 20, 22, 24, 27, 28, 34, 36, 39, 42, 45, 47, 48
Iron	10,300 – 15,900	47,700	7,740 – 20,900	0	
Lead	11.3 – 39.6	118.8	94.3 - 367	**45**	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50
Magnesium	1,130 – 1,830	5,490	1,020 – 2,510	0	
Manganese	330 - 500	1,500	255 - 759	0	
Nickel	3.4 – 9.4	28.2	3.3 – 19.1	0	
Potassium	1,100 – 1,710	5,130	943 – 2,810	0	
Selenium	10.6 U – 14.3	42.9	9.9 U – 58.4	**1**	37
Silver	2.1 U – 2.2 U	≥ Reporting Limit	2.0 U – 3.0	**3**	37, 42, 47
Sodium	53.0 U – 76.2	228.6	49.7 U - 194	0	
Thallium	10.6 U – 11.2 U	≥ Reporting Limit	9.9 U – 11.2 U	0	
Vanadium	17.4 - 23	69	11.9 – 31.4	0	
Zinc	63.36 – 193 J[2]	579	451 – 2,640	**42**	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22,

Table 7: Expanded List of Metals Results from Site Inspection Sampling

	Background Samples		Residential Property Samples		
Analyte	**Concentration Range (mg/kg)**	**Observed Contamination Concentration[1] (mg/kg)**	**Concentration Range (mg/kg)**	**Number of Samples Meeting Observed Contamination Criteria**	**7516-Series Samples Meeting Observed Contamination Criteria**
					23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 41, 42, 45, 46, 47, 48, 49, 50
Reference for Column	16, pp. 83, 87	1, Table 2-3	16, pp. 83, 84, 88-99		16, pp. 88-99

Notes:

1 If the background concentration is not detected (or less than the detection limit), an observed release is established when the sample measurement equals or exceeds the sample quantitation limit. If the background concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration (Ref. 1, Table 2-3).

2 Although the analyte in question has been positively identified in the sample, the quantitation limit is an estimate (J-coded) due to high recovery of this analyte in the laboratory matrix spike. The actual concentration for this analyte may be lower than the reported value (Ref. 16, pp. 85, 86).

mg/kg Milligrams per kilogram

U The analyte was not detected at or above the reporting limit (Ref. 16, p. 82).

≥ Greater than or equal to.

ATTRIBUTION

The Caney Residential Yards site area of observed contamination (AOC A) consists of lead-, zinc-, and cadmium-contaminated soil due, at least in part, to releases from two former lead and zinc smelters that operated in Caney, Kansas—the Owen Zinc Smelter and the American Zinc, Lead, and Smelting Company (AZLSC) (Refs. 7, pp. 6, 9, 10, 11, 12; 8, pp. 6, 8; 10, pp. 4, 5, 18; 23, pp. 1-3; Figure 1). As explained below, lead, zinc, and cadmium contamination in residential soils likely came from both air deposition from smelter stacks and from direct deposition of smelter wastes used for driveway paving, construction backfill and landscape material.

Historically, the smelting process involved heating crushed ore (zinc sulfide [ZnS] also known as sphalerite or blackjack) in kilns for a period of time to oxidize the ore and drive off the sulfur (Ref. 7, pp. 3, 4). The roasted ore would be mixed with coke coal and loaded into clay cylinders called retorts where the mixture was superheated to 1975 degrees centigrade and the zinc would vaporize and move to a condenser to cool to liquid zinc (Ref. 7, p. 4). The smelting process generated a large amount of pollution including sulfur and nitrogen oxides and a large amount of soot. The soot was typically contaminated with lead, cadmium, arsenic, and zinc (Ref. 7, p. 5).

Both the AZLSC and Owen Zinc smelter had one or more stacks over 100 feet tall associated with roasting furnaces and multiple furnace buildings (Refs. 9, p. 10; 23, pp. 1-3). During operations, wind likely would have transported and deposited soot from the Owen Zinc and AZLSC stacks to the surrounding area. Predominant wind direction in Caney is from the south or north (Ref. 11, p. 23).

In addition to the airborne pollution, the smelting operations left large volumes of solid waste including cinders, broken retorts, building materials, and impure smelter slag (Ref. 7, pp. 5, 6). Since the smelters ceased operation, lead particles and other heavy metal particles associated with the smelter operations may have become airborne and settled onto area properties. Also it is possible that yards and roads became contaminated as residents transported waste materials from the smelters, in the form of cinders or other material, to homes and other locations for use as driveway paving, construction backfill and landscape material, as was common practice at that time (Refs. 6, p. 1; 45, p. 8).

At the AZLSC property, notable concentrations of lead (4,555.832 mg/kg), cadmium (309. 371 mg/kg), and zinc (42,440.00 mg/kg) were identified in surface soil samples collected at the property (Ref. 8, pp. 10 - 12, 60, 62, 64). According to Sanborn Fire insurance maps, in 1917 the AZLSC facility consisted of 10 retort furnaces, each with two stacks which extended 10 feet above the roof of the buildings, and 6 roasting furnaces with two 118 feet tall brick stacks and one 125 feet tall concrete stack (Ref. 23, p. 2).

At the former Owen Zinc smelter, notable concentrations of cadmium (1,099 mg/kg), lead (4,845 mg/kg) and zinc

(32,210 mg/kg) were identified in soils at the site in 1991 and 1992 (Ref. 10, pp. 6, 95, 96, 97). Subsequent investigations by KDHE included an Expanded Site Inspection/Preliminary Removal Site Evaluation in 2001 (Ref. 25). Investigation activities confirmed presence of elevated concentrations of lead, zinc, and cadmium at the facility (Ref. 25, pp. 18, 19). Maximum concentrations of lead, cadmium, and zinc reported in soil samples were 4,102.7, 748.8, and 86,104.4 mg/kg respectively (Ref. 25, pp. 9, 10, 53, 56). According to Sanborn Fire insurance maps, in 1917 the Owen Zinc Company facility consisted of 3 retort furnaces buildings, each with two furnaces and 4 brick stacks, and 1 roasting furnace with a 105-foot-high concrete stack (Ref. 23, pp. 1, 3).

Other possible sources of lead in residential soils include the potential past use of leaded paint on houses and emissions from vehicle exhaust when lead was used as an additive in gasoline. In assessing and screening the residential properties in Caney, EPA designed the screening process to segregate drip zones on properties as appropriate and sample them separately. Elevated lead in the drip zones may have been the result of lead based paint on the structures. The results of the drip zone screening samples are presented in Tables 1 and 6 of this documentation record. It is difficult to distinguish whether the lead in the drip zone soils is attributable to lead based paint on the structures or smelter soot/fugitive dust from the smelters landing on the roofs of homes or adhering to outside walls and being washed off by precipitation. Because of this uncertainty, none of the samples used to establish the area of observed contamination were based on samples collected from the drip zones of the properties. In addition no resident population was scored based on drip zone samples only. EPA has performed removal actions in drip zones, but only at properties where one of the other cells/areas at that property exceeded the action level (Ref. 33, pp. 1225-1263).

The other possible source of lead is from vehicular exhaust from automobiles that used leaded gasoline before it was banned. None of the samples used to establish observed contamination were based strictly on samples collected from road easements and were based on lead contamination only. There is also the possibility that slag from the smelting operations was used in the past as road bed material which could explain the occasional elevated road easement results.

Another possible source for the lead, cadmium, and zinc contamination on residential properties may be a smelter/brick facility that was also involved in glass glazing which was located three-quarter miles east along the former railroad tracks north of the Caney High School (Ref. 45, pp. 14, 99). That investigation was at the former location of the Cheyenne Window Glass Company and the Fredonia Window Glass Company (Refs. 22, pp. 1-3; 23, p. 1; 45, p. 4). Very little historical information was available regarding the operational history of the former glass plants (Ref. 45, pp. 4, 5). KDHE initiated a Site Evaluation in 2011 (Ref. 45, p. 5). The SE identified elevated concentrations of lead, cadmium, and chromium in investigated soils (Ref. 45, p. 5). An Integrated Assessment (IA) occurred subsequently. Elevated heavy metal concentrations were confirmed in soils, and a recommendation was offered to consider a removal action (Refs. 11, p. 9; 45, p. 9). KDHE concluded the high zinc concentrations near a rail spur to the AZLSC property may be indicative of waste from smelter operations (Ref. 45, pp. 10, 18).

Area Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

The total Hazardous Constituent Quantity for AOC A 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 is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1), pp. 51546-51647 (Section 5.1.2.2) and p. 51647 (Table 5-2); Tables 5 and 6 of this HRS documentation record]. Insufficient historical and current data (manifests, potentially responsible parties [PRPs] records, State records, permits, waste concentration data, etc.) are available to adequately calculate the total or partial mass 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 AOC A with reasonable confidence.

Hazardous Constituent Quantity Assigned Value: Not Scored
Hazardous Constituent Quantity Complete? No

2.4.2.1.2 Hazardous Wastestream Quantity

The total Hazardous Wastestream Quantity for AOC A could not be adequately determined according to the HRS requirements; that is, the total mass of all hazardous wastestreams and CERCLA pollutants and contaminants for the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51591 (Section 2.4.2.1.2) and 51546-51647 (Section 5.1.2.2); 51647 (Table 5-2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total or partial mass 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 AOC A with reasonable confidence.

Hazardous Wastestream Quantity Assigned Value: Not Scored
Hazardous Wastestream Quantity Complete? No

2.4.2.1.3 Volume

Tier C, Volume, is not scored for AOCs consisting of contaminated soil; therefore, the evaluation of hazardous waste quantity proceeds to the evaluation of Tier D, Area (Ref. 2, Section 5.1.2.1.2, Table 5-2).

Volume Assigned Value: 0

2.4.2.1.4 Area

Description

The boundary of AOC A is defined by samples analyzed by the fixed laboratory using ICP-AES test methods for metals (see Tables 4 and 5 of this HRS documentation record). From the northern most sample meeting the observed contamination criteria and moving clockwise these samples include: samples 7310-12, -12-FD, -13, -13-FD, -15, and -15-FD (collected from property 0457), sample 7278-19 (collected from property 0435), sample 7810-31 (collected from property 0526), sample 7516-13 (collected from property 0795), sample 7810-51 (collected from property 0896), sample 7470-44 (collected from property 0624), samples 7733-16 and -16-FD (collected from property 0861), sample 7470-60 (collected from property 0694), sample 7516-40 (collected from property 0718), sample 7516-27 (collected from property 0686), sample 7810-33 (collected from property 0984), sample 7218-48 (collected from property 0365),sample 7016-2 (collected from property 0104), samples 7733-18, -20 and -22 (collected from property 0872), samples 7016-11 and -11-FD (collected from property 0116), samples 7810-2, -2-FD, -3, -7, -8, and -10 (collected from property 0871), and sample 7888-8 (collected from property 0975). The property numbers for these samples are shown on Figures 2-O1, 2-B1, 2-B2, 2-A2, and 2-A1 of this documentation record. Within this boundary are 192 additional properties where one or more cells/areas from the property met observed contamination criteria and the analysis was by a fixed laboratory. The area of AOC A was calculated by geographic information system (GIS) techniques to be 34,924,715 square feet or about 800 acres.

Also within this boundary are approximately 260 additional distinct properties that were only screened using XRF spectrometer analysis. These 260 properties contained one or more cells/areas with lead at or exceeding 147 ppm, which was the value selected to support inference of lead contamination at the property (see Table 6 of this HRS documentation record).

For the Caney Residential Yards site, removal actions have occurred at one or more cells/areas within approximately 309 properties in Caney through August 2018 (Ref. 33, pp. 15, 22, 1225- 1241). Since the contaminated cells/areas have been removed and replaced with clean fill, those cells/areas from the 297 properties should be subtracted from the AOC A area calculation. Other features that should be excluded include paved roadways and sidewalks, buildings or other structures, and cells/areas that were sampled and shown not to be contaminated (Ref. 1, Section 5.0.1).

The approximate areas of roadways, sidewalks, buildings or other structures, cells/areas subject to removal actions, or cells/areas not meeting the observed contamination criteria could not be estimated or measured with reasonable confidence or accuracy to determine a defensible estimate of the area of AOC A. However, this area is certainly greater than 0 square feet.

Sum (ft^2): >0
Equation for Assigning Value (Ref. 1, Table 5-2): Area (A)/34,000

Area Assigned Value: >0

Area Hazardous Waste Quantity Value: >0

5.1 RESIDENT POPULATION THREAT

5.1.1 LIKELIHOOD OF EXPOSURE

Tables 4 through 5 of this HRS documentation record list surface soil samples (0 to 2 inches bgs) collected during the RA and SI and includes 210 residential properties located within AOC A. Also within AOC A are approximately 260 additional distinct properties that were only screened using XRF spectrometer analysis. These 260 properties contained one or more cells/areas with lead at or exceeding 147 ppm, which was the value selected to support inference of lead contamination at the properties (see Table 6 of this HRS documentation record).

The locations of the properties are shown on Figures 2-O1, 2-A1, 2-A2, 2-B1, and 2-B-2 of this documentation record. All surface soil samples listed in Tables 4 and 5 of this HRS documentation record were collected within the individual property boundaries and are part of AOC A. The locations of the cells/areas sampled in relation to the properties are shown on residential screening forms (Ref. 34). Because there are multiple residential properties meeting the observed contamination criteria, a likelihood of exposure factor value of 550 is assigned in accordance with Section 5.1.1 of Reference 1.

Resident Population Threat Likelihood of
Exposure Factor Category Value: 550

5.1.2 WASTE CHARACTERISTICS

5.1.2.1 Toxicity

The toxicity values for the hazardous substances detected in samples collected in AOC A are summarized in Table 8 below.

Table 8: Soil Exposure Toxicity

Hazardous Substance	Toxicity Factor Value	References
Cadmium	10,000	3, p. 1
Lead	10,000	3, p. 2
Zinc	10	3, p. 3

Cadmium and lead have the highest toxicity values of 10,000. This value will be assigned and entered on line 2 of Table 5-1.

Toxicity Factor Value: 10,000

5.1.2.2 Hazardous Waste Quantity

Table 9: Hazardous Waste Quantity

Area Letter	Source Type	Area Hazardous Waste Quantity	Area Hazardous Constituent Quantity Complete?
A	Contaminated soil	Undetermined but greater than zero	No

The approximate areas of roadways, sidewalks, buildings, cells/areas subject to removal actions, or cells/areas not meeting the observed contamination criteria could not be estimated or measured with reasonable confidence or accuracy to determine the area of AOC A. The area of AOC A is greater than 0 square feet. Per HRS Section 2.4.2.2, the hazardous waste quantity (HWQ) factor value is assigned a default factor value of 10 for the soil exposure component of the soil exposure and subsurface intrusion pathway (Refs. 1, Section 2.4.2.2; 2, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 10
(Refs. 1, Sections 2.4.2.2 and 5.1.2.2, Table 2-6 and Table 5-2; 2, Sections 2.4.2.2 and 5.1.1.2.2)

5.1.2.3 Calculation of Waste Characteristics Factor Category Value

Three hazardous substances, cadmium, lead and zinc, were evaluated for waste characteristics. Cadmium and lead each have a toxicity factor value of 10,000 (Ref. 3, pp. 1, 2). The waste characteristics factor value category is obtained by multiplying the toxicity and HWQ factor values. Based on this product, a value was assigned in accordance with Reference 1, Table 2-7.

Toxicity Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 10

Toxicity Factor Value x Hazardous Waste Quantity Factor Value: 100,000

Waste Characteristics Factor Category Value: 18
(Refs. 1, Section 5.1.2.3, Table 2-7; 2, Section 5.1.1.2.3, Table 2-7)

5.1.3 TARGETS

Individuals whose residence is both on the property of and within 200 feet of the area of observed contamination are included as resident population threat targets (Ref. 2, Section 5.1.2.3; and Tables 4, 5, and 6 and Figures 2-O1, 2-A1, 2-A2, 2-B1, and 2-B-2 of this documentation record).

Level I Concentrations

The hazardous substances associated with the former smelters are lead, zinc and cadmium. There are no benchmarks for lead (Ref. 3, p. 2). Zinc has a non-cancer risk screening concentration of 20,000 milligrams per kilogram (mg/kg) and cadmium has a non-cancer risk screening concentration of 30 mg/kg (Ref. 3, pp 1, 3). No soil sample collected from a residential property contained cadmium or zinc at concentrations exceeding these benchmarks (see Tables 5 and 6 of this HRS documentation record). Therefore, no level I populations are scored.

Level II Concentrations

Tables 4 and 5 of this HRS documentation record list surface soil samples (0 to 2 inches bgs) collected during the RA and SI and includes 210 residential properties located within AOC A. The locations of the samples from the properties are shown on property screening forms (Ref. 34) which show the cells/areas sampled are within 200 feet of the homes. The locations of the properties are shown on Figures 2-O1, 2-A1, 2-A2, 2-B1, and 2-B-2 of this documentation record. The soil samples contained lead, cadmium, or zinc at concentrations three times greater than background concentrations (see Tables 2 through 5 of this documentation record), but below applicable health-based benchmarks (Ref. 3, pp. 1-3).

Level II concentrations were also inferred at approximately 260 properties within AOC-A that were XRF field screened in accordance with EPA SW-846 method 6200. Properties not sampled and/or that did not show contaminant levels meeting observed contamination criteria, where sampled, are not included in the resident population counts below for scoring purposes; however, consistent with HRS Section 5.0.1, inference of contamination on these properties (where complete removal actions have not occurred) at Level II concentrations would be reasonable based on what was most likely the primary mode of deposition in the area – air releases from the smelter stacks.

5.1.3.1 Resident Individual

Area Letter: A
Level of Contamination (Level I/Level II): Level II

As presented in Tables 4 and 5, of this HRS documentation record, all samples collected from residential yards meet the criteria for Level II concentrations (Refs. 1, 3) (see also Figures 2-O1, 2-A-1, 2-A2, 2-B1, and 2-B2).

Resident Individual Factor Value: 45

5.1.3.2 Resident Population

5.1.3.2.1 Level I Concentrations

No level I concentrations have been documented.

Level I Concentrations Factor Value: 0

5.1.3.2.2 Level II Concentrations

<u>Level II Samples</u>

The soil samples listed in Tables 4 and 5 of this HRS documentation record were collected during the EPA RA that began in May 2015 and was concluded in September 2018 (Ref. 11, p. 11; 33, p. 12). With the exception of drip zone samples, all of the samples in the tables meet the criteria for Level II concentrations. Populations associated with the residential yards from which the samples were collected are presented in Table 10 below. Also presented in Table 10 are properties where contamination at a property is inferred. The inference is supported by XRF readings from one or more cells/areas from the property where removal actions have not occurred (see Table 6 of this documentation record). Note that unsampled properties in between properties with sample concentrations meeting observed contamination criteria are not included in the scoring, and the population is not calculated for these properties, but those properties and residents would qualify for inclusion based on inference of contamination (Refs. 1, Section 5.0.1; 33, pp. 28-30). As shown in Table 6, removal actions have occurred at properties where access was granted and lead concentrations exceed 400 parts per million in one of more cells/areas. The removal actions were limited to the cells/areas exceeding 400 parts per million (Ref. 33, pp. 15, 1225 - 1263). Other cells/areas at the properties, not excavated may have contained lead at concentrations above 147 parts per million (see Table 6 of this documentation record).

Level II Resident Population Targets

Resident populations were obtained from property access agreement forms (Ref. 35). The number of permanent residents and children under 7 years of age was self-reported by the property owners. On some forms the owner of the property did not report the number of occupants. In other cases, the owner of the property may have indicated the home was a rental property and did not report the number of people in the rental. Occasionally, the access agreement indicated the property was vacant or the home was being renovated or was for sale. In all these cases, the property was not included in Table 10 below.

In cases where the access form indicated the property was occupied by a renter or the name of the tenant was identified but the number of tenants was not specified, then the property was assigned a resident population of 2.39, which is the 2018 estimated persons per household in Montgomery County, Kansas (Ref. 36).

Table 2 identifies by Property ID Number the fixed laboratory sample ID numbers and impacted cells/areas. Table 6 identifies by Property ID Number those impacted cells/areas determined by XRF.

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0001	6845-26		C3	1		34, p. 1; 35, pp. 1, 2
		XRF	C1, C3			
0004		XRF	C1, C3, C4	10		34, p. 4; 35, pp. 5, 6
0008		XRF	C3, DW	1		34, p. 8; 35, pp. 7, 8
0011		XRF	C3	2		34, p. 11; 35, pp. 9, 10
0012	6845-29		C2	2		34, p. 12; 35, pp. 11, 12
	6845-29-FD					
0013	6845-30		C3	2		34, p. 13; 35, pp. 13, 14
0016		XRF	C1, C2	8		34, p. 15; 35, pp. 15, 16
0017		XRF	C1	2		34, p. 16; 35, pp. 17, 18
0019		XRF	C1, DW	2		34, p. 18; 35, pp. 19, 20
0021		XRF	C1, C2, C3	8		34, pp. 20, 21, 22; 35, pp. 21, 22
0022		XRF	C5			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0023		XRF	C2, C3			
0026		XRF	C2, RE	1		34, p. 25; 35, pp. 23, 24
0027	6845-47		C-2	2		34, p. 26; 35, pp. 25, 26
0028		XRF	C1, GA,	2		34, p. 27; 35, pp. 27, 28
0030		XRF	C2, C3, C4, DW	5		34, p. 29; 35, pp. 29, 30
0032	6845-33		C-4	2		34, p. 33; 35, pp. 31, 32
	6845-33-FD					
0033	6845-34		C-4	1		34, p. 34; 35, pp. 33, 34
0034		XRF	C1	5		34, p. 35; 35, pp. 35, 36
0035		XRF	C1, C4	4		34, p. 36; 35, pp. 37, 38
0038		XRF	C2, C3, C4	2		34, p. 39; 35, pp. 41, 42
0040	6845-24		C-2	3		34, p. 40; 35, pp. 43, 44
0041		XRF	C1	2		34, p. 41; 35, pp. 45, 46
0042		XRF	C2, C3, C4, DW	1		34, p. 42; 35, pp. 47, 48
0043		XRF	C3	1		34, p. 43; 35, pp. 49, 50
0044		XRF	C1, C2, C3, C4, C5	2		34, p. 44; 35, pp. 51, 52
0045		XRF	C2, RE	1		34, p. 45; 35, pp. 53, 54
0046		XRF	C1, C2	4		34, p. 46; 35, pp. 55, 56
0048	6845-35		C-2	3		34, p. 48; 35, pp. 57, 58
0049		XRF	C2, C4	2		34, p. 49; 35, pp. 59-60
0050	6845-36		RE	3		34, p. 50; 35, pp. 61, 62

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0054		XRF	RE	1		34, p. 54; 35, pp. 63, 64
0055		XRF	C2, C3, DW, PA	4		34, p. 55; 35, pp. 65, 66
0056	6845-38		C4	1		34, p. 56; 35, pp. 67, 68
0057		XRF	C3	1		34, p. 57; 35, pp. 69, 70
0058		XRF	C2	1		34, p. 58; 35, pp. 71, 72
0060	6845-21		C2	1		34, p. 60; 35, pp. 73, 74
0062		XRF	C2	2		34, p. 62; 35, pp. 75, 76
0063		XRF	C1, C2, C3, RE	3		34, p. 63; 35, pp. 77, 78
0064		XRF	C3	4		34, p. 64; 35, pp. 79, 80
0065		XRF	DW	3		34, p. 65; 35, pp. 81, 82
0066		XRF	C1, C2, C3	2		34, p. 66; 35, pp. 83, 84
0067		XRF	C3	4		34, p. 67; 35, pp. 85, 86
0068		XRF	C1, C2, C3, RE	2		34, p. 68; 35, pp. 87, 88
0069		XRF	C1, C2, C3, RE	1		34, p. 69; 35, pp. 89, 90
0070		XRF	C1, C2	1		34, p. 70; 35, pp. 91, 92
0071		XRF	C1, C2, RE	3		34, p. 71; 35, pp. 93, 94
0072	6845-20		C3	1		34, p. 72; 35, pp. 95, 96
		XRF	C1, C2, C3, C4			
0078		XRF	C1, C2, C3	1		34, p. 78; 35, pp. 97, 98
0080	6845-40		C-5	2		34, p. 80; 35, pp. 99, 100
		XRF	C-4, C-5			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0081		XRF	C3, C4	5		34, p. 81; 35, pp. 101, 102
0090		XRF	C1, C3, C4, RE	3		34, p. 90; 35, pp. 107, 108
0091		XRF	C1, C3	3		34, p. 91; 35, pp. 109, 110
0092		XRF	C2, C3, GA, RE	2		34, p. 92; 35, pp. 111, 112
0093		XRF	RE	2		34, p. 93; 35, pp. 113, 114
0100		XRF	C2, RE	5		34, p. 100; 35, pp. 115, 116
0101	7016-1		C-1	3		34, p. 101; 35, pp. 117, 118
	7016-1-FD					
0102		XRF	C2, RE	9		34, p. 102; 35, pp. 119 - 122
0103		XRF	C1, RE	3		34, p. 103; 35, pp. 123, 124
0104	7016-2		C-4	2		34, p. 104; 35, pp. 125, 126
0106		XRF	C1, C2, C3, RE	3		34, p. 106; 35, pp. 129, 130
0107	7016-4		C2	3		34, p. 107; 35, pp. 131, 132
0108	7016-5		C2	3		34, p. 108; 35, pp. 133, 134
0109	7016-6		C3	5		34, p. 109; 35, pp. 135, 136
0110		XRF	C1, C2, RE	4		34, p. 110; 35, pp. 137, 138
0111		XRF	C1	1		34, p. 111; 35, pp. 139, 140
0112		XRF	C1, C2	2		34, p. 112; 35, pp. 141, 142
0113	7016-9		C1	2		34, p. 113; 35, pp. 143, 144
0114		XRF	C2, RE	2		34, p. 114; 35, pp. 145, 146
0116	7016-11		C-4	1		34, p. 116; 35, pp. 147, 148
	7016-11-FD		C4			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0117		XRF	C1, C2	4		34, p. 117; 35, pp. 149, 150
0118	7016-13		G	2		34, p. 118; 35, pp. 151, 152
	7016-14		RE			
		XRF	C-3, GA, RE			
0119		XRF	C1, LS, RE	2		34, p. 119; 35, pp. 153, 154
0122	7016-17		C2	6		34, p. 122; 35, pp. 159, 160
0126		XRF	C3, DW	3		34, p. 126; 35, pp. 163, 164
0130		XRF	C1	4		34, p. 130, 131, 132; 35, pp. 165, 166
	7016-18		C3			
0131		XRF	RE			
0132		XRF	C3, DW			
0133	7016-20		C1	4		34, p. 133; 35, pp. 167, 168
0136		XRF	C2, RE	5		34, p. 136; 35, pp. 169, 170
0139		XRF	C1, RE	4		34, p. 139; 35, pp. 171, 172
0144		XRF	C1, C2	2		34, p. 144; 35, pp. 175, 176
0147		XRF	C1, C2, RE	3		34, p. 147; 35, pp. 1477, 178
0148	7016-30		C2	1		34, p. 148; 35, pp. 179, 180
0149		XRF	RE	6		34, p. 149; 35, pp. 181, 182
0150		XRF	C1, RE	3		34, p. 150; 35, pp. 183, 184
0153	7016-33		C2	5		34, p. 153; 35, pp. 187, 188
0155		XRF	C1, C2	1		34, p. 155; 35, pp. 189, 190
0156		XRF	C1, C2, C4, RE	4		34, p. 156; 35, pp. 191, 192
0157		XRF	C1	7		34, p. 157; 35, pp. 193, 194

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0158		XRF	C2, DW, RE	1		34, p. 158; 35, pp. 195, 196
0160		XRF	C4, LS, RE		2.39	34, p. 160; 35, pp. 197, 198; 36
0161	7016-35		RE		2.39	34, p. 161; 35, pp. 197, 198; 36
	7016-35-FD		RE			
		XRF	C1, C2, RE			
0163	7016-37		LS	1		34, p. 163; 35, pp. 199, 200
		XRF	C3, LS			
0164	7016-38		C2	3		34, p. 164; 35, pp. 201, 202
0165		XRF	C1, C2, RE	3		34, p. 165; 35, pp. 203, 204
0169	7016-41		C1	5		34, p. 169; 35, pp. 207, 208
	7016-41-FD		C1			
0170	7016-43		C2	3		34, p. 170; 35, pp. 209, 210
0172		XRF	C1, C2	1		34, p. 172; 35, pp. 211, 212
0173	7016-45		C1	2		34, p. 173; 35, pp. 213, 214
0174		XRF	C2, C3, C4, RE	2		34, p. 174; 35, pp. 215-216
0178		XRF	C1, C2	4		34, pp. 178, 179; 35, pp. 217, 218
0179	7016-47		C1			
0181	7016-48		C1	3		34, p. 181; 35, pp. 219, 220
	7810-1		C6			
0182	7016-51		C1	5		34, p. 182; 35, pp. 221, 222
0186		XRF	C1, C2, C3, DW	2		34, p. 185; 35, pp. 223, 224
0187	7016-53		C3	4		34, p. 186; 35, pp. 225, 226
	7016-53-FD		C3			
0190	7016-55		G2	4		34, p. 189; 35, pp. 229, 230
0191		XRF	C2, RE	2		34, p. 190; 35, pp. 231, 232
0197		XRF	C3	2		34, p. 195; 35, pp. 235, 236

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0201	7016-59		C1	1		34, p. 199; 35, pp. 239, 240
0202	7016-61		C2	1		34, p. 200; 35, pp. 241, 242
	7016-61-FD		C2			
0203	7016-62		C2	1		34, p. 201; 35, pp. 243, 244
0206	7016-63		C2	4		34, p. 204; 35, pp. 245, 246
0209	7016-64		DW	3		34, p. 207; 35, pp. 247, 248
0212	7016-65		C1	4		34, p. 210; 35, pp. 249, 250
0213		XRF	C-1, C-2, RE	2		34, p. 211; 35, pp. 251, 252
0215	7016-67		C1	6		34, p. 213; 35, pp. 253, 254
0216		XRF	C1, C2	1		34, p. 214; 35, pp. 255, 256
0217		XRF	C3, RE	1		34, p. 215; 35, pp. 257, 258
0218	7016-69		C1	2		34, p. 216; 35, pp. 259, 260
0220	7016-70		C1	1		34, p. 218; 35, pp. 261, 262
0223		XRF	C1, RE	2		34, p. 221; 35, pp. 263, 264
0226	7016-72		C1	2		34, p. 224; 35, pp. 265, 266
	7016-72-FD					
0228		XRF	C3, C4, RE	3		34, p. 226; 35, pp. 267, 268
0229		XRF	C1, RE	1		34, p. 227; 35, pp. 269, 270
0230		XRF	C2, RE	5		34, pp. 228, 229; 35, pp. 271, 272
0231		XRF	C1, C3			
0232		XRF	C2, DW	1		34, p. 230; 35, pp. 273, 274
0233	7016-75		C2	1		34, p. 231; 35, pp. 275, 276
0237	7016-77		C1	4		34, p. 235; 35, pp. 277, 278

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0238	7016-79		C1	2		34, p. 236; 35, pp. 281, 282
0240	7016-80		C1	2		34, p. 238; 35, pp. 283, 284
0241	7016-81		C2	3		34, p. 239; 35, pp. 285, 286
0242		XRF	C1, LS, RE	2		34, p. 240; 35, pp. 287, 288
0247	7016-86		C1	3		34, p. 245; 35, pp. 291, 292
0248		XRF	LS	2		34, p. 246; 35, pp. 293, 294
0249	7016-88		C2	1		34, p. 247; 35, pp. 295, 296
		XRF	C1, C2, LS, RE			
0252	7016-90		C1	3		34, p. 250; 35, pp. 297, 298
0254		XRF	C1, C3, C4	3		34, pp. 251, 252; 35, pp. 299, 300
0255		XRF	C1, C2, RE			
0257		XRF	C1, C2	1		34, p. 254; 35, pp. 303, 304
0258	7016-92		C2	2		34, p. 255; 35, pp. 305, 306
0259	7016-94		C1	1		34, p. 256; 35, pp. 307, 308
0260		XRF	C1, C2, C3, RE	2		34, p. 257; 35, pp. 309, 310
0261		XRF	C1, C4, C5, DW, GA, RE	1		34, p. 258; 35, pp. 311, 312
0262		XRF	C1, C2, RE	1		34, p. 259; 35, pp. 313, 314
0263	7016-96		C1	4		34, p. 260; 35, pp. 315, 316
0264	7016-97		C1	4		34, p. 261; 35, pp. 317, 318
0269	7016-99		C2	2		34, p. 266; 35, pp. 319, 320
0270		XRF	C-1, DW, LS, RE	2		34, p. 267; 35, pp. 321, 322

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0271	7016-102		RE	4		34, p. 268; 35, pp. 323, 324
		XRF	C1, RE			
0272		XRF	C1, DW, RE	5		34, p. 269; 35, pp. 325, 326
0274	7016-105		C2	2		34, p. 271; 35, pp. 327, 328
0276		XRF	C2	2		34, p. 273; 35, pp. 329, 330
0279		XRF	C2, C3, RE	3		34, p. 276; 35, pp. 331, 332
0280		XRF	C1, C2	2		34, p. 277; 35, pp. 333, 334
0281	7016-106		C2	2		34, p. 278; 35, pp. 335, 336
0285		XRF	C1	2		34, p. 282; 35, pp. 339, 340
0286		XRF	C1, C2, LS	3		34, p. 283; 35, pp. 341, 342
	7218-2		C2			
0287		XRF	C1, C2, DW, RE	1		34, p. 284; 35, pp. 343, 344
0288		XRF	C1, C2, C3, GA, LS	2		34, p. 285; 35, pp. 345, 346
0290		XRF	C1, C2, LS, RE	4		34, p. 287; 35, pp. 347, 348
	7218-4		C2			
0291	7218-6		C1	1		34, p. 288; 35, pp. 349, 350
0292		XRF	C1, C3, RE	2		34, p. 289; 35, pp. 351, 352
0293		XRF	C1	5		34, p. 290; 35, pp. 353, 354
0295	7218-8		C2	3		34, p. 292; 35, pp. 355, 356
0297	7218-9		C4	1		34, p. 294; 35, pp. 357, 358
0299		XRF	C1, LS	4		34, p. 296; 35, pp. 359, 360
0302		XRF	C1, C2, C3, C4, LS	2		34, p. 299; 35, pp. 361, 362
	7218-15		DW			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0304		XRF	C1, C2	5		34, pp. 301, 302; 35, pp. 363, 364
0305		XRF	C1, RE			
	7218-17		C1			
0310		XRF	C2	1		34, p. 307; 35, pp. 365, 366
	7218-22		C2			
0317		XRF	C1, C2	2		34, p. 314; 35, pp. 369, 370
0319		XRF	C1, C2, C3	1		34, p. 316; 35, pp. 371, 372
0320		XRF	C1, C2, RE	2		34, p. 317; 35, pp. 373, 374
0321		XRF	C2	2		34, p. 318; 35, pp. 375, 376
	7218-27		C2			
0322		XRF	C1, LS	1		34, p. 319; 35, pp. 377, 378
0323		XRF	DW, RE	1		34, p. 320; 35, pp. 379, 380
0327		XRF	C1, C3, C4	3		34, p. 324; 35, pp. 383, 384
0329		XRF	C1, C2, C3, C4 GA, LS	1		34, p. 326; 35, pp. 385, 386
	7218-31		C2			
0331		XRF	C1, C2, C3, C4, RE	1		34, p. 328; 35, pp. 387, 388
0333		XRF	C2	1		34, p. 330; 35, pp. 389, 390
0341		XRF	C2, DW, RE	3		34, p. 338; 35, pp. 393, 394
0343		XRF	C1, DW, RE	2		34, p. 340; 35, pp. 395, 396
0351		XRF	C1, C2	3		34, p. 347; 35, pp. 399, 400
0352	7218-41		RE	1		34, p. 348; 35, pp. 401, 402
0353		XRF	C1, C2, RE	2		34, p. 349; 35, pp. 403, 404
0354		XRF	C1, C3, LS, RE	2		34, p. 350; 35, pp. 405, 406
0355	7218-42		C2	5		34, p. 351; 35, pp. 407, 408

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0357		XRF	C1, C3	2		34, pp. 353, 364; 35, pp. 409, 410
	7218-43		RE			
0368		XRF	C1, C2			
0360		XRF	C1, C2	1		34, p. 356; 35, pp. 411, 412
	7218-44		C1			
0361		XRF	C1, C2, C3, DW	3		34, p. 357; 35, pp. 413, 414
0363		XRF	C1, C2, C3, RE	2		34, p. 359; 35, pp. 415, 416
	7218-46		C2			
0365	7218-48		C2	2		34, p. 361; 35, pp. 417, 418
0369	7218-50		C1	2		34, p. 365; 35, pp. 419, 420
0372		XRF	C1, LS	3		34, p. 368; 35, pp. 421, 422
0374		XRF	C1, C2, RE	1		34, p. 370; 35, pp. 423, 424
0379	7278-4		GA	5		34, p. 375; 35, pp. 425, 426
	7278-7		RE			
0380		XRF	C1, C2, RE	4		34, p. 376; 35, pp. 427, 428
0383		XRF	C1, C2, RE	2		34, p. 379; 35, pp. 431, 432
0384		XRF	C3	5		34, p. 380; 35, pp. 433, 434
0385		XRF	C4	2		34, p. 381; 35, pp. 435, 436
0386		XRF	C2, C3, C4	1		34, p. 382; 35, pp. 437, 438
0387		XRF	C1, C2, PA	5		34, p. 383; 35, pp. 439, 440
0388		XRF	C1, RE	3		34, p. 384; 35, pp. 441, 442
0392	7278-8		G	2		34, pp. 388, 389; 35, pp. 445, 446
	7278-8-FD		G			
	7278-9		LS			
0393		XRF	C2, C3			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0394	7278-11		C2	1		34, p. 390; 35, pp. 447, 448
	7278-15		G			
0396		XRF	C1	2		34, p. 392; 35, pp. 449, 450
0397		XRF	C1, C2, RE	6		34, p. 393; 35, pp. 451, 452
0399		XRF	C1, DW, RE	2		34, p. 394; 35, pp. 455, 456
0403	7278-36		C2	5		34, p. 398; 35, pp. 457, 458
	7278-37		RE			
0406		XRF	C1, C2, C3, C4, RE	1		34, p. 401; 35, pp. 459, 460
0408		XRF	C1, C2, RE	4		34, p. 403; 35, pp. 461, 462
0410		XRF	C1, C2, RE	3		34, p. 405; 35, pp. 463, 464
0413		XRF	C1, C4	4		34, p. 408; 35, pp. 467, 468
0418		XRF	C2, DW, RE	1		34, p. 413; 35, pp. 469, 470
0435	7278-19		C2	5		34, p. 430; 35, pp. 473, 474
0436	7278-34		RE	1		34, p. 431; 35, pp. 475, 476
0437	7278-38		C3	3		34, p. 432; 35, pp. 477, 478
	7278-39		RE1			
	7278-40		RE2			
0446		XRF	C2, C3, GA, PA, LS, RE	3		34, p. 441; 35, pp. 479, 480
0448	7278-41		C3	2		34, p. 443; 35, pp. 481, 482
	7248-43		LS			
0457	7310-12		C1	2		34, p. 451; 35, pp. 483, 484
	7310-12-FD		C1			
	7310-13		C2			
	7310-13-FD		C2			
	7310-15		C4			
	7310-15-FD		C4			
0463		XRF	LS	1		34, p. 457; 35, pp. 487, 488

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0466		XRF	C1, C2, LS	1		34, p. 460; 35, pp. 489, 490
0467	7310-5		C2	2		34, p. 461; 35, pp. 491, 492
	7310-7		C4			
	7310-10		LS			
	7310-11		RE			
0470		XRF	C1, C3, DW, GA	2		34, p. 464; 35, pp. 493, 494
0471		XRF	LS		2.39	34, p. 465; 35, pp. 495, 496; 36
0480	7310-19		C2	2		34, p. 474; 35, pp. 501, 502
	7310-21		RE			
0482		XRF	C1, RE	4		34, p. 476; 35, pp. 503, 504
0483	7310-24		C2	4		34, p. 477; 35, pp. 505, 506
	7310-26		RE			
0484		XRF	C1, C2	1		34, p. 478; 35, pp. 507, 508
0485	7310-27		C1	2		34, p. 479; 35, pp. 509, 510
	7310-28		C2			
0486	7310-30		C1	1		34, p. 480; 35, pp. 511, 512
0488	7310-33		C1	1		34, p. 482; 35, pp. 513, 514
0489		XRF	C1, C3, RE	3		34, p. 483; 35, pp. 515, 516
0493	7310-36		C2	3		34, p. 487; 35, pp. 521, 522
0498		XRF	C2, C3, RE	6		34, p. 492; 35, pp. 523, 524
0499		XRF	C1, C2 RE	4		34, p. 493; 35, pp. 525, 526
0502	7470-2		C2	3		34, p. 496; 35, pp. 527, 528
0515		XRF	C2	1		34, p. 509; 35, pp. 533, 534
0518		XRF	C1, C2, C3, RE	2		34, p. 512; 35, pp. 535, 536

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0527	7390-9		RE	2		34, p. 520; 35, pp. 545, 546
		XRF	C1, C2, RE			
0537		XRF	C2	3		34, p. 530; 35, pp. 561, 562
0540		XRF	C2, C3, GA, RE	1		34, p. 533; 35, pp. 567, 568
0542	7390-21		C4	2		35, pp. 571, 572
	7390-21-FD		C4			
0550	7390-28		C1	4		34, p. 543; 35, pp. 579, 580
0551	7390-29		C2	4		34, p. 544; 35, pp. 581, 582
0555	7390-32		C3	3		34, pp. 548-549; 35, pp. 585 - 588
0556		XRF	C1, C2, C3, C4			
0557	7390-42		RE	2		34, p. 550; 35, pp. 589, 590
		XRF	C2, RE			
0558	7390-43		RE	1		34, p. 551; 35, pp. 591, 592
		XRF	C2, DW, RE			
0569		XRF	C1, C3, PA, RE	2		34, p. 562; 35, pp. 599, 600
0573		XRF	C2	1		34, p. 566; 35, pp. 601, 602
0575		XRF	C1, C2, RE	1		34, p. 568; 35, pp. 603, 604
0576		XRF	C3, C4	1		34, p. 569; 35, pp. 605, 606
0579		XRF	C2, C3	1		34, p. 572; 35, pp. 609, 610
0589		XRF	C3, LS	2		34, p. 582; 35, pp. 617, 618
0597		XRF	C2, C4, DW, LS, RE	2		34, p. 590; 35, pp. 625, 626
0599		XRF	C2	3		34, p. 592; 35, pp. 627, 628
	7470-16		C1			
	7470-17		C3			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0605		XRF	C-1, C-3	3		34, p. 598; 35, pp. 629, 630
	7470-31		C2			
	7470-31-FD					
	7470-32		C3			
	7470-34		RE			
0606		XRF	C3, PA	6		34, p. 599; 35, pp. 631, 632
0607		XRF	C4, C5, RE	4		34, p. 600; 35, pp. 633, 634
0610		XRF	C1, C2, RE	1		34, p. 603; 35, pp. 637, 638
0613	7516-10		C1	1		34, p. 606; 35, pp. 639, 640
0614	7516-6		C1	2		34, p. 607; 35, pp. 641, 642
0616		XRF	C2, C3, C4, C5		2.39	34, p. 609; 35, pp. 643, 644; 36
0621	7470+-40		C1	4		34, p. 614; 35, pp. 647, 648
	7470-43		RE1			
	7470-43-FD					
0622	7516-30		C2		2.39	34, p. 615; 35, pp. 649, 650; 36
0624	7470-44		C3	1		34, p. 617; 35, pp. 651, 652
0629	7562-4		RE	4		34, p. 622; 35, pp. 657, 658
0630	7470-46		C2	1		34, p. 623; 35, pp. 659, 660
	7470-47		C3			
	7470-49		RE			
0631	7516-29		C1	2		34, p. 624; 35, pp. 661, 662
		XRF	C1, DW, RE			
0633		XRF	C1, RE	2		34, p. 626; 35, pp. 663, 664
0634		XRF	C1, C2, C3, RE	4		34, p. 627; 35, pp. 665, 666
0635	7516-36		C3	1		34, p. 628; 35, pp. 667, 668
		XRF	C1, C2, C3, RE			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0637	7516-33		C2	1		34, p. 629; 35, pp. 669, 670
0638	7516-26		C3	2		34, p. 630; 35, pp. 671, 672
0645		XRF	C1, C2, DW	2		34, p. 637; 35, pp. 673, 674
0646		XRF	C3, RE	3		34, p. 638; 35, pp. 675, 676
0668		XRF	C2, C4, DW	1		34, p. 659; 35, pp. 683, 684
0679		XRF	C3, LS, RE	2		34, p. 667; 35, pp. 687, 688
0682		XRF	C1, C2	2		34, p. 670; 35, pp. 689, 690
0685	7516-34		C1	1		34, p. 674; 35, pp. 693, 694
0686	7516-27		C1	1		34, p. 675;35, pp. 695, 696
		XRF	C1, RE			
0689		XRF	C2, DW, GA	2		34, p. 678; 35, pp. 699, 700
	7470-54		C2			
	7470-54-FD					
0694	7470-60		C1	2		34, p. 683; 35, pp. 701, 702
0696	7516-47		C2	1		34, p. 685; 35, pp. 703, 704
		XRF	C1, C2, RE			
0698		XRF	C1, C2, RE	5		34, p. 687; 35, pp. 705, 706
0700	7516-35		C2	2		34, p. 689; 35, pp. 709, 710
0702	7516-38		C1	4		34, p. 691;35, pp. 711, 712
		XRF	C1			
0704		XRF	C2, C3	2		34, p. 693; 35, pp. 715, 716
0705		XRF	C1, C2, RE	3		34, p. 694; 35, pp. 717, 718
0711		XRF	C1, PA, LS	1		34, p. 700; 35, pp. 723, 724
	7262-26		LS			
0713	7516-45		C1	3		34, p. 702; 35, pp. 725, 726
		XRF	C1, C3			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0717	7516-43		C1	2		34, p. 706; 35, pp. 729, 730
		XRF	C1, C2			
0718	7516-40		C2, RE	2		34, p. 707; 35, pp. 731, 732
0725		XRF	C2, LS	2		34, p. 714; 35, pp. 735, 736
0733	7470-63		C1	7		34, p. 720; 35, pp. 739, 740
0734	7516-39		C2	5		34, p. 721; 35, pp. 741, 742
		XRF	C2, RE			
0735	7516-41		C1	2		34, p. 722; 35, pp. 743, 744
		XRF	C1, RE			
0736	7516-22		C1	7		34, p. 723; 35, pp. 745, 746
		XRF	C1, RE			
0737		XRF	C1, C2, C3, RE	5		34, p. 724; 35, pp. 747, 748
0740		XRF	C3	1		34, p. 727; 35, pp. 749, 750
0741		XRF	C-1, RE	1		34, p. 728; 35, pp. 751, 752
0742		XRF	C1, RE	1		34, p. 729; 35, pp. 753, 754
0747	7516-24		C2	2		34, p. 734; 35, pp. 759, 760
		XRF	C2			
0749	7516-32		C2	1		34, p. 736; 35, pp. 761, 762
		XRF	C-2, LS, RE			
0750	7516-50		C1	2		34, p. 737; 35, pp. 763, 764
		XRF	C1, DW, RE			
0754	7516-11		C1	1		34, p. 741; 35, pp. 765, 766
		XRF	C1, RE			
0758	7516-25		C1	3		34, p. 745; 35, pp. 769, 770
		XRF	C1, C2			
0760	7516-5		C2	2		34, p. 747; 35, pp. 771, 772
		XRF	C1, C2, DW			
0761		XRF	C1, C2	1		34, p. 748; 35, pp. 773, 774
0772	7516-49		C3	5		34, p. 761; 35, pp. 783, 784
		XRF	C3, PA, RE			

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0780		XRF	C1, C2, C3, C4, RE	2		34, p. 769; 35, pp. 785, 786
	7562-31		C1			
	7562-32		C3			
	7562-34		RE			
0781		XRF	C1, C2, LS	4		34, p. 770; 35, pp. 787, 788
0785		XRF	C2, RE	2		34, p. 774; 35, pp. 791, 792
0789		XRF	C1, C2, C4	4		34, p. 778; 35, pp. 795, 796
0790		XRF	C3, GA, RE	4		34, p. 779; 35, pp. 797, 798
0793		XRF	C2, C5, RE	3		34, p. 782; 35, pp. 799, 800
0795	7516-13		C4	2		34, p. 784; 35, pp. 801, 802
0801		XRF	C2, LS	1		34, p. 789; 35, pp. 803, 804
0802	7516-7		C1	6		34, p. 790; 35, pp. 805, 806
		XRF	C1, C2, RE			
0805	7516-21		C4	5		34, p. 793; 35, pp. 809, 810
		XRF	C4, RE			
	7562-45		C2			
	7562-47		RE2			
0816		XRF	C1, C2, C3, RE	3		34, p. 804; 35, pp. 819, 820
0829		XRF	C1, DW	1		34, p. 818; 35, pp. 821, 822
0832		XRF	DW	4		34, p. 821; 35, pp. 823, 824
0834	7516-17		C2	1		34, p. 823; 35, pp. 825, 826
		XRF	C1, C2			
0838		XRF	C1, C2	2		34, p. 827; 35, pp. 829, 830
0842		XRF	C1, RE	2		34, p. 831; 35, pp. 833, 834
0844		XRF	C1, C2	2		34, p. 833; 35, pp. 835, 836

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0846		XRF	C2, C3, LS	1		34, p. 835; 35, pp. 839, 840
0858		XRF	C2, C3, RE	3		34, p. 846; 35, pp. 851, 852
0860		XRF	C3, C4	6		34, p. 848; 35, pp. 853, 854
0861	7733-16 7733-16-FD		C3	2		34, p. 849; 35, pp. 855, 856
0865		XRF	C1, C2, LS	2		34, p. 853; 35, pp. 861, 862
0870		XRF	C1, C4	2		34, p. 858; 35, pp. 865, 866
0896	7810-51		DW4	2		34, p. 880; 35, pp. 879, 880
0897		XRF	C2, C3, C4, RE	4		34, p. 881; 35, pp. 881, 882
0916		XRF	C1, RE		2.39	34, p. 900; 35, pp. 911, 912, 36
0917		XRF	C1, C2, RE	1		34, p. 901; 35, pp. 913, 914
0918	7810-46 7810-46-FD		C1	3		34, p. 902; 35, pp. 915, 916
0927		XRF	C1, RE	1		34, p. 911; 35, pp. 923, 924
0928		XRF	C2, DW	2		34, p. 912; 35, pp. 925, 926
0931		XRF	RE	1		34, p. 915; 35, pp. 929, 930
0934		XRF	C3, RE	4		34, p. 918; 35, pp. 931, 932
0938		XRF	C1, C3, LS	4		34, p. 922; 35, pp. 937, 938
0939		XRF	C1, C3, RE	5		34, p. 923; 35, pp. 939, 940
0946		XRF	C1	3		34, p. 930; 35, pp. 947, 948
0947		XRF	C1, C2, C4, RE	1		34, p. 931; 35, pp. 949, 950
0948		XRF	C1, C3, C4, DW, RE	2		34, p. 932; 35, pp. 951, 952

Table 10: Level II population within AOC A based on sampling data

Property Number	Sample Identification	Rationale for Inferring Contamination	Cells/Areas Impacted	Number of Residents	County Multiplier	References
0949		XRF	C-3	2		34, p. 933; 35, pp. 953, 954
0950	7810-27		C2	2		34, p. 934; 35, pp. 953, 954
0951		XRF	C1	2		34, p. 935; 35, pp. 953, 954
0957		XRF	C2, RE	1		34, p. 940; 35, pp. 957, 958
0958	7810-34		RE1	5		34, p. 941; 35, pp. 959, 960
0966		XRF	C1, C2, RE	1		34, p. 949; 35, pp. 969, 970
0977	7888-10		RE2	1		34, p. 960; 35, pp. 981, 982
0980	7888-12		RE2	1		34, p. 963; 35, pp. 985, 986
0986		XRF	C4, RE	2		34, p. 969; 35, pp. 989, 990
0988		XRF	C1, C2, C4	1		34, p. 971; 35, pp. 993, 994

Notes:

C Cell
DW Driveway
GA Garden area
LS Landscape
PA Play area
RE Road easement
XRF X-ray fluorescence

The total number of self-reported residents subject to level II concentrations of lead, cadmium, or zinc is 884 persons. Six occupied rental homes were also subject to level II concentrations; however, the number of renters was not provided. The 2018 Montgomery County estimate of 2.39 persons per household (Ref. 36) was used to assign population to these six rental properties to obtain a rental property population of 14.34.

Sum of individuals subject to Level II concentrations: 884 + 14.34

Level II Concentrations Factor Value: 898.34

5.1.3.3 Workers

Sampling has focused on residential properties. No workplaces are known to have been accessed. This factor was not scored.

Workers Factor Value: Not evaluated
(Ref. 1, Table 5-4)

5.1.3.4 Resources

No resources such as commercial agriculture, silviculture of livestock production are known to occur within the area of observed contamination. The resource factor was not scored.

Resources Factor Value: Not scored

5.1.3.5 Terrestrial Sensitive Environments

No known terrestrial sensitive environments meeting the definitions presented in Table 5-5 of the HRS rule are known to be present within the area of contamination. The terrestrial sensitive environments factor was not evaluated.

Terrestrial Sensitive Environments Factor Value: Not scored

5.2 NEARBY POPULATION THREAT

The nearby population threat was not evaluated.