HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD COVER SHEET

Name of Site: Former Kil-Tone Company

EPA ID No.: NJN000200874

Contact Persons

Documentation Record:

Ildefonso Acosta, National Priorities List Coordinator
U.S. Environmental Protection Agency, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4344

James Desir, Site Assessment Manager
U.S. Environmental Protection Agency, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4342

Sandra Harrigan, Site Manager
Tetra Tech, Inc.
1955 Evergreen Boulevard, Suite 300
Duluth, Georgia 30096
(678) 775-3088

Pathways, Components, or Threats Not Scored

The ground water and air migration pathways, the drinking water threat of the surface water migration pathway, and the nearby population threat of the soil exposure pathway were not scored in this Hazard Ranking System (HRS) documentation record because the human food chain and environmental threats of the surface water migration pathway and resident population threat of the soil exposure pathway are sufficient to qualify the site for the National Priorities List (NPL). The ground water migration pathway, drinking water threat of the surface water migration pathway, and nearby population threat of the soil exposure 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 threats and pathways mentioned above.

Ground Water Migration Pathway: In August 2014, the New Jersey Department of Environmental Protection (NJDEP) collected ground water samples at and in the vicinity of the Former Kil-Tone property (Ref. 12, pp. 1, 22). The ground water migration pathway is of concern because arsenic was detected at concentrations that ranged from 8.4 micrograms per liter (µg/L) to 14,000 µg/L (Ref. 12, pp. 22, 38 through 41).

Drinking Water Threat, Surface Water Migration Pathway: No drinking water intakes are located within the 15-mile target distance limit.

Nearby Population Threat, Soil Exposure Pathway: Soil sampling on residential properties in the vicinity of the Former Kil-Tone property is ongoing as additional properties are identified for sampling (Ref. 43, p. i; 53).

Air Migration Pathway: The listing of the site would not be changed by evaluating this pathway.

HAZARD RANKING SYSTEM (HRS) DOCUMENTATION RECORD

Name of Site:	Former Kil-Tone Company
EPA Region:	2
Date Prepared:	September 2015
Street Address of Site*:	527 East Chestnut Avenue
City, County, State, Zip:	Vineland, Cumberland County, New Jersey 08360
General Location in the State:	Southwestern portion of state
Topographic Maps:	Millville, New Jersey, 1997
Latitude:	39° 28' 42.276" North
Longitude:	75° 1' 31.76" West

The coordinates above for the Former Kil-Tone Company were measured from sampling location USC-SUR-9/USC-SUB-9A collected in the northwestern portion of the property (Ref. 4).

* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the 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	Not Scored
Surface Water Migration	84.00
Soil Exposure	100.00
Air Migration	Not Scored
HRS SITE SCORE	**65.29**

WORKSHEET FOR COMPUTING HRS SITE SCORE

	S Pathway	S^2 Pathway
Ground Water Migration Pathway Score (S_{gw})	NS	NS
Surface Water Migration Pathway Score (S_{sw})	84	7,056
Soil Exposure Pathway Score (S_s)	100	10,000
Air Migration Pathway Score (S_a)	NS	NS
$S^2_{gw} + S^2_{sw} + S^2_s + S^2_a$		17,056
$(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a) / 4$		4,264
$\sqrt{(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a) / 4}$		**65.29**

Note:

NS = Not scored

Table 4-1 –Surface Water Overland/Flood Migration Component Scoresheet			
Factor Categories and Factors	**Maximum Value**	**Value Assigned**	
Drinking Water Threat			
Likelihood of Release:			
1. Observed Release	550	550	
2. Potential to Release by Overland Flow:			
2a. Containment	10	NS	
2b. Runoff	25	NS	
2c. Distance to Surface Water	25	NS	
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	500	NS	
3.Potential to Release by Flood:			
3a. Containment (Flood)	10	NS	
3b. Flood Frequency	50	NS	
3c. Potential to Release by Flood (lines 3a x 3b)	500	NS	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	NS	
5. Likelihood of Release (higher of lines 1 and 4)	550		550
Waste Characteristics:			
6. Toxicity/Persistence	(a)	10,000	
7. Hazardous Waste Quantity	(a)	100	
8. Waste Characteristics	100		NS
Targets:			
9. Nearest Intake	50	NS	
10. Population:			
10a. Level I Concentrations	(b)	NS	
10b. Level II Concentrations	(b)	NS	
10c. Potential Contamination	(b)	NS	
10d. Population (lines 10a + 10b + 10c)	(b)	NS	
11. Resources	5	NS	
12. Targets (lines 9 + 10d + 11)	(b)		NS
Drinking Water Threat Score:			
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a maximum of 100]	100		NS
Human Food Chain Threat			
Likelihood of Release:			
14. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			
15. Toxicity/Persistence/Bioaccumulation	(a)	50,000,000	
16. Hazardous Waste Quantity	(a)	100	
17. Waste Characteristics	1,000		180
Targets:			
18. Food Chain Individual	50	20	

Table 4-1 –Surface Water Overland/Flood Migration Component Scoresheet (Continued)			
Factor Categories and Factors	**Maximum Value**	**Value Assigned**	
19. Population			
19a. Level I Concentrations	(b)	0	
19b. Level II Concentrations	(b)	0	
19c. Potential Human Food Chain Contamination	(b)	0.00006	
19d. Population (lines 19a + 19b + 19c)	(b)	0.00006	
20. Targets (lines 18 + 19d)	(b)		20.00006
Human Food Chain Threat Score:			
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to maximum of 100]	100		24.00
Environmental Threat			
Likelihood of Release:			
22. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	50,000,000	
24. Hazardous Waste Quantity	(a)	100	
25. Waste Characteristics	1,000		180
Targets:			
26. Sensitive Environments			
26a. Level I Concentrations	(b)	0	
26b. Level II Concentrations	(b)	100	
26c. Potential Contamination	(b)	NS	
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	100	
27. Targets (value from line 26d)	(b)		100
Environmental Threat Score:			
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a maximum of 60]	60		60
Surface Water Overland/Flood Migration Component Score for a Watershed			
29. Watershed Score[c] (lines 13+21+28, subject to a maximum of 100)	100		84.00
Surface Water Overland/Flood Migration Component Score			
30. Component Score (S_{sw})[c] (highest score from line 29 for all watersheds evaluated; subject to a maximum of 100)	100		84.00

Notes:

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

TABLE 5-1 --SOIL EXPOSURE PATHWAY 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	50	
6. Resident Population:			
6a. Level I Concentrations	(b)	1,145.80	
6b. Level II Concentrations	(b)	11	
6c. Population (lines 6a + 6b)	(b)	1,156.80	
7. Workers	15	5	
8. Resources	5	0	
9. Terrestrial Sensitive Environments	(c)	0	
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)		1,211.80
Resident Population Threat Score			
11. Resident Population Threat Score (lines 1 x 4 x 10)	(b)		11,996,820
Nearby Population Threat			
Likelihood of Exposure:			
12. Attractiveness/Accessibility	100	NS	
13. Area of Contamination	100	NS	
14. Likelihood of Exposure	500	NS	NS
Waste Characteristics:			
15. Toxicity	(a)	NS	
16. Hazardous Waste Quantity	(a)	NS	
17. Waste Characteristics	100		NS
Targets:			
18. Nearby Individual	1	NS	
19. Population Within 1 Mile	(b)	NS	
20. Targets (lines 18 + 19)	(b)		NS
Nearby Population Threat Score:			
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)		NS
Soil Exposure Pathway Score:			
22. Soil Exposure Pathway Score [d] (S_s), (lines [11+21]/82,500, subject to a maximum of 100)	100		100.00

Notes:

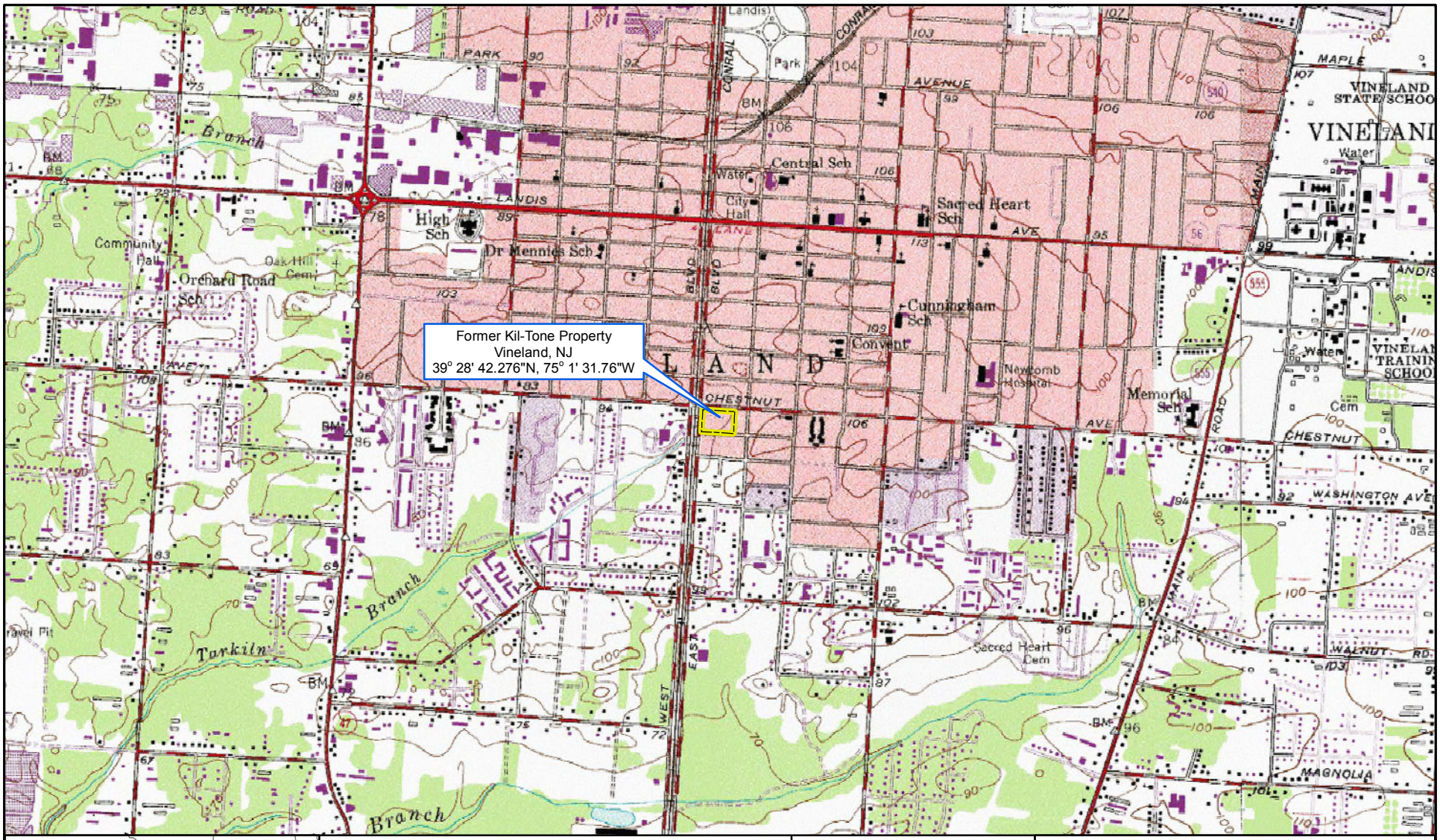
[a] Maximum value applies to waste characteristics category.

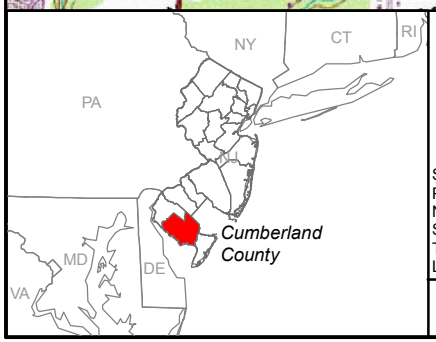
[b] Maximum value not applicable.

[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.

NS Not scored





Legend

Former Kil-Tone Company Property Boundary

Sources:
Property Boundary: Cumberland County Department of Planning and Development NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), 2011; and Reference No. 13. Topographic maps: USGS 7.5 Minute Topographic Quadrangle Maps: Millville, NJ 1997 & Five Points, NJ 1994. Latitude and Longitude Coordinates obtained from Reference (Ref.) 4.

EPA Contract No.: EP-S5-13-01
TDD No.: S05-0005-1501-300

N

1,000 0 1,000

Feet

Former Kil-Tone Company
Vineland, Cumberland County, New Jersey

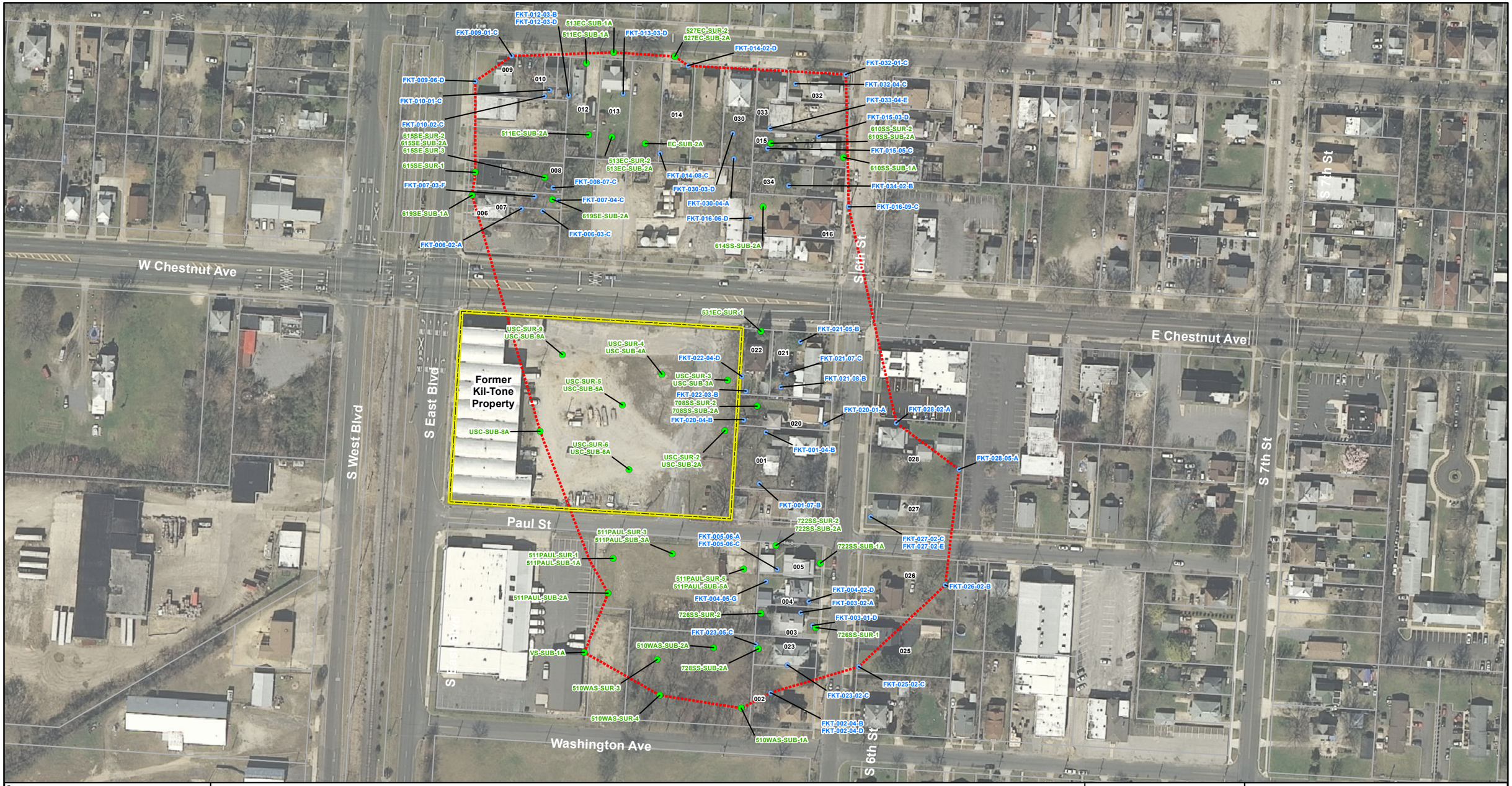
Figure 1

Facility Location

TETRA TECH

Date Saved: 8/14/2015

Coordinate System: NAD 1983 UTM Zone 18NTransverse Mercator



Source:
Streets: New Jersey Department of Environmental Protection (NJDEP), Office of Information Resources Management (OIRM), Bureau of Geographic Information Systems (BGIS) and U.S. Census Bureau, 2003;
Property Boundary: Cumberland County Department of Planning and Development and New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), 2011; Ref. 13
Aerial Photograph: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Natural Color Aerial Photo, 2012-2013;
Sampling Locations: Ref. 12, pp. 38 to 41; also see Section 5.01 and Tables 17, 18, 19, and 20 of this Hazard Ranking System documentation record.

Legend

Green Text — NJDEP Site Investigation Sampling Location
Blue Text — EPA January and February 2015 Sampling Location
Parcel Boundary
FKT Property Boundary
Source No. 1

NJDEP August 2014

A	Depth of 1.5 to 2 feet bgs
NJDEP	New Jersey Department of Environmental Protection
SUB	Subsurface soil
SUR	Surface soil

EPA January and February 2015

##	Number of sampling station on property
###	Site-specific property ID assigned for project
A	Depth of 0 to 2 inches bgs
AOC	Area of observed contamination
B	Depth of 2 to 6 inches bgs
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs
D	Depth of 12 to 24 inches bgs
E	Depth of 0 to 2 inches bgs
F	Depth of 2 to 6 inches bgs
FKT	Former Kil-Tone Company
G	Depth of 6 to 12 inches bgs

N

75 0 75

Feet

EPA Contract No.: EP-S5-13-01
TDD No.: S05-0005-1501-300

Former Kil-Tone Company
Vineland, Cumberland County, New Jersey

Figure 2

Source No. 1 Samples

TETRA TECH

Date Saved: 8/14/2015

Source:
Streets: New Jersey Department of Environmental Protection (NJDEP), Office of Information Resources Management (OIRM), Bureau of Geographic Information Systems (BGIS) and U.S. Census Bureau, 2003;
Property Boundary: Cumberland County Department of Planning and Development and New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), 2011; Ref. 13
Aerial Photograph: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Natural Color Aerial Photo, 2012-2013;
also see Section 5.01 and Tables 15 and 16 of this Hazard Ranking System documentation record for references for background sampling locatons.

Legend

- EPA January and February 2015 Sampling Location
- FKT Property Boundary
- Parcel with Background Location

EPA January and February 2015

##	Number of sampling station on property
###	Site-specific property ID assigned for project
A	Depth of 0 to 2 inches bgs
B	Depth of 2 to 6 inches bgs
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs
D	Depth of 12 to 24 inches bgs
FKT	Former Kil-Tone Company

EPA Contract No.: EP-S5-13-01
TDD No.: S05-0005-1501-300

N

1,000 0 1,000

Feet

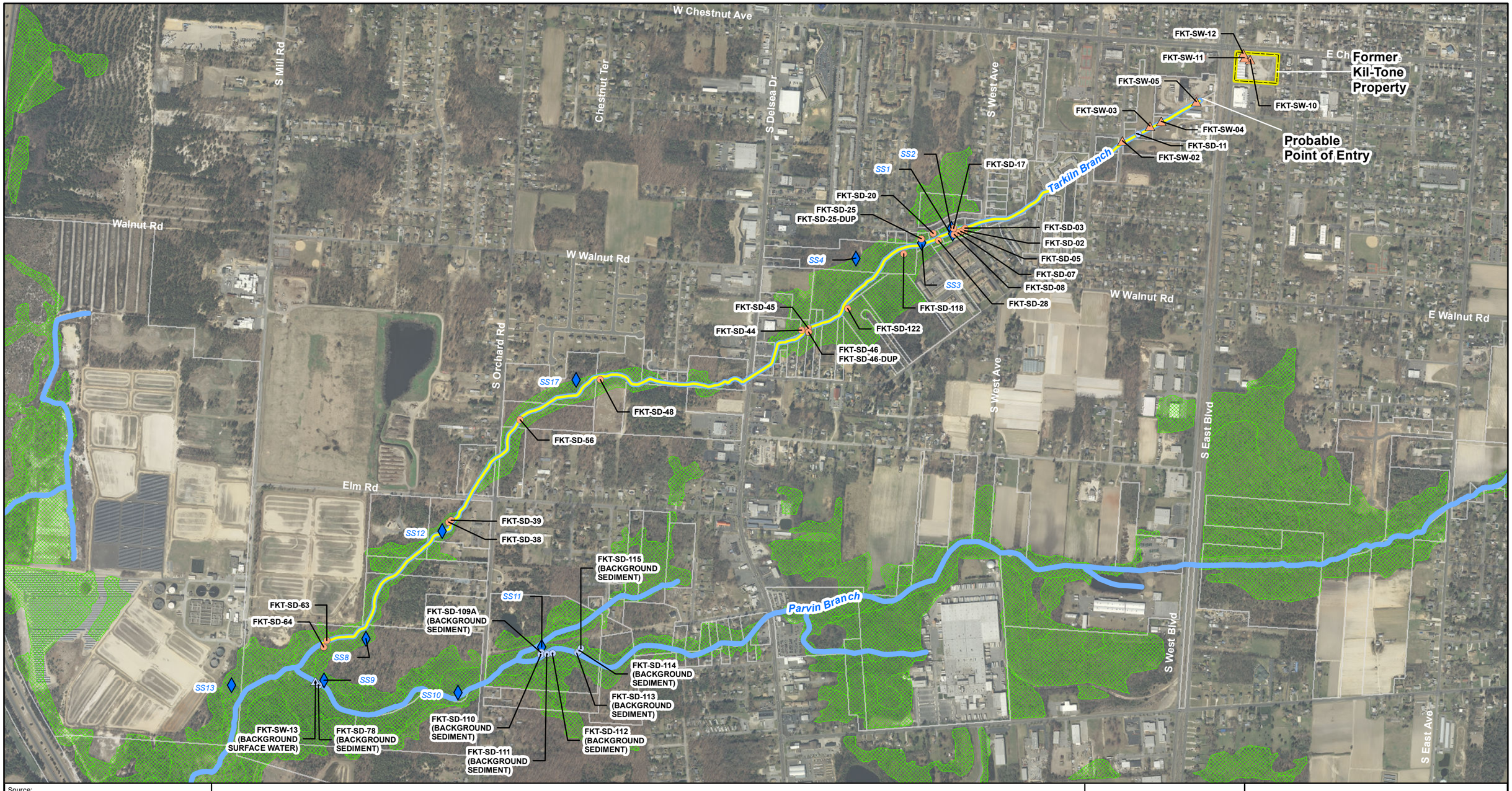
Former Kil-Tone Company
Vineland, Cumberland County, New Jersey

Figure 3

Background Soil Samples

TETRA TECH

Date Saved: 8/14/2015



Source:
Streets: New Jersey Department of Environmental Protection (NJDEP), Office of Information Resources Management (OIRM), Bureau of Geographic Information Systems (BGIS) and US Census Bureau, 2003;
Property Boundary: Cumberland County Department of Planning and Development and New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), 2011; Ref. 13
Aerial Photograph: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Natural Color Aerial Photo, 2012-2013;
Wetlands: USFWS National Wetlands Inventory, 2012 (http://www.fws.gov/wetlands);
Hydrology: USGS National Hydrography Dataset, 2014 (http://nhd.usgs.gov);
Sampling Locations: Ref. 43, pp. 180 to 182; also see Section 4.1.2.1.1 and Tables 4, 5, 6, 7, and 8 of this Hazard Ranking System documentation record.

Date Saved: 8/13/2015

Legend

- Sediment (0" - 6")
- Surface Water
- Background Sediment (0" - 6")
- Background Surface Water
- Wetland Verification Location
- Stream
- Zone of Contamination
- FKT Property Boundary
- Parcel Boundary
- USFWS Wetlands (PFO, PEM, PSS)

- Number of sampling station on property
- Site-specific property ID assigned for project
FKT - Former Kil-Tone Company
PFO - Palustrine Forested
PEM - Palustrine Emergent
PSS - Palustrine Scrub/Shrub

N

500 0 500

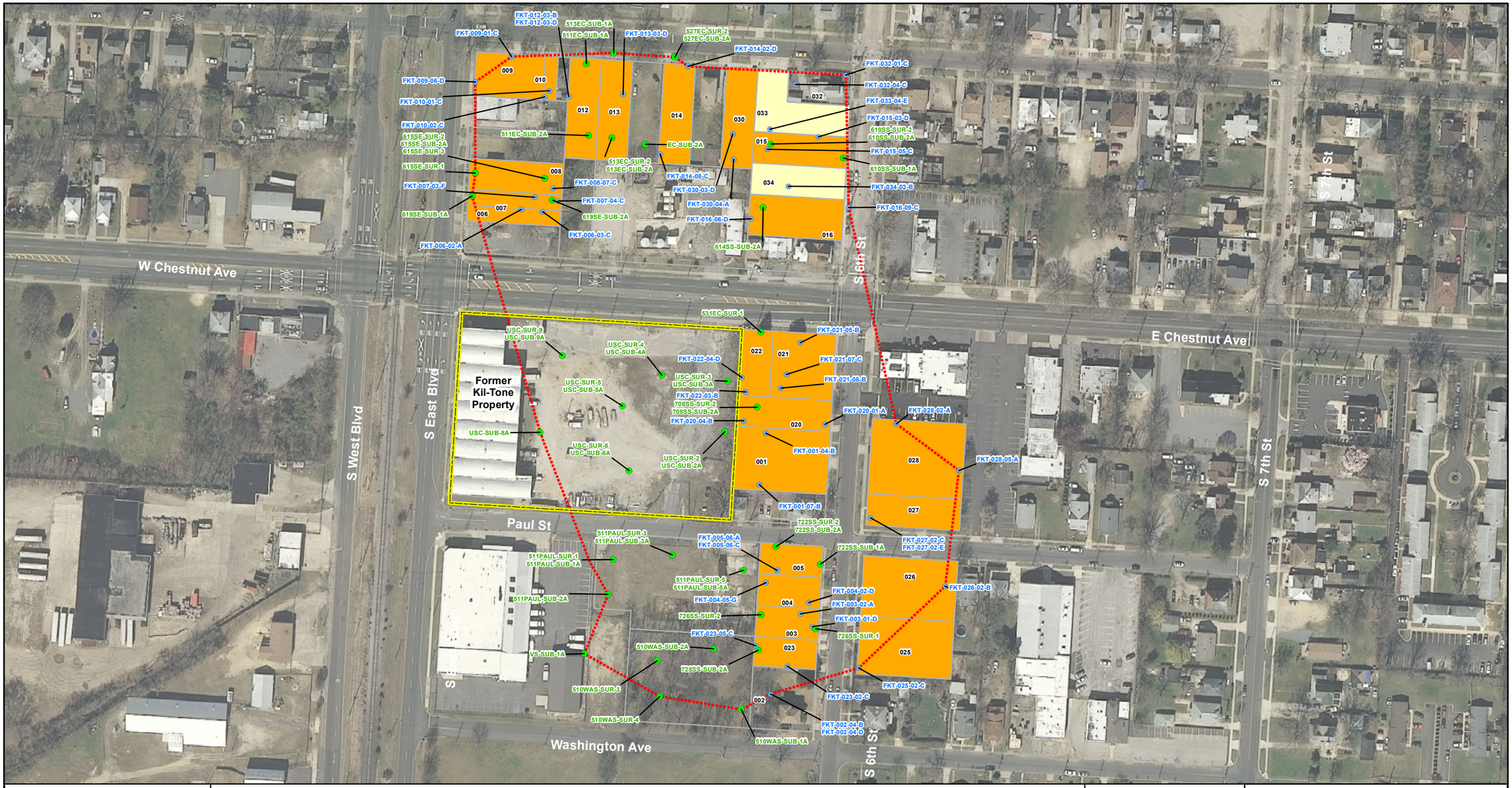
Feet

EPA Contract No.: EP-S5-13-01
TDD No.: S05-0010-1501-400

Former Kil-Tone Company
Vineland, Cumberland County, New Jersey

Figure 4
Surface Water Migration Pathway Observed Release

TETRA TECH



Source:
Streets: New Jersey Department of Environmental Protection (NJDEP), Office of Information Resources Management (OIRM), Bureau of Geographic Information Systems (BGIS) and U.S. Census Bureau, 2003;
Property Boundary: Cumberland County Department of Planning and Development and New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), 2011; Ref. 13
Aerial Photograph: New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Natural Color Aerial Photo, 2012-2013;
Sampling Locations: Reference No. 12; also see Section 5.01 and Tables 17, 18, 19, 20, 24, and 25 of this Hazard Ranking System documentation record for references for sampling locations.

Legend

- Green Text: NJDEP Site Investigation Sampling Location
- Blue Text: EPA January and February 2015 Sampling Location
- AOC A
- Parcel Boundary
- Level I Property
- Level II Property
- FKT Property Boundary

NJDEP August 2014

A	Depth of 1.5 to 2 feet bgs
NJDEP	New Jersey Department of Environmental Protection
SUB	Subsurface soil
SUR	Surface soil

EPA January and February 2015

##	Number of sampling station on property
###	Site-specific property ID assigned for project
A	Depth of 0 to 2 inches bgs
AOC	Area of observed contamination
B	Depth of 2 to 6 inches bgs
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs
D	Depth of 12 to 24 inches bgs
E	Depth of 0 to 2 inches bgs
F	Depth of 2 to 6 inches bgs
FKT	Former Kil-Tone Company
G	Depth of 6 to 12 inches bgs

EPA Contract No.: EP-S5-13-01
TDD No.: S05-0005-1501-300

N

75 0 75

Feet

Former Kil-Tone Company
Vineland, Cumberland County, New Jersey

Figure 5

AOC-A and Level I and II Properties

TETRA TECH

Prepared By: joel.peters

Date Saved: 8/14/2015

REFERENCES

1. U.S. Environmental Protection Agency (EPA). Hazard Ranking System, Title 40 *Code of Federal Regulations* Part 300, 55 Federal Register 51532. December 14, 1990. A complete copy of the Hazard Ranking System can be obtained at the Regional docket upon request. A complete copy is also available at: http://www.epa.gov/superfund/sites/npl/hrsres/#HRS Rule. 138 Pages.

2. EPA. Superfund Chemical Data Matrix (SCDM). June 20, 2014. Excerpt, 50 Pages. A complete copy of SCDM is available at: http://epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

3. U.S. Department of the Interior, U.S. Geological Survey (USGS). Millville Quadrangle, New Jersey. 7.5 Minute Series (Topographic). Scale, 1:24,000. 1997. 1 Map. Note: Modified by Tetra Tech on April 13, 2015 to add the Location of the Former Kil-Tone Company.

4. Tetra Tech. Project Note to File with Attachment. Subject: Coordinates for the Former Kil-tone Company in Vineland, New Jersey. Attachment: Google Earth Map. April 13, 2015. 2 Pages.

5. EPA. Region 2 Laboratory. Letter with Attachment. Regarding Kil-Tone -1502010. From: James Ferretti, Acting Chief, Division of Environmental Science and Assessment (DESA)/Laboratory Branch (LB). To: Amelia Jackson, Hazardous Waste Support Branch (HWSB), DESA/HWSP. Attachment: Analytical Data Results for Project Number 1502010. February 27, 2015. 211 Pages.

6. New Jersey Department of Environmental Protection (NJDEP). Site Remediation Program, Bureau of Environmental Measurements and Site Assessment (BEMSA). Work Plan for Site Investigation. Former Kil-Tone Company. August 4, 2014. 29 Pages.

7. EPA. NPL Listing History for Iceland Coin Laundry. New Jersey. EPA ID#: NJ0001360882. October 8, 2014. 2 Pages.

8. Tetra Tech. Former Kil-Tone Site, Vineland, New Jersey, Soil Boring Logs. January 23, 2015. 33 Pages.

9. Tetra Tech. Project Note to File with Attachment. Subject: Removal Assessment Residential Sampling Activities in the Vicinity of the Former Kil-Tone Company. Attachment: Field Sample Collection Sheets. July 3, 2015. 94 Pages.

10. EPA. Superfund Enterprise Management System (SEMS). Former Kil-Tone Company. Accessed on December 1, 2015. 1 Page.

11. EPA. NPL Listing History for Vineland Chemical Co., Inc. New Jersey. EPA ID#: NJD002385664. September 21, 1984. 3 Pages.

12. NJDEP, Division of Remediation Support, BEMSA. Site Investigation. Former Kil-Tone Company. 570 Pages.

13. Tetra Tech. Project Note to File with Attachments. Subject: Property Tax Information for 527 East Chestnut Avenue, Vineland, Cumberland Co., NJ. Attachments: Property Detail and Property Tax Information. August 14, 2015. 3 Pages.

14. State of New Jersey, Department of Law and Public Safety, Division of Criminal Justice. Memorandum. Subject: Kiltone Chemical, Vineland, New Jersey. From: Steven J. Madonna, Chief, Environmental Prosecutions Section. To: Gerrard Burke, Assistant Director, Office of Regulatory Services. October 9, 1984. 1 Page.

15. Tetra Tech. Letter with Attachment. Regarding Sampling and Analysis Plan, Former Kil-Tone Removal Assessment, Vineland, Cumberland County, New Jersey. EPA Contract No. EP-S5-13-01

(START IV, Region 5), EPA TDD No. 0010-1501-400, Document Tracking No.: 0129. Attachment: Sampling and Analysis Plan. January 23, 2015. 316 Pages.

16. EDR. Certified Sanborn Map Report for Former Kil-Tone Company. Inquiry Number: 4164617.3. December 18, 2014. 10 Pages.

17. Monograph of the Mercantile, Industrial and Professional Interests of Beautiful Vineland. Vineland Chamber of Commerce. 1920. Excerpt, 4 Pages.

18. NJDEP. Memorandum. Subject: Former Kil-Tone Company site, 527 E. Chestnut Ave., Vineland City, Cumberland Co. From: Robert Beretsky, Responsible Party Investigations Unit. To: Kevin Kratina, Assistant Director, Enforcement and Assignment Element. June 7, 2014. 5 Pages.

19. Gary R. Brown, LSRP. RT Environmental Services, Inc. Lerco Site, 520 Chestnut Avenue, Vineland, New Jersey. Remedial Investigation Report/Remedial Action Workplan. May 2013. 72 Pages.

20. Flaster Greenberg, Attorney at Law. Letter Regarding Woodruff Marcacci Fuel Company now known as Lerco Fuel Oil Company, 520 Chestnut Avenue, Vineland, New Jersey 08361. NJDEP Case # 90-10-29-1132, EA ID # SUB06001, SRP# 012769. From: Mitchell H. Kizner, Flaster/Greenberg P.C. To: Matthew E. Turner, NJDEP. May 6, 2014. 4 Pages.

21. State of New Jersey, County of Cumberland. Affidavit of Adolph Franzoi. September 22, 1989. 4 Pages.

22. U.S. Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS). Custom Soil Resource Report for Cumberland County, New Jersey. Former Kil-Tone Company and Vicinity. April 11, 2015. 16 Pages.

23. Tetra Tech. Project Note to File with Attachment. Subject: Soil Boring Logs. Attachment: NJDEP Soil Boring Logs. April 10, 2015. 5 Pages.

24. EPA, Region 2 Laboratory. Letter Regarding Former Kil-Tone Company – 1408029. From: John R. Bourbon, Chief, DESA/LB. To: Kimberly McEvoy, NJDEP Site Remediation Program. October 21, 2014. 236 Pages.

25. Aqua-tex. Underground Storage Tank Closure and Remedial Investigation Report. Lerco Fuel Company. March 23, 1994. 115 Pages.

26. City of Vineland, New Jersey. Existing Drainage from Landis Avenue to Parvins Branch and from Delsea Drive to Valley Avenue. December 29, 1989. Scale 1 inch = 400 feet. Excerpt, 2 Maps.

27. Tetra Tech. Project Note to File with Attachment. Subject: Chain of Custody Records – August 2014 Site Inspection Sampling Event. Attachment: Chain of Custody Records. April 9, 2015. 17 Pages.

28. Tetra Tech. Project Note to File with Attachment. Subject: Chain of Custody Records – January and February 2015 EPA Residential Soil Sampling Event. Attachment: Chain of Custody Records. April 9, 2015. 19 Pages.

29. Tetra Tech. Project Note to File with Attachment. Subject: Soil Survey. Attachment: Soil Survey for background samples collected during the January and February 2015 removal assessment at the Former Kil-Tone Company property. April 13, 2015. 8 Pages.

30. U.S. Census Bureau. State and County QuickFacts for Cumberland County, New Jersey. Available at: http://quickfacts.census.gov/qfd/states/34/34011.html. Accessed on July 5, 2015. 2 Pages.

31. Tetra Tech. Project Note to File. Subject: USEPA Region 2 Laboratory Data Review Process and Definition of Reporting Limit. July 13, 2015. 1 Page.

32. EPA. Lead Arsenate EPA Pesticide Fact Sheet 12/86. Available at: http://pmep.cce.cornell.edu/profiles/insect-mite/fenitrothion-methylpara/lead-arsenate/insect-prof-leadars.html. Accessed on April 9, 2015. 3 Pages.

33. Washington State University. Historical use of lead arsenate insecticides, resulting soil contamination and implications for soil remediation. Available at: http://soils.tfrec.wsu.edu/historical-use-of-lead-arsenate-insecticides/. Accessed on September 3, 2015. 6 Pages.

34. New Jersey Agricultural Experiment Stations Bulletin 315. Analyses of Materials Sold as Insecticides and Fungicides for 1917. September 27, 1917. 16 Pages.

35. New Jersey Agricultural Experiment Stations Bulletin 339. Analyses of Materials Sold as Insecticides and Fungicides for 1919. October 13, 1919. 21 Pages.

36. New Jersey Agricultural Experiment Stations Bulletin 357. Analyses of Materials Sold as Insecticides and Fungicides for 1921. October 17, 1921. 22 Pages.

37. New Jersey Agricultural Experiment Stations Bulletin 372. Analyses of Materials Sold as Insecticides and Fungicides for 1922. October 1922. 24 Pages.

38. Market Growers Journal. The Market Gardener's Trade Paper. January 1, 1919. 117 Pages.

39. Cumberland County Improvement Authority. Cumberland County Business and Industry Guide 2015-2016. 72 Pages.

40. EPA. Standard Operating Procedure (SOP). Preparation and Analysis of Metals in Aqueous, TCLP Extracts, Soil/Sediment/Sludge, and Biological Tissue Samples by Inductively Coupled Plasma-Atomic Emission Spectrometry. SOP #: C-109. Revision #: 3.3. November 30, 2014. 50 Pages.

41. EPA. Standard Operating Procedure. Guidance for Laboratory Data Review. SOP #: G-26. Revision # 1.3. October 31, 2014. 24 Pages.

42. Tetra Tech. Project Note to File with Attachments. Subject: NPL Sites in Vineland, New Jersey: Vineland Chemical Company and Iceland Coin Laundry. Attachments: Superfund Information System and Google Earth Map for Vineland Chemical Company and Superfund Information System and Google Earth Map for Iceland Coin Laundry. April 13, 2015. 15 Pages.

43. Tetra Tech. Project Note to File with Attachment. Subject: April 2015 Sampling Event – Surface Water Pathway Sampling – Former Kil-Tone. Attachment: Field Sample Sheets. June 15, 2015. 184 Pages.

44. EPA, Region 2 Laboratory. Letter Regarding Former Kil-Tone - 1504031. From: Gregory J. Santacroce, Chief, DESA/LB. To: Amelia Jackson, Hazardous Waste Support Branch, DESA/HWSB. June 30, 2015. 246 Pages.

45. Federal Emergency Management Agency. Flood Insurance Rate Map. City of Vineland, New Jersey, Cumberland County. Panel 15 of 35. July 5, 1982. Excerpt. 1 Map.

46. Tetra Tech. Letter with Attachment. Regarding Final Tarkiln Branch Sampling and Analysis Plan, Former Kil-Tone Removal Assessment, Vineland, Cumberland County, New Jersey. EPA Contract No. EP-S5-13-01 (START IV, Region 5), EPA TDD No. 0010-1501-400, Document Tracking No.: (DTN) 0170. Attachment: Sampling and Analysis Plan. April 10, 2015. 397 Pages.

47. Tetra Tech. Project Note to File with Attachment. Subject: Chain of Custody Records for the EPA April 2015 Sampling Event – Tarkiln Branch and Parvin Branch in the Vicinity of the Former Kil-Tone Company. Attachment: Chain of Custody Records. July 13, 2015. 22 Pages.

48. Tetra Tech. Project Note to File with Attachment. Subject: USEPA Region 2 Laboratory Data Review – EPA April 2015 Removal Assessment Sampling Event, Former Kil-Tone Company. Attachment: Data Review Documentation. July 12, 2015. 244 Pages.

49. Tetra Tech. Project Note to File with Attachment. Subject: USEPA Region 2 Laboratory Data Review – August 2014 – New Jersey Department of Environmental Protection, Site Inspection, Former Kil-Tone Company. Attachment: Data Review Documentation. July 12, 2015. 59 Pages.

50. EPA, Region 2, Division of Environmental Science and Assessment, Laboratory Branch. Standard Operating Procedure for Total Organic Carbon – Sediments. SOP #: C-88. Revision #: 2.6. Effective Date October 31, 2014. 19 Pages.

51. NJDEP, Bureau of Environmental Measurements and Site Assessment (BEMSA). Logbook Notes for Former Kil-Tone Company. August 2014. 26 Pages.

52. Tetra Tech. Project Note to File with Attachment. Subject: USEPA Region 2 Laboratory Data Review – EPA January and February 2015 Removal Assessment Sampling Event, Former Kil-Tone Company. Attachment: Data Review Documentation. July 12, 2015. 54 Pages.

53. Tetra Tech. Project Note to File with Attachment. Subject: EPA June and July 2015 Sampling Activities at the Former Kil-Tone Company. Attachment: Photographs. July 8, 2015. 2 Pages.

54. EPA. Using Qualified Data to Document an Observed Release and Observed Contamination. EPA 540-F-94-028. November 1996. 18 Pages.

55. Tetra Tech. Project Note to File. Subject: Hazardous Waste Quantity for Source No. 1 and AOC A. July 15, 2015. 2 Pages.

56. Tetra Tech. Project Note to File with Attachment. Subject: Resident Population in AOC A. Attachment: Resident Population Questionnaires. April 10, 2015. 65 Pages.

57. USDA, Food and Drug Administration (FDA). Notice of Judgment Under the Insecticide Act. Issued November 28, 1932. 22 Pages.

58. EPA, Region 2, Division of Environmental Science and Assessment Laboratory Branch. Standard Operating Procedure for the Determination of Metals in Aqueous, TCLP Extracts, Soil/Sediment, Sludge, and Biological Tissue Samples by Inductively Coupled Plasma – Atomic Emission Spectrometry. SOP#: C-109. Revision Number: 3.2. Effective Date August 31, 2012. 28 Pages.

59. EPA, Region 2, Division of Environmental Science and Assessment Laboratory Branch. Standard Operating Procedure for Guidance for Laboratory Data Review. SOP #: G-26. Revision # 1.2. Effective Date June 15, 2012. 12 Pages.

60. USGS. Water Data Report 2013. 01411500 Maurice River at Norma, New Jersey, Maurice River Basin. 2013. 3 Pages.

61. EDR. The EDR Aerial Photo Decade Report, Enhanced with Aerial Viewpoint. Former Kil-Tone Company. Inquiry Number: 4164617.9. December 18, 2014. 18 Pages.

62. Tetra Tech. Wetland Presence/Absence Determination for the Former Kil-Tone Site, Vineland, Cumberland County, New Jersey. Program Interest # 648249. July 2015. 86 Pages.

63. Tetra Tech. Electronic Mail Correspondence. Subject: RE: Former Kil-Tone. Between: Sandra Harrigan, Environmental Scientist and Kim McEvoy, NJDEP, BEMSA. July 21, 2015. 2 Pages.

64. New Jersey Birding & Wildlife Trails. Union Lake Wildlife Management Area. Available at: http://www.njwildlifetrails.org/DelawareBayshoreTrails/Sites/tabid/440/Scope/site/Guide/DELBAYSH/Site/84/Version/2c/Default.aspx. Accessed on June 17, 2015. 2 Pages.

65. NJDEP. 2013 Fish Smart, Eat Smart. A Guide to Health Advisories for Eating Fish and Crabs Caught in New Jersey Waters. Available at: http://www.nj.gov/dep/dsr/fishadvisories/2013-final-fish-advisories.pdf. 79 Pages.

66. U.S. Department of the Interior, National Park Service. Partnership Wild & Scenic Rivers, The Maurice Wild and Scenic River. Available at: http://www.nps.gov/ncrc/programs/pwsr/maurice_pwsr_sub.html. Accessed on July 16, 2015. 2 Pages.

67. EPA, On-Scene Coordinator. Site Profile, Former Kil-Tone Site, Vineland, NJ – EPA Region II. Available at: http://epaosc.org/site/site_profile.aspx?site_id=9959. Accessed on July 18, 2015. 8 Pages.

68. Tetra Tech. Surface Water Migration Pathway – 15-Mile Target Distance Limit. USGS 7.5 Minute Series Topographic Quadrangle Maps of New Jersey: Dividing Creek 1986, Five Points 1994, Port Elizabeth 1994, and Millville 1997. Scale 1:24,000. 1 Map.

69. EPA. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Available at: http://www.epa.gov/agriculture/lfra.html. Last Updated on June 27, 2012. 9 Pages.

70. USDA, FDA. Notices of Judgment Under the Insecticide Act, 1176-1190. Issued October 1930. 16 Pages.

71. USDA, FDA. Notices of Judgment Under the Insecticide Act, 1191-1200. Issued January 1931. 16 Pages.

72. Tetra Tech. Project Note to File. Subject: EPA April 2015 Sampling Event – Description of Sediment in Tarkiln and Parvin Branches. July 28, 2015. 1 Page.

73. NJDEP, Division of Science, Research, and Technology. Environmental Assessment and Risk Analysis Element, Research Project Summary. Ambient Levels of Metals in New Jersey Soils, Abstract. Prepared by Paul F. Sanders, PhD. May 2003. Note: Annotated by Tetra Tech to Show the Location of Vineland, Cumberland County, New Jersey and the Mean Arsenic and Lead Concentrations in the Upper Coastal Plain. 6 Pages.

74. Tetra Tech. Record of Telephone Conversation. Between Sandra Harrigan, Environmental Scientist and Christopher Smith, Principal Fisheries Biologist, New Jersey Division of Fish and Wildlife. July 29, 2015. 1 Page.

75. Tetra Tech. Project Note to File with Attachments. Subject: Historical Property Deeds. Attachments: Historical Property Deeds for Former Kil-Tone Site Property. July 29, 2015. 33 Pages.

76. U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Arsenic. August 2007. 559 Pages.

77. NJDEP, Division of Fish and Wildlife. Map of Union Lake Wildlife Management Area. Cumberland Count, Vineland City and Salem County, Pittsgrove Township. Available at: http://www.state.nj.us/dep/fgw/pdf/wmamaps/union_lake.pdf. Accessed on August 2, 2015. 1 Map.

78. NJDEP. Division of Fish and Wildlife. New Jersey's Endangered and Threatened Wildlife. Available at: http://www.state.nj.us/dep/fgw/tandespp.htm. Attachments: Wildlife Notes for Bald Eagle and Osprey. Accessed on June 17, 2015. 9 Pages.

79. Accutest Laboratories. Technical Report for Tetra Tech EMI. Kil-Tone Company, Vineland, New Jersey. Accutest Job Number JB88391. Sampling Dates: January 23, 2015 through February 4, 2015. February 26, 2015. 205 Pages.

80. Ebasco Services Incorporated. REM III Program. Remedial Planning Activities at Selected Uncontrolled Hazardous Substances Disposal Sites. EPA Contract No. 68-01-7250. Attachment: Remedial Investigation Report for Vineland Chemical. June 1989. 272 Pages.

81. Delaware River Basin Commission. National Wild and Scenic Rivers. Creation of the National Wild and Scenic River System. Available at: http://www.state.nj.us/drbc/basin/wild.html. Last modified: February 24, 2015. Attachment: 1 Map. 3 Pages.

82. Tetra Tech. Project Note to File with Attachments. Subject: Contaminated Wetland Frontage along Tarkiln Branch downstream of the FKT Property. Attachments: Table with Wetland Frontage Calculation and Maps Depicting Wetland Segments. August 11, 2015. 5 Pages.

83. EPA. Electronic Mail Correspondence. Subject: Kil-tone Forensic Results – Copper Isotopes. Between: Jon C. Gabry, PhD, Chief, Hazardous Waste Support Branch, Region 2 and Kimberly Staiger, Amelia Jackson, Mel Hauptman, James Desir, Ildefonso Acosta, and Kevin Kubik, Region 2. August 18, 2015. 1 Page.

84. Tetra Tech. Project Note to File. Subject: Former Kil-Tone – Residential Soil Samples. August 20, 2015. 1 Page.

85. Tetra Tech. Project Note to File with Attachment. Subject: Former Kil-Tone Company – NJDEP 2014 SI: Nomenclature and Collection Techniques of Soil Samples. Attachment: Sample Nomenclature Diagrams. August 20, 2015. 2 Pages.

86. EPA. Facility Registry System Query Results. Vineland, Cumberland County, New Jersey. Available at: http://www.epa.gov/enviro/html/fii/fii_query_java.html, search terms: City Name – "Vineland", County Name – "Cumberland", State – "New Jersey". Accessed on August 21, 2015. 23 Pages.

87. EPA. Facility Registry Detail Report. Agway Inc Energy Products Vineland Bulk Plant. Available at: http://iaspub.epa.gov/enviro/fii_query_detail.disp_program_facility?p_registry_id=110001981954. Accessed on August 21, 2015. 2 Pages.

88. Cornell University. Copper Sulfate (Bluestone) Herbicide Profile 3/83. Chemical Factsheet for Copper Sulfate. Available at: http://pmep.cce.cornell.edu/profiles/herb-growthreg/cacodylic-cymoxanil/copper-sulfate/herb-prof-copper-sulfate.html. Accessed on August 31, 2015. 5 Pages.

SITE DESCRIPTION

The Former Kil-Tone (FKT) site is the result of a release of arsenic and lead to soil on commercial and residential properties and surface water, sediments, and wetlands of Tarkiln Branch, which receives runoff from the Former Kil-Tone Company (Kil-Tone). More specifically, for HRS scoring purposes, the FKT site includes Source No. 1 and area of observed contamination (AOC A), both of which are contaminated soil throughout the FKT property, as well as on residential and commercial properties surrounding FKT, and surface water and sediment in Tarkiln Branch (Refs. 5, pp. 13, 17, 20, 35, 38, 44, 45, 47, 52, 54, 66, 68, 73, 75, 78, 83, 86, 103, 134, 150, 153, 160, 190, 200; 24, pp. 15, 16, 22, 23, 26, 27, 31, 32, 35, 36, 44, 48, 49, 152; 44, pp. 59, 75, 82, 83, 85, 89, 90, 226 to 229). Tarkiln Branch receives runoff from the FKT property (Ref. 26). According to the U.S. Geological Survey Topographic Quadrangle Map of Millville, New Jersey, 1997, Tarkiln Branch is a perennial surface water body (Ref. 3). During EPA field activities conducted in February, April, and July 2015, surface water was present at the headwaters of Tarkiln Branch (Ref. 53). Arsenic and lead also have been detected in AOC A, which is comprised of the FKT property, and about 32 residential and commercial properties that surround the FKT property (see Section 5.0.1, General Considerations and Figure 5 of this HRS documentation record). During sampling activities, fill material was encountered in some of the soil borings; the fill material included concrete, red brick, coarse sand, coarse black sand, coarse orange and orange black sand with asphalt, brick shards, plastic, terra cotta, dark brown soil fill, various types of variegated dark brown soil and fill, coal fragments, coal ash, silt, small shards of coal, porcelain, rock shards, slag, and trash (Refs. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33, 34; 23, pp. 1, 2, 3, 4). Source No. 1 and AOC A are not entirely composed of fill (Ref. 8, pp. 3 through 33). Samples collected from Source No. 1 and AOC A were soil that primarily were course sands, loamy sands, sandy loams (Refs. 8, pp. 3 through 33; 23, pp. 2 through 5; 51, pp. 5, 6, 8). Source No. 1, AOC A, and Tarkiln Branch likely became contaminated as the result of filling and other modes of deposition including the dispersion of dust in ambient air and surface water runoff (Refs. 8, pp. 3 through 33; 21, pp. 1, 2, 3; 26; 43, p. i).

The FKT property encompasses about 1.05 acres of land and is located at 527 East Chestnut Avenue in Vineland, Cumberland County, New Jersey (Refs. 12, p. 1; 13, pp. 2, 3; 16, pp. 7, 8) (see Figure 1 of this Hazard Ranking System [HRS] documentation record). More specifically, the geographic coordinates, as measured from sample USC-SUR-9/USC-SUB-9A collected during New Jersey Department of Environmental Protection (NJDEP) site investigation (SI), are latitude 39° 28' 42.276" north and longitude 75° 1' 31.76" west (Ref. 4). The EPA identification number, as recorded in the Superfund Enterprise Management System (SEMS) database, is NJN000200874 (Ref. 10). From 1910 to the 1930s, Kil-Tone manufactured the pesticide arsenate of lead on the property (Refs. 12, pp. 2, 3; 17, p. 2). Arsenate of lead is also known as lead arsenate (see Ref. 34, p. 9). The FKT site comprises contaminated soil at and adjacent to the property (Refs. 5, pp. 13, 15, 17, 20, 23, 26, 35, 37, 38, 40, 43, 44, 45, 47, 50, 52, 54, 55, 65, 66, 68, 69, 70, 73, 74, 75, 78, 82, 83, 84, 86, 87, 89, 90, 93, 103, 134, 139, 144, 150, 153, 160, 163, 172, 187, 190, 200, 201, 207; 24, pp. 15, 16, 22, 23, 26, 27, 31, 32, 35, 36, 44, 48, 49, 55, 64, 69, 72, 73, 76, 80, 87, 95, 100, 103, 107, 113, 116, 121, 122, 126, 129, 130, 137, 138, 151, 157, 161, 164, 168, 169, 172, 174, 178, 182, 186, 187, 196, 210, 211, 220, 225, 228, 229).

According to Sanborn Fire Insurance Maps dated 1919 and 1925, buildings previously located on the property includes an acid plant, a tank room, an engine room, and a manufacturing building for grinding, mixing, pressing, and storage of pesticides (Refs. 12, pp. 2, 3; 16, pp. 7, 8). A laboratory was constructed around 1919 on the southwestern corner of the property (Ref. 16, p. 8). An artesian well and a valve pit were also identified in the center of the FKT property (Refs. 12, pp. 2, 3; 16, pp. 7, 8). The 1919, 1925, and 1949 Sanborn maps depict railroad spurs entering the property at the northwest corner. One railroad spur terminated on the western side of a building marked as storage of finished goods and the other railroad spur ended north of a building marked as tank room, mixing and pressing (Ref. 16, pp. 7, 8). By 1949, additions were made to the original buildings (Ref. 16, p. 6). The 1968 Sanborn map depicts a new

building on the west side of the original buildings and the railroad spur on the western property boundary was no longer present (Ref. 16, p. 5). The current configuration of the building on the property has been in place since at least 1956 (Refs. 61, pp. 6 through 18; 75, p. 33). Based on an historic aerial photograph, the original buildings were raised around 1974 (Ref. 61, p. 9).

The FKT property is bordered to the north by East Chestnut Avenue and residential and commercial properties beyond, to the east by residential properties, to the south by Paul Street and residential and commercial properties beyond, and to the west by South East Boulevard followed by railroad tracks and residential and commercial properties beyond (see Figure 2 of this HRS documentation record). The topography of the FKT property and the surrounding area is generally flat (Ref. 3) (see also Figure 1 of this HRS documentation record).

OPERATIONAL HISTORY

Kil-Tone began operations at the property in 1910 manufacturing the pesticide arsenate of lead (Refs. 12, p. 2; 18, p. 3). In the mid-1920s, Kil-Tone was acquired by John Lucas & Company, which formed the Lucas Kil-Tone Company (Lucas Kil-Tone) (Refs. 12. p. 3; 75, pp. 5, 6, 7). Lucas Kil-Tone continued manufacturing arsenic-based pesticides on the property (Ref. 12, 2, p. 3). Around 1930, John Lucas & Company was acquired by the Sherwin Williams Company. Lucas Kil-Tone operated as a subsidiary of Sherwin Williams until they ceased operations in the 1930s (Ref. 12, pp. 1, 3). The 1949 and 1968 Sanborn maps indicate that the Uddo Taormina Company Food Products occupied the property and configurations of the buildings had changed (Ref. 16, pp. 5, 6). Since that time, several entities have operated on the property (Ref. 12, p. 3). The current owner of the property is Urban Manufacturing and the operator is Urban Sign & Crane, Inc. (Refs. 12, p. 3; 18, pp. 3, 4; 39).

Lead arsenate is a pentavalent form of inorganic arsenic, which exists normally as white crystals with no discernible odor, and contains about 22 percent arsenic and is slightly soluble in cold water (Ref. 32, p. 1). Inorganic arsenicals are known to be acutely toxic (Ref. 32, p. 2). Lead arsenate was the most extensively used of the arsenical insecticides. It was first used as an insecticide in 1892 against the gypsy moth in Massachusetts (Ref. 33, p. 1). Lead arsenate's low solubility and, when applied in foliar sprays, ability to adhere well to plants, made it useful to farmers. Initially, it was prepared by farmers at home by reacting soluble lead salts with sodium arsenate (Ref. 33, p. 1). In 1919, it was discovered that standard practices for washing produce were failing to adequately remove arsenic residues (Ref. 33, p. 2). Unfortunately, all of the tested alternative materials were found to provide less effective insect control or were more toxic to plants and animals (Ref. 33, p. 2). No adequate substitutes were found until 1947, when the synthetic organic insecticide dichlorodiphenyltrichloroethane (DDT) was introduced (Ref. 33, p. 2). The partial or complete substitution of DDT for lead arsenate continued through the mid-1960s. In August 1988, the U.S. Environmental Protection Agency (EPA) banned all insecticidal uses of lead arsenate (Ref. 33, p. 2).

Information obtained from the Vineland Chamber of Commerce and the New Jersey Experiment Stations that date between 1917 and 1926 indicate that specific products manufactured by Kil-Tone included Green Cross Dry Powdered Arsenate of Lead, Green Cross Standard Arsenate of Lead (paste), Green Cross Sulpho-arsenate Powder, Green Cross Sulphur and Arsenate of Lead Mixture, Modified Kil-Tone, Improved Kil-Tone, Fruit Kil-Tone, Bordeaux Mixture, Dry Powdered Arsenite of Zinc, and Beetle Mort (Refs. 17, pp. 1, 2; 34, pp. 9, 13, 14; 35, pp. 9, 19, 20; 36, pp. 10, 17, 18; 37, pp. 10, 13, 19, 20; 38, pp. 26-(106), 26-(154)). Based on the timeframe during which FKT operated, these products were regulated under the Insecticide Act of 1910 (Ref. 69, p. 1; 70, p. 126).

Early pesticide control laws were aimed at protecting consumers against ineffective products and deceptive labeling (Ref. 69, p. 2). In September 1932, the U.S. Department of Agriculture (USDA) issued a Notice of Judgment Under the Insecticide Act against the Lucas Kil-Tone Co. for the adulteration

and misbranding of Bordo (lead arsenate) and Green Cross Nico-Tone (Ref. 57, pp. 121, 125, 126). In this judgment, the Lucas Kil-Tone Co. pleaded guilty and paid a $490 fine (Ref. 57, pp. 125, 126, 127). This action involved shipments of Bordo Lead Arsenate and Green Cross Nico-Tone that contained ingredients (for example calcium arsenate) that were not declared on the label and greater percentages of arsenic in water soluble form than declared on the label (Ref. 57, pp. 125, 126, 127). In 1929 and 1930, Lucas Kil-Tone also was issued a Notice of Judgment for adulteration and misbranding of Green Cross Beetle Mort (Refs. 70, pp. 66, 67, 69, 70; 71, p. 88). The products contained ingredients that were inconsistent with the label including, a greater amount of water-soluble arsenic expressed as metallic (Refs. 70, pp. 66, 67, 69, 70; 71, p. 88).

PREVIOUS INVESTIGATIONS

Limited number of previous environmental investigations have been conducted at and in the vicinity of the FKT property. Table 1 lists the previous investigations at the FKT property including the hazardous substances detected in the samples collected. A brief summary of these investigations is provided following Table 1.

TABLE 1: Summary of Previous Investigations

Company/ Agency	Investigation	Date	Samples Collected	Hazardous Substances Detected	References
NJDEP, BEMSA	Site Investigation	August 2014	Soil, sediment, and ground water	Arsenic Lead	12, pp. 9 through 17, 22, 28
EPA Region 2	Removal Assessment	January 2015 and ongoing	Soil	Arsenic Lead	5, pp. 11 through 210

Notes:

BEMSA Bureau of Environmental Measurements and Site Assessment
EPA U.S. Environmental Protection Agency
NJDEP New Jersey Department of Environmental Management

In August 2014, the NJDEP, Bureau of Environmental Measurements and Site Assessment (BEMSA) conducted a site investigation (SI) of the FKT property (Ref. 12, pp. 1, 7, 32). The SI included the collection of ground water, surface water, sediment, and surface and subsurface soil samples at the FKT property (currently occupied by Urban Sign & Crane), and on residential, commercial, and vacant lots within 1 block north, east, south, and west of the FKT property (Ref/. 12, pp. 32, 33, 38 through 42). Ground water samples revealed the presence of arsenic (up to 14,000 µg/L) and lead (at 24 µg/L) above background (Ref. 12, pp. 22, 38). Surface water samples collected from Tarkiln Branch revealed the presence of arsenic, (up to 260 µg/L) and lead (at 71 µg/L) (Ref. 12, pp. 28, 42). Sediment samples collected from Tarkiln Branch contained arsenic (up to 4.4 mg/kg) and lead (up to 410 mg/kg) (Ref. 12, pp. 28, 42). The highest concentrations of arsenic and lead in soil samples collected within 2 feet of ground surface were detected in the northwestern portion of the FKT property at 3,000 mg/kg and 3,100 mg/kg, respectively (Ref. 12, pp. 10, 38). In addition to the shallow samples (within 2 feet of ground surface), soil samples were collected up to 6 feet below ground surface (bgs) on the FKT property (Ref. 12, pp. 9 through 14). A subsurface soil sample collected in the western portion of the FKT property at 4 feet bgs contained arsenic and lead at 5,800 mg/kg and 3,600 mg/kg (Ref. 12, pp. 10, 38).

During the SI, NJDEP BEMSA also collected surface and subsurface soil samples on residential, commercial, and vacant properties within 1 block north, south, and east of the FKT property (Ref. 12, pp. 8, 39, 40, 41). The results of the samples collected indicated that soils on the FKT property, as well as

residential and commercial properties north, south, and east, of the FKT property were impacted by arsenic and lead (Ref. 12, pp. 12, 14, 16, 38 to 41). Arsenic and lead were detected as high as 95 mg/kg and 1,100 mg/kg within 2 feet of ground surface on residential properties northwest and north, respectively of the FKT property (Ref. 12, pp. 15, 16, 41). During sampling activities, NJDEP observed fill in the soil borings from 1.5 to 2.5 feet (18 to 24 inches) bgs (Refs. 23, pp. 1, 2, 3, 4; 51, pp. 5, 6, 8). Based on the results of the SI, NJDEP submitted the FKT property to the EPA Region 2 Removal Branch for removal considerations to protect human health from the arsenic and lead concentrations in soil on residential and commercial properties (Ref. 12, pp. 32, 33).

In January 2015, the EPA Region 2 Emergency Response and Removal Division initiated a removal assessment to determine whether arsenic concentrations in soils in the vicinity of the FKT property are present at concentrations that could pose a threat to public health and the environment (Ref. 15, p. 1). During the initial stage of the removal assessment, EPA communicated with residents in the study area and obtained site access and population data for the residential properties (Ref. 9, p. i). Based on the properties where site access was granted, EPA sampled about 32 residential properties located north, south, and east of the FKT property. Soil samples were not collected at the FKT property during this investigation (Refs. 5, pp. 2 through 8; 9, p. i; 15, p. 11). Surface and subsurface soil samples were collected at multiple locations throughout each residential property and at multiple depth intervals including 0 to 2 inches bgs, 2 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 24 inches bgs (Refs. 9, p. i; 15, pp. 3, 4, 5). The samples were screened with an X-ray fluorescence (XRF) instrument, which was used to select samples that were sent to the EPA Region 2 laboratory and an EPA Contract Laboratory Program laboratory for analysis of EPA Target Analyte List (TAL) metals including mercury (Ref. 9, p. i). Based on the XRF results, 237 samples were submitted to the fixed laboratories for analysis (Refs. 9, p. i; 15, p. 3). Background samples were collected from local parks and a cemetery in Vineland, New Jersey for comparison to the residential properties (Ref. 9, p. i).

The highest concentration of arsenic (1,000 mg/kg) was detected in the 2- to 6-inch interval on a property located about 190 feet northwest of the FKT property (Refs. 5, p. 160; 9, pp. 19 to 21). The highest concentration of lead (2,500 mg/kg) was detected in the 6- to 12-inch interval on a property located about 380 feet northwest of the FKT property (Refs. 5, p. 40; 9, pp. 31 to 33) (see Figure 2 of this HRS documentation record). During sampling activities, fill material was encountered in the soil borings advanced on the residential properties (Ref. 8, pp. 4 through 8, 11, 13, 16, 17, 19, 20, 22, 33).

In April 2015, EPA collected surface water samples from a puddle of water and storm drains on the FKT property (Ref. 43, pp. 19 to 22). Arsenic and lead were detected in the puddle of water at 200 and 460 µg/L, respectively (Ref. 44, p. 235). The surface water samples collected in the storm drains contained arsenic up to 13,000 µg/L and lead up to 39,000 µg/L (Ref. 44, p. 237). EPA also collected surface water and sediment samples from the in-stream segment, floodplain, banks, and wetlands of Tarkiln Branch (Refs. 43, p. i; 46, pp. 6 to 10). Arsenic and lead were detected in the surface water samples up to 360 µg/L and 16 µg/L, respectively (Ref. 44, pp. 227, 229). Arsenic and lead were detected in the sediment samples up to 1,400 mg/kg and 2,200 mg/kg, respectively (Ref. 44, p. 98).

EPA investigations at the FKT property are ongoing (Ref. 43, p. i; 53, p. 1). EPA is conducting soil sampling on residential properties as access to properties is granted, if laboratory results indicate that the extent of the soil contamination need further delineation, and to determine which properties may warrant a removal action (Ref. 53, p. 1). The residential soil sampling was expanded to include additional properties to determine the extent of contamination. From June 8 to July 1, 2015, soil sampling was conducted at 35 out of 48 residential properties targeted for Phase II residential sampling. To date, about 827 soil samples have been collected and sent to the EPA Region 2 Division of Environmental Science and Assessment (DESA) laboratory for EPA TAL metals analysis (Ref. 67, p. 1).

On June 22, 2015, the EPA Environmental Response Team (ERT) initiated a high resolution characterization of the soils at the FKT property using Cone Penetrometer Technology/XRF (CPT/XRF) equipment to determine the horizontal and vertical extent of contamination on the FKT property (Ref. 67, pp. 2, 3, 5). During the study, the EPA ERT used a Geoprobe drill rig to collect soil cores for visual comparison to the CPT logs. In addition, confirmation soil samples, for comparison to the XRF screening results, were collected from the soil cores and submitted to a fixed laboratory for analysis (Ref. 67, pp. 2, 3, 5). XRF screening results using the CPT/XRF equipment indicated arsenic concentrations as high as 47,000 parts per million (ppm; equivalent to mg/kg) and lead concentrations as high as 119,280 ppm in the soils near the former rail spur (Ref. 67, pp. 2, 3, 5). According to the Sanborn Fire Insurance maps of 1919, 1925, and 1949 there were rail spurs in the north and west sides of the FKT property (Ref. 16, p. 6, 7, 8). The 1968 Sanborn map shows only one rail spur in the northern portion of the site (Ref. 16, p. 5). Also, field XRF screening of the soil borings collected near the location of the former grinding house recorded concentrations of both arsenic and lead at 100 percent (Ref. 67, p. 2). Product was observed in a soil sample at 18 to 24 inches bgs (Ref. 67, p. 8). The 1919 and 1925 Sanborn maps depict the grinding room (house) in the southern portion of the property along E. Chestnut Avenue (Ref. 16, pp. 7, 8).

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Number of source: 1

Name of source: Contaminated soil

Source Type: Contaminated soil

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

Source No. 1 is contaminated soil, which contains arsenic and lead above background levels, throughout the FKT property, as well as on residential and commercial properties surrounding the FKT property (Refs. 5, pp. 13, 17, 20, 35, 38, 44, 45, 47, 52, 54, 66, 68, 73, 75, 78, 83, 86, 103, 134, 150, 153, 160, 190, 200; 24, pp. 15, 16, 22, 23, 26, 27, 31, 32, 35, 36, 44, 48, 49, 152) (see Figure 2 of this HRS documentation record). Soil samples that meet observed release criteria were used to delineate Source No. 1 (Ref. 1, Table 2-3). Soil within Source No. 1 likely became contaminated because of the use of fill material, surface water runoff, and air deposition (Refs. 21, p. 2). During sampling activities, fill material was observed on the FKT property and several residential properties within Source No. 1. Fill material observed during soil sampling included concrete, red brick, coarse sand, coarse black sand, coarse orange and orange black sand with asphalt, brick shards, plastic, terra cotta, dark brown soil fill, various types of variegated dark brown soil and fill, coal fragments, coal ash, silt, small shards of coal, porcelain, rock shards, slag, and trash (Refs. 23, pp. 1, 2, 3, 4; 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). The fill material was mixed with the soil, which was primarily course sands, loamy sands, and sandy loams (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Fill material is not continuous throughout individual properties or on all properties that comprise Source No. 1 (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Arsenic and lead have been detected at varying concentrations in soil samples collected from Source No. 1 (Ref. 5, pp. 12 through 210). This inconsistent nature of arsenic and lead contamination in the soils of Source No. 1 is characteristic for deposition by wind-blown particulates (Ref. 76, pp. 3, 15, 313). Because the soil and fill material are mixed, Source No. 1 is evaluated as contaminated soil.

Kil-Tone began operations at the property in the late 1910s manufacturing the pesticide arsenate of lead (Ref. 12, p. 2). Lead arsenate is a pentavalent form of inorganic arsenic (Ref. 32, p. 1). In a 1989 affidavit, a resident confirmed that while Kil-Tone was in operation, a green and white dust typically coated the ground and rooftops, as well as along the shore of Tarkiln Branch, near the FKT property (Ref. 21, pp. 1, 2).

Arsenic and lead have been detected in Source No. 1, which is comprised of the FKT property, and about 32 residential and commercial properties that surround the FKT property. The extent of Source No. 1 is determined by contaminated soil samples contained in Tables 18 and 20 of this HRS documentation record. EPA is evaluating analytical results of samples collected during the removal assessment to determine what properties are located in impacted areas and which ones will need to be considered for a removal action (Ref. 67, p. 1). In accordance with Section 5.0.1 General Considerations, of the HRS, areas lying between sampling locations, except those areas that are covered by an impenetrable material, are included in Source No. 1 (Ref. 1, Section 5.0.1) (see also Figure 2 of this HRS documentation record).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

Source No. 1 is characterized by soil samples collected during the August 2014 NJDEP SI and the EPA January and February 2015 removal assessment. An evaluation of samples collected from two local parks, a cemetery, and the soil samples collected in August 2014 and January and February 2015 was conducted to establish background levels. Based on the analytical results, the parks and cemetery, located north, northwest, and southwest of Source No. 1, do not appear to have been impacted by past operations at the FKT property (Refs. 5, pp. 56, 57, 58, 59, 63, 114 through 121, 122 through 130). In addition to the samples collected from areas outside the influence of the FKT property, soil samples collected within Source No. 1 that did not meet observed release criteria were evaluated to establish background levels. This evaluation revealed that some soil samples contained low levels of arsenic and lead at concentrations that ranged from 1.4 mg/kg (615SE-SUB-1A) to 6.5 mg/kg for arsenic (FKT-030-04-A, FKT-033-02-A, and FKT-034-02-A) and 4.0 mg/kg (728SS-SUB-1A) to 7.1 mg/kg (511PAUL-SUB-6A) for lead (Refs. 5, pp. 88, 110, 111; 24, pp. 91, 142, 165). Also, between 1996 and 2001, NJDEP conducted a study to determine the ambient levels of metals in New Jersey soils (Ref. 73, p. 1). Cumberland County is located in the Urban Coastal Plain (Ref. 73, p. 2). Soil samples were collected from various parks because those soils likely had not been disturbed for some time (Ref. 73, p. 2). The study revealed that the average concentrations of arsenic and lead were 5.2 mg/kg and 37.6 mg/kg, respectively (Ref. 73, p. 3). As a result of the background evaluation, it was determined that arsenic and lead concentrations detected in soil samples collected at Landis Park located about 5,280 feet or 1 mile north of the FKT property are adequate to establish background levels for comparison to samples collected in Source No. 1 (Refs. 5, pp. 56, 57, 58, 59, 63; 9, pp. 48, 49, 50). Samples collected from Landis Park were collected during the EPA January and February 2015 removal assessment (Ref. 9, pp. i, 48, 49, 50),

Soil samples that comprise Source No. 1 were collected in 2014 and 2015 throughout the FKT property and from residential and commercial properties located in the immediate vicinity of the FKT property (Refs. 9, p. i, ii; 12, pp. 8, 38 to 41). Soil samples evaluated for Source No. 1 were collected at depths ranging from 0 to 24 inches bgs (Refs. 9, p. i, 1, 4, 7, 10, 13, 16, 19, 22, 25, 26, 30, 33, 36, 39, 42, 45, 51, 54, 57, 60, 63, 66, 69, 75, 78, 81, 84; 15, pp. 3, 4; 12, pp. 9, 10; 51, pp. 3 to 46). The contaminated soil samples contained arsenic and lead at elevated concentrations in accordance with Table 2-3 of the HRS (Ref. 1, p. 51589, Section 2.3 (see Tables 16, 18, and 19 of this HRS documentation record)). The Source No. 1 soil samples depicted on Figure 2 and listed in Tables 18 and 19 of this HRS documentation record are evaluated as contaminated soil possibly impacted by past operations at the FKT property (See Tables 18 and 19 of the HRS documentation record). The Agency for Toxic Substances and Disease Registry ATSDR Toxicological Profile for arsenic indicates that once released, arsenic cannot be destroyed in the environment (Ref. 76, p. 3). During operations, Kil-Tone and Lucas Kil-Tone were issued Notices of Judgments under the Federal Insecticide Act for adulteration and misbranding of Green Cross Beetle Mort (Refs. 70, pp. 66, 67, 69; 71, p. 88). The products contained ingredients that were inconsistent with the label including, a greater amount of water-soluble arsenic expressed as metallic (Ref. 70, p. 66, 67, 69, 70; 71, p. 88). For the presentation of analytical results documenting hazardous substances, see Section 5.0.1 of this HRS documentation record and Figure 2 for sample locations.

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Soil samples collected from Source No. 1 contained arsenic and lead (see Tables 18 and 20 of this HRS documentation record). Source No. 1 is comprised of contaminated soil on the FKT property and residential and commercial properties in Vineland, New Jersey along East Cherry Street, East Chestnut Avenue, Washington Avenue, South 6th Street, Paul Street, and South East Boulevard (see Figure 2 of this HRS documentation record). Analytical results for surface water and sediment samples from Tarkiln Branch which receives runoff from Source No. 1, indicate that a release of hazardous substances has occurred to the surface water migration pathway as documented in Section 4.0 of this HRS documentation record.

During the EPA April 2015 sampling event, a functioning and maintained run-on control system or run-off management system was not observed at the FKT property (Ref. 43, p. i). Additionally, surface water samples were collected from a puddle of water leading to a storm drain and from two storm drains in the northwestern portion of the property (Refs. 43, pp. i, 19 to 23; 47, p. 21). The storm drains direct water into a culvert under South West Boulevard. The culvert discharges into the headwaters of Tarkiln Branch, west of South West Boulevard and about 400 feet west of the FKT property (Refs. 26, p. 2; 43, pp. i, 19 to 23). The samples contained arsenic (up to 13,000 µg/L) and lead (up to 39,000 µg/L) (see Table 4 of this HRS documentation record). Therefore, a containment factor value of 10 as noted in Table 2 was assigned for the surface water migration pathway (Ref. 1, Section 4.1.2.1.2.1.1).

TABLE 2: Containment Factors for Source No. 1

Containment Description	Containment Factor Value	References
Gas release to air	NS	NA
Particulate release to air	NS	NA
Release to ground water	NS	NA
Release via overland migration: no engineered maintained cover or functioning and maintained run-on control system or runoff management system is present.	10	1, Section 4.1.2.1.2.1.1; 26, p. 2; 43, p. i, 19 to 23; 47, p. 21; see Table 4 of this HRS documentation record

Notes:

NA Not applicable
NS Not scored

2.4.2.1 HAZARDOUS WASTE QUANTITY

Insufficient information exists to evaluate Hazardous Constituent Quantity, Hazardous Wastestream Quantity, and Volume. Therefore the hazardous waste quantity value will be calculated using Tier D, area of contaminated soil (Ref. 1, pp. 51590, 51591).

2.4.2.1.1 Hazardous Constituent Quantity (Tier A) – Not Evaluated

The hazardous constituent quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence (Ref. 1, pp. 51590-51591 [Section 2.4.2.1.1]). There are insufficient historical and current data (manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.) 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 evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier B, Hazardous wastestream quantity (Ref. 1, p. 51591).

Hazardous Constituent Quantity Assigned Value: NS
Are the data complete for hazardous constituent quantity for this area? No

2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) – Not Evaluated

The hazardous wastestream quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the mass of the hazardous wastestreams plus the mass of any additional CERCLA pollutants and contaminants in the source and releases from the source is not known and cannot be estimated with reasonable confidence (Ref. 1, p. 51591 [Section 2.4.2.1.2]). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total or partial mass of the wastestream plus the mass of all CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, Volume (Ref. 1, p. 51591).

Hazardous Wastestream Quantity Assigned Value: NS
Are the data complete for hazardous constituent quantity for this area? No

2.4.2.1.3 Volume (Tier C)

The information available is not sufficient to determine Tier C because the depth of contamination is not known throughout the source; therefore, it is not possible to adequately determine a source volume (Tier C) in cubic yards (yd3) (Ref. 1, Sec. 2.4.2.1.3, p. 51591). As a result, the evaluation of source volume proceeds to the evaluation of Tier D, source area (Ref. 1, Sec. 2.4.2.1.4, p. 51591).

Volume Assigned Value: 0
Are the data complete for volume quantity for this area? No

2.4.2.1.4 Area (Tier D)

Evaluate the area measure using the area of the source. Based on this area, assign a value to the area measure as follows: for the migration pathways assign the source a value for area using the appropriate Tier D equation from Ref. 1, Table 2-5 (Ref. 1, p. 51591). Using Figure 2 of this HRS documentation record and References 9 and 12 that depict the soil sampling locations from August 2014 and January/February 2015, the estimated area of Source No. 1, excluding impervious surfaces, on each property was determined. The measuring tool in Adobe Acrobat was used to calculate the square footage of the unpaved areas on each property (Ref. 55). The approximate area of Source No. 1 is at least 132,252 square feet (Ref. 55) (see Figure 2 of this HRS documentation record). (Ref. 1, Section 2.4.2.1.4).

Sum (ft^2): 132,252
Equation for Assigning Value (Table 2-5): Area (A)/34,000

Area Assigned Value: 3.88

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source HWQ value for Source No. 1 is assigned a source HWQ value of at least 3.88 (Refs. 1, Section 2.4.2.1.5; 55).

Source HWQ Value: 3.88

SUMMARY OF SOURCE DESCRIPTIONS

TABLE 3: Summary of Source Descriptions

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Yes/No)	Containment Factor Value by Pathway				Ref.
			Ground Water (Table 3-2)	Surface Water Overland (Table 4-2)	Air		
					Gas (Table 6-3)	Particulate (Table 6-9)	
1	3.88	No	NS	10	NS	NS	1, Section 2.4.2.1.5; 55

Notes:

NS Not scored
Ref. Reference

Description of Other Possible On-Site Sources

No other possible on-site sources have been identified or evaluated.

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT – Tarkiln Branch, Parvin Branch, and Maurice River

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

The hazardous substance migration pathway includes both the overland segment and the in-water segment that hazardous substances would take as they migrate away from sources. The overland segment begins at the source and proceeds downgradient to the probable point of entry (PPE) to surface water. The in-water segment at the PPE continues in the direction of flow (Ref. 1, Section 4.1.1.1).

Surface water runoff from Source No. 1 enters storm drains on the properties and along the streets. The storm drains direct runoff to concrete pipes along and under the streets. Water in the pipes enters a 5-foot by 4-foot box culvert under South West Boulevard (Ref. 26). The box 5-foot by 4-foot culvert under South West Boulevard directs runoff into a 10-foot by 6-foot box culvert that discharges into the headwaters of Tarkiln Branch west of South West Boulevard about 200 feet southwest of the FKT property (Ref. 26). The point at which the 10-foot by 6-foot box culvert discharges into Tarkiln Branch is the probable point of entry (PPE) into perennial surface water (Refs. 3; 26) (see Figure 4 of this HRS documentation record). According to the U.S. Geological Survey Topographic Quadrangle Map of Millville, New Jersey, 1997, Tarkiln Branch is a perennial surface water body (Ref. 3). During EPA field activities conducted in February, April, and July 2015, surface water was present at the headwaters of Tarkiln Branch (Ref. 53).

From the PPE, Tarkiln Branch flows in a southwesterly direction for about 2.3 miles and converges with Parvin Branch. Parvin Branch flows south-southwest for about 1.5 miles before entering Maurice River. Maurice River flows south-southeast for about 1 mile to where it widens into Union Lake, which flows south for about 2.3 miles (Refs. 3, 68). The Maurice River exits Union Lake and flows for more than 7.9 miles to complete the 15-mile surface water migration pathway target distance limit (TDL) just south of Lake Laurel and North of Port Elizabeth (Ref. 68). The zone of contamination is designated from the PPE at the headwaters of Tarkiln Branch to sediment sample FKT-SD-64 collected from Tarkiln Branch about 2.26 miles downstream the PPE (Ref. 68) (see also Figure 4 of this HRS documentation record).

Published flow rate data from the U. S. Geological Survey (USGS) is not available for Tarkiln Branch and Parvin Branch. The flow rate for Tarkiln Branch is estimated to be less than 10 cubic feet per second (cfs) and the flow rate for Parvin Branch is estimated to be about 15 cfs (Ref. 12, p. 26). According to the USGS, the annual mean flow rate for the Maurice River for water years 1933 to 2013 was 165 cfs (Ref. 60, p. 3). Tarkiln Branch, from its headwaters to its confluence with Parvin Branch, is located within a 100-year flood plain (Ref. 45).

Targets associated with the surface water bodies along the 15-mile TDL include recreational activities in Union Lake; Maurice River/Union Lake fisheries; HRS-eligible wetland along Tarkiln Branch, Parvin Branch, and the Maurice River; the Union Lake Wildlife Management Area (Union Lake WMA); the Maurice Wild and Scenic River; and the Bald Eagle and Osprey, state-designated endangered and threatened species (Refs. 64; 66; 74; 77; 78). The Maurice River is a spawning area for two anadromous fish species, Alewife and Blue Black herring. The NJDEP Division of Fish and Wildlife installed a fish ladder in the Maurice River to enable these anadromous fish species to swim up river and into Union lake to spawn (Ref. 74). The Union Lake WMA is a 5,000-acre WMA that serves as a water recreation area, fishery, and habitat for wildlife including the Bald Eagle and Osprey, two state-designated endangered species (Refs. 64; 74; 77).

On December 1, 1993, 35.4 miles of the Maurice River in southern New Jersey to Delaware Bay was designated a Wild and Scenic River (Refs. 66; 81, p. 1). The Maurice Wild and Scenic River supports habitat for endangered species, and is vital to the migration of birds, waterfowl, rails, and fish (Ref. 66). About 3 miles of HRS-eligible palustrine forested wetlands are evaluated for the Former Kil-Tone site (Refs. 62, pp. 3 through 10, 14 through 19, 26 through 28; 68; 82, pp. 1 through 5).

4.1.2.1 LIKELIHOOD OF RELEASE

4.1.2.1.1 OBSERVED RELEASE

Direct Observation

During the April 2015 sampling event, EPA collected the surface water samples listed in Table 4 below from a puddle of water leading to a storm drain and from two storm drains in the northwestern portion of the property; one in a grassy area and the other in the loading dock area (Refs. 43, pp. i, 19, to 23, 182; 47, p. 21). These storm drains on the FKP property direct water into a culvert under South West Boulevard (Ref. 43, p. i). The culvert discharges into the headwaters of Tarkiln Branch, west of South West Boulevard and about 200 feet west of the FKT property (Refs. 43, p. i, 19 to 23; 26, p. 2) (see also Figure 5 of this HRS documentation record). Analysis of the surface water samples documented hazardous substances, arsenic and lead, entering Tarkiln Branch, a perennial surface water body that receives runoff from the FKT property via the storm drains, thereby establishing an observed release by direct observation (see Refs. 1, p. 51609; 3; 26; 43, p. i; 44, pp. 235, 236, 237).

The samples were collected in accordance with the EPA-approved Sampling and Analysis Plan dated April 10, 2015 (Refs. 43, pp. i, 19 through 23; 46, pp. 6 through 9). The EPA Region 2 Laboratory analyzed the surface water samples for EPA Target Analyte List (TAL) metals using EPA Method 200.7 and in accordance with SOP C-109 Revision 3.3 (Refs. 31; 40, p. 3; 44, p. 11). The EPA Region 2 laboratory reviewed the data in accordance with SOP G-26, Revision 1.3 (Refs. 31; 41, pp. 5 to 11). The data review checklists are provided in Reference 52. The reporting limits (RLs) are listed on the analytical data sheets in Reference 44, pp. 235, 236, 237. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation and is adjusted for sample preparation volumes, and any dilutions performed (Ref. 31). The RLs are equivalent to SQLs as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31).

TABLE 4: Surface Water Samples – Observed Release by Direct Observation

Sample ID	Sample Location	Hazardous Substance	Concentration (µg/L)	RL (µg/L)	Reference
FKT-SW-10	FKT property, puddle of water leading to storm drain	Arsenic	200	8.0	43, pp. 19, 182; 44, pp. 9, 235; 47, p. 21
		Lead	460	8.0	
FKT-SW-11	FKT property; storm drain in loading dock area in paved area in the northwestern corner of property	Arsenic	3,800	8.0	43, pp. 20, 21, 182; 44, pp. 9, 236; 47, p. 21
		Lead	7,900	8.0	
FKT-SW-12	FKT property; storm drain in a grassy area in the northwestern corner of property	Arsenic	13,000	8.0	43, pp. 22, 23, 182; 44, pp. 9, 237; 47, p. 21
		Lead	39,000	8.0	

Notes:

µg/L Micrograms per liter
FKT Former Kil-Tone Company
ID Identification number
RL Reporting limit
SW Surface water

Chemical Analysis

An observed release by chemical analysis is established by showing that the hazardous substance in release samples are significantly greater in concentration than in the background level and by documenting that at least part of the significant increase is due to a release from the site being evaluated. The significant increase can be documented in one of two ways for HRS purposes. If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the appropriate quantitation limit. If the background sample 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 and above the appropriate quantitation limit (Ref. 1, p. 51589 [Table 2-3]). An observed release of arsenic and lead is documented in the following sections by comparing the hazardous substance concentrations in similar background and contaminated surface water and sediment samples (see Tables 4, 5, 6, 7, and 8 in this section, Section 4.1.2.1.1, of this HRS documentation record) and by attributing the increase to the site. The samples documenting this observed release were collected by EPA during the April 2015 sampling event (Ref. 43, pp. i, 3 to 10, 24, 27, 28, 30, 32, 33, 46, 50, 55, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100, 113, 145 through 150, 153, 157, 180, 181, 182) (see also Figure 4 of this HRS documentation record).

EPA April 2015 Sampling Event

Background Samples

During the April 2015 sampling event, EPA collected background surface water and sediment samples along Parvin Branch, upstream of its confluence with Tarkiln Branch (Ref. 43, p. i). Tarkiln Branch receives runoff from streets, parking areas, and farm fields (see Ref. 72) including from the Former Kil-Tone facility. Eight sediment samples (FKT-SD-78 and FKT-SD-109 through FKT-SD-115) collected from Parvin Branch were evaluated to identify similar background sediment samples for comparison to the contaminated sediment samples collected from Tarkiln Branch (Refs. 43, pp. 113, 144 through 150, 180, 182; 47, pp. 12, 18, 19) (see also Figure 4 of this HRS documentation record). Parvin Branch also receives runoff from streets, parking areas, and farm fields (see Ref. 72). A background surface water sample (FKT-SW-13) also was collected from Parvin Branch (Refs. 43, p. 24, 182; 47, p. 21).

The background surface water and sediment samples presented in Table 5 below were collected from Parvin Branch upstream of its confluence with Tarkiln Branch and therefore outside the influence of the site (Refs. 3; 43, pp. 24, 113, 144 through 150, 180, 182; 46, p. 9) (see also Figure 4 of this HRS documentation record). The background surface water sample was collected about 2 to 4 inches below the surface of the water and the background sediment samples were collected at 0 to 6 inches below the surface water-sediment interface (Ref. 43, pp. i, 113).

Background and contaminated surface water and sediment samples were collected during the same sampling event, using the same sampling procedures (stainless steel ponar dredges or macrocore samplers), and in accordance with the EPA-approved SAP dated April 10, 2015 (Refs. 43, pp. i, 3 to 10, 24, 27, 28, 30, 32, 33, 46, 50, 55, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100, 113, 144 through 150, 180, 181, 182; 46, pp. 6 to 9). The background and contaminated samples were collected from similar soil types that were typically a sandy loam consisting of sand, silt, and some clay (Ref. 72). The sediment samples were analyzed for total organic carbon (TOC) (Ref. 47, pp. 4 to 13, 18 to 21). The EPA Region 2 Laboratory conducted TOC analysis using EPA Method 415.1mod in accordance with SOP # 88, Revision 2.6 (Refs. 44, p. 11; 50). The TOC concentrations in the background sediment samples ranged from 53,000 mg/kg in sample FKT-SD-114 to 150,000 mg/kg in sample FKT-SD-78 (Ref. 44, pp. 146, 200, 204 through 209). The TOC concentrations in the contaminated sediment samples ranged from 41,000 mg/kg in sample FKT-SD-25 to 170,000 mg/kg in sample FKT-SD-118 (Ref. 44, pp. 59, 65, 72, 73, 76, 82, 83, 85, 89, 90, 98, 99, 100, 101, 106, 117, 126, 127, 137, 153, 211, 218). The field sample collection sheets and geographic coordinates for the background surface water and sediment samples are

contained in Reference 43, pp. 24, 113, 144 through 150, 180, 182. The chain-of-custody records are provided in Reference 47, pp. 4 through 13, 18 through 21.

Based on the surface water bodies, physical characteristics, sample collection methods, time frame, and depths, the background and contaminated surface water and sediment samples are similar (Refs. 43, pp. i, 3 to 10, 24, 27, 28, 30, 32, 33, 46, 50, 55, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100, 113, 144 through 150; 72) (also see Tables 4, 5, 6, 7, and 8 in this section [Section 4.1.2.1.1] of this HRS documentation record).

TABLE 5: Background Surface Water and Sediment Samples						
Sample ID	**Sample Location**	**TOC (mg/kg)**	**Distance feet[1]**	**Depth**	**Date Sampled**	**References**
Surface Water Sample: Depth below surface of water (bsw)						
FKT-SW-13	Parvin Branch upstream of confluence with Tarkiln Branch	NA	260	2 to 4 bsw	04/15/2015	43, pp. i, 24, 182; 47, p. 21; see Figure 4 of this HRS documentation record
Sediment Samples: Depth below surface water sediment interface (bswsi)						
FKT-SD-78	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	150,000	311	0 to 6 inches bswsi	04/15/2015	43, pp. i, 113, 182; 44, p. 146; 47, p. 12; 62, pp. 10, 13, 18, 28; see Figure 4 of this HRS documentation record
FKT-SD-109-A	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	100,000	3,109	0 to 6 inches bswsi	04/16/2015	43, pp. i, 144, 180; 44, p. 200; 47, p. 18; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record
FKT-SD-110	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	110,000	3,088	0 to 6 inches bswsi	04/16/2015	43, pp. i, 145, 180; 44, p. 204; 47, p. 18; 62, pp. 9, 19 28; see Figure 4 of this HRS documentation record
FKT-SD-111	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	110,000	3,145	0 to 6 inches bswsi	04/16/2015	43, pp. i, 146, 180; 44, p. 205; 47, p. 18; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record

TABLE 5: Background Surface Water and Sediment Samples						
Sample ID	**Sample Location**	**TOC (mg/kg)**	**Distance feet[1]**	**Depth**	**Date Sampled**	**References**
FKT-SD-112	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	130,000	3,196	0 to 6 inches bswsi	04/16/2015	43, pp. i, 147, 180; 44, p. 206; 47, p. 18; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record
FKT-SD-113	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	68,000	3,490	0 to 6 inches bswsi	04/16/2015	43, pp. i, 148, 180; 44, p. 207; 47, p. 18; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record
FKT-SD-114	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	53,000	3,500	0 to 6 inches bswsi	04/16/2015	43, pp. i, 149, 180; 44, p. 208; 47, p. 18; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record
FKT-SD-115	Background HRS-eligible palustrine forested wetlands; Parvin Branch upstream of confluence with Tarkiln Branch	94,000	3,512	0 to 6 inches bswsi	04/16/2015	43, pp. i, 150, 180; 44, p. 209; 47, pp. 18, 19; 62, pp. 9, 19, 28; see Figure 4 of this HRS documentation record

Notes:

[1] The distance is measured from the confluence of Tarkiln Branch and Parvin Branch to the sampling location (see Figure 4 of HRS documentation record).

bsw below surface of water
bswsi Below surface water sediment interface
FKT Former Kil-Tone Company
HRS Hazard Ranking System
ID Identification number
mg/kg Milligram per kilogram
NA TOC analysis was not conducted for surface water sample FKT-SW-13 (Ref. 44, p. 238).
SD Sediment sample
SW Surface water
TOC Total organic carbon

Background Levels

Eight sediment samples (FKT-SD-78 and FKT-SD-109 through FKT-SD-115), collected from Parvin Branch, were evaluated to establish background arsenic and lead concentration levels for comparison to contaminated arsenic and lead concentrations detected in Tarkiln Branch (Refs. 43, pp. 113, 144 through 150, 180, 182; 72) (see also Figure 4 of this HRS documentation record). In the background sediment samples, arsenic concentrations ranged from 11 mg/kg to 38 mg/kg, and lead concentrations ranged from 890 to 250 mg/kg (Ref. 44, pp. 145, 200, 203 through 209). Therefore, to be conservative, arsenic (38 mg/kg) and lead (190J [adjusted to 273.6]) mg/kg) concentrations detected in sediment sample FKT-SD-78, which were the highest in the background sediment samples evaluated, were determined to represent background levels for arsenic and lead in sediment within the zone of contamination (Ref. 44, p. 145). One background surface water sample (FKT-SW-13) was collected from Parvin Branch (Ref. 43, p. 24, 182) (see also Figure 4 of this HRS documentation record). Arsenic and lead were detected in the background surface water sample at 8.2 micrograms per liter (µg/L) and 8.0 U µg/L, respectively (Ref. 44, p. 238).

The background surface water and sediment samples listed in Table 6 were collected by EPA during the April 2015 sampling event (Refs. 43, pp. i, 24, 113, 180, 182; 47, p. 12, 21). The EPA Region 2 Laboratory analyzed the background surface water and sediment samples for EPA TAL metals using EPA Method 200.7 and in accordance with SOP C-109 Revision 3.3 (Refs. 40, p. 3; 44, p. 11). The EPA Region 2 laboratory reviewed the data in accordance with SOP G-26, Revision 1.3 (Refs. 31; 41, pp. 5 to 11). The data review checklists are provided in Reference 48. The RLs are listed on the analytical data sheets in Reference 44, pp. 145, 238. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation and is adjusted for preparation weights and volumes, and any dilutions performed (Ref. 31). The RLs are equivalent to SQLs as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31).

TABLE 6: Analytical Results for Background Samples

Sample ID	Hazardous Substance	Concentration	RL	References
Surface Water Samples				
FKT-SW-13	Arsenic	8.2 µg/L	8 µg/L	44, pp. 9, 238
FKT-SW-13	Lead	8.0 U µg/L	8 µg/L	44, pp. 9, 238
Sediment Samples				
FKT-SD-78	Arsenic	38 mg/kg[1]	2.3 mg/kg	44, pp. 6, 145
FKT-SD-78	Lead	190 J (273.6)[1] mg/kg	2.4 mg/kg	44, pp. 6, 145; 54, pp. 8, 18
FKT-SD-109	Arsenic	20 mg/kg	2.1 mg/kg	44, pp. 8, 200
FKT-SD-109	Lead	140 mg/kg	2.1 mg/kg	44, pp. 8, 200
FKT-SD-110	Arsenic	20 mg/kg	2.0 mg/kg	44, pp. 8, 203
FKT-SD-110	Lead	130 mg/kg	2.0 mg/kg	44, pp. 8, 203
FKT-SD-111	Arsenic	22 mg/kg	1.5 mg/kg	44, pp. 8, 204
FKT-SD-111	Lead	150 mg/kg	1.5 mg/kg	44, pp. 8, 204
FKT-SD-112	Arsenic	27 mg/kg	2.4 mg/kg	44, pp. 8, 205

TABLE 6: Analytical Results for Background Samples				
Sample ID	**Hazardous Substance**	**Concentration**	**RL**	**References**
FKT-SD-112	Lead	150 mg/kg	2.4 mg/kg	44, pp. 8, 205
FKT-SD-113	Arsenic	19 mg/kg	1.2 mg/kg	44, pp. 8, 206
FKT-SD-113	Lead	250 mg/kg	1.2 mg/kg	44, pp. 8, 206
FKT-SD-114	Arsenic	11 mg/kg	1.1 mg/kg	44, pp. 8, 207, 208
FKT-SD-114	Lead	89 mg/kg	1.1 mg/kg	44, pp. 8, 207, 208
FKT-SD-115	Arsenic	21 mg/kg	1.3 mg/kg	44, pp. 8, 208, 209
FKT-SD-115	Lead	240 mg/kg	1.3 mg/kg	44, pp. 8, 208, 209

Notes:

[1] Background concentrations for arsenic and lead
µg/L Micrograms per liter
FKT Former Kil-Tone Company
ID Identification number
mg/kg Milligrams per kilogram
RL Reporting limit
SD Sediment sample
SW Surface water
J The identification of the analyte is acceptable; the reported value is an estimate. Unknown bias is assumed because the direction of the bias is not known. 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. 54, pp. 8, 18). The adjusted value reflects the substance concentration when the possible bias is considered.
U The analyte was not detected at or above the reporting limit.

Contaminated Samples

The surface water and sediment samples listed in Table 7 were collected by EPA during the April 2015 sampling event (Refs. 43, pp. i, 3 to 10, 27 to 33, 46, 57, 180, 181, 182; 47, pp. 4 to 7, 20). The surface water and sediment samples were collected from Tarkiln Branch downstream of the FKT property (Refs. 3; 43, pp. 3 to 10, 27 to 33, 46, 50, 55, 57, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100; 46, pp. 6 to 10) (see Figure 4 of this HRS documentation record). The surface water samples were collected about 2 to 4 inches below the surface of the water and sediment samples were collected at 0 to 6 inches below the surface water-sediment interface (Ref. 43, pp. i, 3 to 10, 27 to 33, 46, 50, 55, 57, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100). The contaminated surface water and sediment samples were collected during the same sampling event; from Tarkiln Branch, which is similar to Parvin Branch (background sampling locations); using the same sampling procedures; at the same depths; and are similar in characteristics (TOC and soil type) (Refs. 3; 43, p. i; 46, pp. 6 to 9; 72). The contaminated samples were collected from soils that typically were a sandy loam, consisting of sand, silt, and some clay (Ref. 72). The contaminated sediment samples were analyzed for TOC and concentrations ranged from 40,000 mg/kg to 170,000 mg/kg, which is similar to the background sediment samples TOC concentrations (Ref. 44, pp. 59, 65, 72, 73, 82, 83, 85, 89, 90, 93, 98, 99, 100, 101, 106, 117, 153). Based on the surface water bodies, physical characteristics, sample collection methods, time frame, and depths, the background and contaminated surface water and sediment samples are similar (Refs. 43, pp. i, 3 to 10, 24, 27, 28, 30, 32, 33, 46, 50, 55, 58, 73, 75, 80, 81, 82, 84, 92, 99, 100, 113, 144 to 150, 180, 181, 182; 72; also see Tables 4, 5, 6, 7, and 8 in this section [Section 4.1.2.1.1] of this HRS documentation record).

The surface water and sediment samples were collected in accordance with the EPA-approved SAP dated April 10, 2015 (Refs. 43, pp. i; 46, pp. 6 to 9). The field sample collection sheets for the contaminated surface water and sediment samples are contained in Reference 43, pp. 3 to 10, 27 to 33, 46, 57, 180, 181, 182. The chain-of-custody records are provided in Reference 47, pp. 4 to 7, 20.

TABLE 7: Contaminated Surface Water and Sediment Samples – April 2015

Sample ID	Sample Location	TOC	Distance from PPE (feet)	Depth	Date Sampled	References
Surface Water Samples						
FKT-SW-02	Tarkiln Branch downstream of the FKT property	NA	933	2 to 4 inches below surface of water	4/13/2015	43, pp. i, 3, 4, 182; 47, p. 20
FKT-SW-03	Tarkiln Branch downstream of the FKT property	NA	602	2 to 4 inches below surface of water	4/13/2015	43, pp. i, 5, 6, 182; 47, p. 20
FKT-SW-04	Tarkiln Branch downstream of the FKT property	NA	474	2 to 4 inches below surface of water	4/13/2015	43, pp. i, 7, 8, 182; 47, p. 20
FKT-SW-05	Tarkiln Branch downstream of the FKT property	NA	46	2 to 4 inches below surface of water	4/13/2015	43, pp. i, 9, 10, 182; 47, p. 20

TABLE 7: Contaminated Surface Water and Sediment Samples – April 2015						
Sample ID	**Sample Location**	**TOC**	**Distance from PPE**	**Depth (bsws)**	**Date Sampled**	**References**
Sediment Samples						
FKT-SD-02	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	71,000 mg/kg	2,904	0 to 6 inches	4/13/2015	43, pp. i, 27, 180; 44, p. 82; 47, p. 6; 62, pp. 9, 14, 20, 26
FKT-SD-03	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	87,000 mg/kg	2,892	0 to 6 inches	4/13/2015	43, pp. i, 28, 180; 44, p. 83; 47, p. 6; 62, pp. 9, 14, 20, 26
FKT-SD-05	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	70,000 mg/kg	2,944	0 to 6 inches	4/13/2015	43, pp. i, 30, 180; 44, p. 85; 47, p. 7; 62, pp. 9, 14, 20, 26
FKT-SD-07	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	61,000 mg/kg	2,978	0 to 6 inches	4/13/2015	43 pp. i, 32, 180; 44, p. 89; 47, p. 7; 62, pp. 9, 14, 20, 26
FKT-SD-08	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	70,000 mg/kg	3,020	0 to 6 inches	4/13/2015	43, pp. i, 33, 180; 44, p. 90; 47, p. 7; 62, pp. 9, 14, 20, 26
FKT-SD-17	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	45,000 mg/kg	3,006	0 to 6 inches	4/13/2015	43, pp. i, 46, 180; 44, p. 59; 47, p. 4; 62, pp. 9, 14, 20, 26
FKT-SD-20	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	45,000 mg/kg	3,232	0 to 6 inches	4/13/2015	43, pp. i, 50, 181; 44, p. 65; 47, p. 5; 62, pp. 9, 14, 20, 26
FKT-SD-25	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	41,000 mg/kg	3,360	0 to 6 inches	4/43/2015	43, pp. i, 55, 181; 44, p. 72; 47, p. 5; 62, pp. 9, 14, 20, 26

TABLE 7: Contaminated Surface Water and Sediment Samples – April 2015						
Sample ID	**Sample Location**	**TOC**	**Distance from PPE**	**Depth (bsws)**	**Date Sampled**	**References**
Sediment Samples						
FKT-SD-25-DUP	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	46,000 mg/kg	3,360	0 to 6 inches	4/13/2015	43, pp. i, 55, 181; 44, p. 73; 47, p. 5; 62, pp. 9, 14, 20, 26
FKT-SD-28	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	97,000 mg/kg	3,207	0 to 6 inches	4/13/2015	43, pp. i, 58, 181; 44, p. 76; 47, p. 6; 62, pp. 9, 14, 20, 26
FKT-SD-118	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	170,000 mg/kg	3,613	0 to 6 inches	4/17/2015	43, pp. i, 153, 180; 44, p. 211; 47, p. 19; 62, pp. 9, 14, 20, 26
FKT-SD-122	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	73,000 mg/kg	4,494	0 to 6 inches	4/17/2015	43, pp. i, 157, 180; 44, p. 218; 47, p. 19; 62, pp. 9, 14, 20, 26
FKT-SD-45	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	54,000 mg/kg	4,965	0 to 6 inches	4/14/2015	43, p. 81; 44, 181, p. 99; 47, p. 8; 62, pp. 9, 14, 20, 26
FKT-SD-46	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	85,000 mg/kg	4,982	0 to 6 inches	4/14/2015	43, pp. i, 82, 181; 44, p. 100; 47, p. 8; 62, pp. 9, 14, 20, 26
FKT-SD-46-DUP	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	68,000 mg/kg	4,982	0 to 6 inches	4/14/2015	43, pp. i, 82, 181; 44, p. 101; 47, p. 8; 62, pp. 9, 14, 20, 26
FKT-SD-44	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	74,000 mg/kg	5,031	0 to 6 inches	4/14/2015	43, pp. i, 80, 181; 44, p. 98; 47, p. 8; 62, pp. 9, 14, 20, 26

TABLE 7: Contaminated Surface Water and Sediment Samples – April 2015						
Sample ID	**Sample Location**	**TOC**	**Distance from PPE**	**Depth (bsws)**	**Date Sampled**	**References**
Sediment Samples						
FKT-SD-48	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	100,000 mg/kg	7,569	0 to 6 inches	4/14/2015	43, pp. i, 84, 181, ; 44, p. 106; 47, p. 9; 62, pp. 10, 15, 21, 27
FKT-SD-56	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	70,000 mg/kg	8,564	0 to 6 inches	4/14/2015	43, pp. i, 92, 181; 44, p. 117; 47, p. 10; 62, pp. 10, 15, 21, 27
FKT-SD-39	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	140,000 mg/kg	9,891	0 to 6 inches	4/14/2015	43, pp. i, 75, 181; 44, p. 127; 47, p. 11; 62, pp. 10, 16, 22, 28
FKT-SD-38	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	130,000 mg/kg	9,933	0 to 6 inches	4/14/2015	43, pp. i, 73, 181; 44, p. 126; 47, p. 11; 62, pp. 10, 16, 22, 28
FKT-SD-63	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	120,000 mg/kg	11,901	0 to 6 inches	4/15/2015	43, pp. i, 99, 181; 44, p. 153; 47, p. 13; 62, pp. 10, 16, 22, 28
FKT-SD-64	HRS-eligible Palustrine forested wetlands on Tarkiln Branch downstream of the FKT property	110,000 mg/kg	11,966	0 to 6 inches	4/15/2015	43, pp. i, 100, 181; 44, p. 137; 47, p. 12; 62, pp. 10, 16, 22, 28

Notes:

bsws Below surface water sediment interface
FKT Former Kil-Tone Company
HRS Hazard Ranking System
ID Identification number
mg/kg milligram per kilogram
NA TOC analysis was not conducted for surface water samples FKT-SW-02, FKT-SW-03, FKT-SW-04, and FKT-SW-05 (Ref. 44, pp. 226 through 229).
PPE Probable point of entry

Table 7 – Notes Continued:

SD	Sediment sample
SW	Surface water
TOC	Total organic carbon

Contaminated Concentrations

The background surface water and sediment samples listed in Table 8 were collected by EPA during the April 2015 sampling event (Refs. 43, pp. i, 3 to 10, 27 to 33, 46, 57, 180, 181, 182; 47, pp 4 to 7, 20). The EPA Region 2 Laboratory analyzed the background soil samples for EPA TAL metals using EPA Method 200.7 and in accordance with SOP C-109 Revision 3.3 (Refs. 40, p. 3; 44, p. 11). The EPA Region 2 laboratory reviewed the data in accordance with SOP G-26, Revision 1.3 (Refs. 31; 41, pp. 5 to 11). The data review checklists are provided in Reference 48. The RLs are listed on the analytical data sheets in Reference 44, pp. 59, 75, 82, 83, 85, 89, 90, 226 to 229. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation; it is adjusted for preparation weights and volumes, and any dilutions performed (Ref. 31). The RLs are equivalent to SQLs as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31). All samples listed in Table 8 meet observed release criteria in accordance with Reference 1, Table 2-3.

TABLE 8: Analytical Results for Contaminated Samples

Sample ID	Hazardous Substance	Concentration	RL	References
Surface Water Samples Compared to Background Concentrations of 8.2 µg/L for Arsenic and 8.0U µg/L for Lead (Ref. 44, pp. 9, 238)				
FKT-SW-02	Arsenic	54 µg/L	8 µg/L	44, pp. 9, 226
FKT-SW-03	Arsenic	130 µg/L	8 µg/L	44, pp. 9, 227
FKT-SW-03	Lead	16 µg/L	8 µg/L	44, pp. 9, 227
FKT-SW-04	Arsenic	92 µg/L	8 µg/L	44, pp. 9, 228
FKT-SW-05	Arsenic	360 µg/L	8 µg/L	44, pp. 9, 229
Sediment Samples Compared to Background Concentrations of 38 mg/kg for Arsenic and 273.6 mg/kg for Lead (Ref. 44, pp. 6, 145; 54, pp. 8, 18)				
FKT-SD-02	Arsenic	190 mg/kg	0.90 mg/kg	44, pp. 4, 82
FKT-SD-02	Lead	860 mg/kg	0.90 mg/kg	44, pp. 4, 82
FKT-SD-03	Arsenic	170 mg/kg	0.94 mg/kg	44, pp. 4, 83
FKT-SD-05	Arsenic	340 mg/kg	0.94 mg/kg	44, pp. 4, 85
FKT-SD-05	Lead	1,100 mg/kg	0.94 mg/kg	44, pp. 4, 85
FKT-SD-07	Arsenic	230 mg/kg	0.86 mg/kg	44, pp. 4, 89
FKT-SD-08	Arsenic	420 mg/kg	0.97 mg/kg	44, pp. 4, 90
FKT-SD-08	Lead	1,100 mg/kg	0.97 mg/kg	44, pp. 4, 90
FKT-SD-17	Arsenic	140 mg/kg	0.90 mg/kg	44, pp. 3, 59
FKT-SD-20	Arsenic	140 mg/kg	0.91 mg/kg	44, pp. 3, 65
FKT-SD-25	Arsenic	310 mg/kg	0.85 mg/kg	44, pp. 4, 72

TABLE 8: Analytical Results for Contaminated Samples				
Sediment Samples Compared to Background Concentrations of 38 mg/kg for Arsenic and 273.6 mg/kg for Lead (Ref. 44, pp. 6, 145; 54, pp. 8, 18)				
FKT-SD-25-DUP	Arsenic	240 mg/kg	0.86 mg/kg	44, pp. 4, 73
FKT-SD-28	Arsenic	400 mg/kg	0.90 mg/kg	44, pp. 4, 76
FKT-SD-28	Lead	1,100 mg/kg	0.90 mg/kg	44, pp. 4, 76
FKT-SD-118	Arsenic	140 mg/kg	1.8 mg/kg	44, pp. 8, 211
FKT-SD-122	Arsenic	230 mg/kg	0.97 mg/kg	44, pp. 8, 217
FKT-SD-122	Lead	1,200 mg/kg	0.97 mg/kg	44, pp. 8, 217
FKT-SD-45	Arsenic	350 mg/kg	0.88 mg/kg	44, pp. 5, 99
FKT-SD-46	Arsenic	230 mg/kg	1.0 mg/kg	44, pp. 5, 100
FKT-SD-46	Lead	900 mg/kg	1.0 mg/kg	44, pp. 5, 100
FKT-SD-46-DUP	Arsenic	180 mg/kg	1.0 mg/kg	44, pp. 5, 101
FKT-SD-44	Arsenic	1,400 mg/kg	1.0 mg/kg	44, pp. 4, 98
FKT-SD-44	Lead	2,200 mg/kg	1.0 mg/kg	44, pp. 4, 98
FKT-SD-48	Arsenic	130 mg/kg	1.1 mg/kg	44, pp. 5, 105
FKT-SD-56	Arsenic	230 mg/kg	1.1 mg/kg	44, pp. 5, 117
FKT-SD-39	Arsenic	120 mg/kg	2.0 mg/kg	44, pp. 5, 127
FKT-SD-38	Arsenic	150 mg/kg	1.7 mg/kg	44, pp. 5, 126
FKT-SD-63	Arsenic	160 mg/kg	1.8 mg/kg	44, pp. 6, 153
FKT-SD-64	Arsenic	150 mg/kg	1.9 mg/kg	44, pp. 6, 136

Notes:

µg/L Micrograms per liter
DUP Duplicate sample
FKT Former Kil-Tone Company
ID Identification number
mg/kg Milligram per kilogram
RL Reporting limit
SD Sediment sample
SW Surface water

Attribution

The Former Kil-Tone Company (Kil-Tone) began operations at the property in late 1910s manufacturing the pesticide arsenate of lead (Ref. 12, p. 2). Lead arsenate is a pentavalent form of inorganic arsenic, which exists naturally as white crystals with no discernible odor, and contains about 22 percent arsenic and is slightly soluble in cold water (Ref. 32, p. 1). However, based on the Sanborn Fire Insurance Maps dated 1919 and 1925, buildings previously located on the property included an acid plant, a tank room, an engine room, and a manufacturing building for grinding, mixing, pressing, and storage of pesticides (Refs. 12, pp. 2, 3; 16, pp. 7, 8). A laboratory was constructed around 1919 on the southwestern corner of the property (Ref. 16, p. 8). In August 1988, the EPA banned all insecticidal uses of lead arsenate (Ref. 33, p. 2).

Information obtained from the Vineland Chamber of Commerce and the New Jersey Experiment Stations that date between 1917 and 1926 indicate that specific products manufactured by Kil-Tone included Green Cross Dry Powdered Arsenate of Lead, Green Cross Standard Arsenate of Lead (paste), Green Cross Sulpho-arsenate Powder, Green Cross Sulphur and Arsenate of Lead Mixture, Modified Kil-Tone, Improved Kil-Tone, Fruit Kil-Tone, Bordeaux Mixture, Dry Powdered Arsenite of Zinc, and Beetle Mort (Refs. 17, pp. 1, 2; 34, pp. 9, 13, 14; 35, pp. 9, 19, 20; 36, pp. 10, 17, 18; 37, pp. 10, 13, 19, 20; 38, pp. 26-(106), 26-(154)). Based on the timeframe during which FKT operated, these products were regulated under the Insecticide Act of 1910 (Ref. 69, p. 1; 70, p. 126).

Early pesticide control laws were aimed at protecting consumers against ineffective products and deceptive labeling (Ref. 69, p. 2). From 1929 to 1932, the USDA issued Notices of Judgment under the Insecticide Act against the Lucas Kil-Tone Co. of Vineland, New Jersey for the adulteration and misbranding of various products including Beetle Mort, Green Cross Nico-Tone, Paris Green and Bordo Lead Arsenate (Refs. 57, pp. 125, 126, 127, 133, 134; 70, p. 66, 67, 69, 70; 71, p. 88). Arsenic in water-soluble form, expressed as metallic, was present at higher concentrations than declared on the labels (Refs. 57, pp. 125, 127, 133; 70, p. 70; 71, p. 88). In some cases, the products were misbranded because they contained ingredients that were not declared (for example calcium arsenate) on the label (Ref. 57, p. 127). The ATSDR Toxicological Profile for arsenic indicates that arsenic is expected to accumulate in soil in areas where it was used in agriculture (Ref. 76, pp. 324, 363). Any pesticide in Source 1 that was created in violation of the pesticide control laws or used in any way other than the labeled use would be a CERCLA hazardous substance.

In August 2014, NJDEP collected surface soil samples from Source No. 1, which is comprised of contaminated soil on the FKP property, as well residential and commercial properties located about 1 block north, south, and east of the FKT property (Ref. 12, pp. 32, 33, 38 through 42). Analytical results of the Source No. 1 samples indicated the presence of arsenic (up to 3,000 mg/kg in sample USC-SUB-9A) and lead (up to 3,100 mg/kg in USC-SUB-9A) above background levels (Refs. 24, pp. 16, 49, 152; 51, pp. 3, 13, 38). Sample USC-SUB-9A was collected in the northwestern portion of the FKT property (Ref. 12, pp. 10, 38). In addition to the shallow samples (within 2 feet of ground surface), soil samples were collected up to 6 feet bgs on the FKT property (Ref. 12, pp. 9 through 14). A subsurface soil sample collected in the western portion of the FKT property at 4 feet bgs contained arsenic and lead at 5,800 mg/kg and 3,600 mg/kg, respectively (Ref. 12, pp. 10, 38). Based on the Sanborn maps of the FKT property, the former rail spurs entered the FKT property in the northwestern corner (Ref. 16, pp. 5, 6, 7, 8).

EPA collected surface soil samples from Source No. 1 in January and February 2015 (Ref. 9, p. i). The Source No. 1 samples contained arsenic and lead above background levels (see also Tables 18 and 20 of this HRS documentation record). The highest concentration of arsenic (1,000 mg/kg) was detected in the 2- to 6-inch interval on a property located about 190 feet northwest of the FKT property (Refs. 5, p. 160; 9, pp. 19 to 21). The highest concentration of lead (2,500 mg/kg) was detected in the 6- to 12-inch interval on a property located about 380 feet northwest of the FKT property (Refs. 5, p. 40; 9, pp. 30 to 33) (see also Figure 2 of this HRS documentation record).

Information regarding actual operational activities at Kil-Tone is limited; therefore, information regarding modes of deposition and waste disposal is limited. In 1984, NJDEP received information that Kil-Tone reportedly allowed a toxic substance referred to as "Bluestone" to seep into the ground and ultimately into a small stream along the railroad tracks on the Blvd. (Ref. 14). Bluestone, also known as copper sulfate, is an herbicide that is used to control algae growths and foliar pathogens on fruit, nuts, vegetables, field crops, ornamentals, and agricultural and home garden uses (Ref. 88, p. 1). In a 1989 affidavit, a resident confirmed that while Kil-Tone was in operation, a green and white dust typically coated the ground and rooftops, as well as along the shore of Tarkiln Branch, near the FKT property (Ref. 21, pp. 1, 2). Kil-Tone manufactured arsenate of lead (lead arsenate), which is a powdered insecticide (Refs. 34, p. 9; 35, p. 9).

In June 2015, EPA ERT initiated a high resolution characterization study using CPT/XRF to determine the horizontal and vertical extent of arsenic and lead contamination in soil on the FKT property (Ref. 67, pp. 2, 3, 5). XRF screening results using the CPT/XRF equipment indicated arsenic concentrations as high as 47,000 ppm and lead concentrations as high as 119,280 ppm in the soils near the former rail spur (Ref. 67, pp. 2, 3, 5). According to the Sanborn Fire Insurance maps of 1919, 1925, 1949, and 1968, there were rail spurs on the north and west sides of the FKT property (Ref. 16, p. 5, 6, 7, 8). Also, field XRF of soil borings collected near the location of the former grinding house recorded concentrations of both arsenic and lead at 100 percent (Ref. 67, p. 2). The 1919 and 1925 Sanborn maps depict the grinding room (house) in the southern portion of the property along E. Chestnut Avenue (Ref.; 16, pp. 7, 8). In addition, product was observed in a soil sample at 18 to 24 inches bgs (Ref. 67, p. 8). Subsurface soil samples collected during the NJDEP 2014 SI contained arsenic up to 5,800 mg/kg and lead up to (3,600 mg/kg at 3.5 to 4 feet bgs, and arsenic up to 1,400 mg/kg and lead up to 14 mg/kg at 5.5 to 6 feet bgs (Refs. 12, pp. 10, 38; 24, pp. 38, 42, 46, 47). Also, during the NJDEP 2014 and the EPA 2015 sampling events, fill material similar to that observed on the FKT property, also was observed while collecting soil samples on the residential and commercial properties (Refs. 8, pp. 5, 6, 7, 8, 11, 13, 16, 17, 19, 20, 21, 22, 31, 32, 33; 23, pp. 1, 2, 3, 4; 51, pp. 5, 6, 8).

In addition to Source No. 1, arsenic and lead have been detected in surface water and sediment samples collected from Tarkiln Branch, indicating that a release to perennial surface water has occurred (see Tables 6 and 8 of this HRS documentation record). During the April 2015 sampling activities, EPA observed a puddle of water leading to a storm drain in the northwestern portion of the FKT property (Ref. 43, pp. i, 19 through 23). Arsenic and lead were detected in the puddle of water at 200 and 460 µg/L, respectively (Refs. 43, p. 19; 44, p. 235). The surface water samples collected in the storm drains contained arsenic up to 13,000 µg/L and lead up to 39,000 µg/L (Refs. 43, pp. 22, 23; 44, p. 237). The storm drains direct water into a culvert under South West Boulevard (Refs. 26; 43, p. i). The culvert discharges into the headwaters of Tarkiln Branch, west of South West Boulevard and about 200 feet west of the FKT property (Refs. 26, p. 2; 43, p. i, 19 to 23) (see also Figure 5 of this HRS documentation record). The presence of arsenic and lead in the puddle of water and storm drains document an observed release by direct observation (see Section 4.1.2.1.1 – Observed Release – Direct Observation of this HRS documentation record). Surface water samples collected from Tarkiln Branch during the April 2015 sampling event contained arsenic up to 360 µg/L (FKT-SW-05) and lead at 16 µg/L (FKT-SW-03) (Ref. 44, pp. 227, 229). Sediment samples collected from Tarkiln Branch downstream of the FKT property contained arsenic up to 1,400 mg/kg and lead up to 2,200 mg/kg (FKT-SD-44) (Ref. 44, p. 98).

An observed release also was documented in the zone of contamination that extends from the PPE at the headwaters of Tarkiln Branch to sediment sample FKT-SD-64 collected about 2.26 miles downstream (Refs. 3; 43, p. 100; 44, p. 136; 68). To attribute these releases to Source No. 1, background levels were established using surface water and sediment samples collected from Parvin Branch, a perennial surface water body that is similar to Tarkiln Branch (Refs. 43, pp. i, 24, 113, 144 through 150, 180, 182; 46, pp. 9, 10; 68; 72). The locations of the background surface water and sediment samples accounted for runoff from streets, parking areas, and farm fields (see Ref. 72).

Additionally, EPA conducted isotope analysis on isotopes of copper found in on-site surface water, off-site surrounding residential soil, Tarkiln Branch sediment, and Tarkiln and Parvin confluence sediment

samples. The results of this analysis indicate that the copper in these samples originated from the FKT property (Ref. 83).

In addition, to surface water runoff from streets, parking areas, and farm fields, other potential off-site sources of contamination in the Vineland area that were evaluated for attribution purposes include the Lerco Fuel Company (Lerco), Vineland Chemical Company, and Iceland Coin and Laundry (Refs. 3; 25, p. 1; 42, pp. i, 7, 14; 68).

Lerco is a former fuel distribution facility located at 520 East Chestnut Avenue about 75 feet north of the FKT property (Refs. 12, pp. 4, 16, 17; 19, pp. 14, 15; 20, pp. 1, 2; 25, p. 1). Initial environmental investigations regarding petroleum releases and removal of an underground storage tank at the Lerco property began in 1989 (Ref. 25, p. 1). Since then, Lerco has conducted several investigations to remediate petroleum-related contamination related to the petroleum releases (Refs. 20, p. 2; 25, pp. 1, 3, 17 to 29). In addition to petroleum-related contaminants, arsenic and lead have been detected in soil and ground water samples at the Lerco property (Refs. 19, pp. 14, 15, 17 through 20; 25, pp. 20 to 29). Arsenic was detected up to 1,940 milligrams per kilogram (mg/kg) and lead was detected up to 3,280 mg/kg is soil samples collected within 2 feet of the ground surface (Ref. 19, p. 14). The highest concentrations of arsenic and lead in soil and ground water samples were as follows: arsenic, up to 20,500 parts mg/kg in soil and up to 33,000 micrograms per liter (µg/L) in ground water; and lead, up to 28,700 mg/kg in soil and up to 630 µg/L in ground water (Ref. 19, pp. 14, 15, 18, 19). Based on the results of samples collected at Lerco, high concentrations of arsenic have been detected in conjunction with high lead concentrations (Ref. 19, pp. 14, 15). The presence of arsenic in conjunction with lead indicates that it is likely that some portion of the lead contamination may not be petroleum related.

Vineland Chemical Company, located about 2.7 miles northwest of the FKT property, and Iceland Coin Laundry, located about 1.65 miles southwest of the FKT property are NPL sites located in Vineland (Ref. 42, pp. i, 7, 14). Vineland Chemical Company manufactured arsenic-based herbicides from about 1950 to 1994 (Ref. 11, p. 1). The contaminant of concern is arsenic and the media impacted include ground water, sediment, and on-site soils (Refs. 11, p. 1; 42, p. 5). Cleanup of the Vineland Chemical Company NPL site is underway (Refs. 11, pp. 2, 3; 42, p. 3). Vineland Chemical is located about 2.7 miles northwest of the FKT property (Ref. 42, p. 7). Surface water runoff from Vineland Chemical appears to flow into wetlands then into the Maurice River (Ref. 11, p. 1). This location is upstream of Tarkiln Branch and the observed release samples for the FKT property (Refs. 3; 42, p. 7). A 1989 Remedial Investigation (RI) report prepared for Vineland Chemical included a study of the Maurice River (Ref. 80, pp. C, ES-1). The RI report (River Area RI) presented typical background ranges of metals found in the Maurice River (Ref. 80, p. 6-5, Table 6-3). The data presented in the River Area RI for Vineland Chemical indicate that typical background arsenic and lead concentrations in sediment range from 0.1 mg/kg to 30 mg/kg and less than 10 mg/kg (non-detect) to 70 mg/kg, respectively (Ref. 80, p. 6-5, Table 6-3). In surface water samples, the typical background concentrations were less than 10 µg/L (non-detect) for arsenic and 5 µg/L to 30 µg/L for lead (Ref. 80, p. 6-5, Table 6-3).

Iceland Coin Laundry is a ground water plume that is contaminated with mercury and volatile organic compounds (VOCs) including tetrachloroethylene, trichloroethylene, and 1,2-dichloroethene (Refs. 7, p. 1; 42, pp. i, 12). Lead and arsenic, which were detected in Source No. 1, are not contaminants of concern for the Iceland Coin Laundry NPL site (Ref. 42, p. 12). Iceland Coin and Laundry is located about 1.65 miles southwest of the FKT property (Ref. 42, p. 7). Tarkiln Branch, which receives runoff from the FKT property, flows from northeast to southwest; therefore, surface water runoff from Iceland Coin and Laundry is not expected to impact Tarkiln Branch upstream of Source No. 1 (Refs. 3; 26; 42, p. 14; 43, p. i; 68). Additionally, the hazardous substances of concern at this site are volatile organic compounds not currently of concern in Source 1 at the Former Kil-Tone site (tetrachloroethene, trichloroethene, and cis-1,2-dichloroethene) (Ref. 42, p. i).

Bob's Transmission, located at 611 S East Boulevard, and a former gasoline station, located at 511 Paul Street, may be potential sources of contamination in the vicinity of Source No. 1. Bob's Transmission or the address of 611 S East Boulevard is not listed in any EPA or New Jersey regulatory databases (Ref. 86,

pp. 1 through 23). Also, samples were not collected from this property in 2014 or 2015 (Ref. 9, p. ii; 12, pp. through 17). The 511 Paul Street property is listed in the EPA Resources Conservation and Recovery Act and Air Facility System, and in the New Jersey Environmental Management System (Refs. 86, p. 2; 87). The address is listed as Agway, Inc. Energy Products Vineland Bulk Plant (Ref. 86, p. 2; 87). Agway is listed as a petroleum products wholesaler, except for bulk stations and terminals; and as a fuel oil dealer (Ref. 87). Information regarding environmental investigations at Agway were not available at the time of this HRS documentation record; however, it appears that New Jersey led remedial and cleanup activities have been conducted at this property (Ref. 87). Currently, the property appears to be vacant (see Figure 2 of this HRS documentation record). Samples collected from the 511 Paul Street property in 2014 contained arsenic at concentrations that ranged from 1.6 mg/kg to 200 mg/kg and lead at concentrations that ranged from 3.9 mg/kg to 190 mg/kg (Ref. 12, pp. 13, 14; 24, pp. 121 to 144). These concentrations are lower than arsenic (up to 3,000 mg/kg) and lead (up to 3,100 mg/kg) concentrations detected at the Former Kil-Tone property in 2014 (Ref. 12, pp. 11, 12; 24, pp. 11 through 18, 22 through 51).

The hazardous substances listed below (arsenic and lead) have been detected in Source No. 1 as well as in surface water and sediment samples collected from Tarkiln Branch immediately downstream of the FKT property, indicating that a release has occurred or is occurring from the FKT property (see also and Tables 6 and 8 in Section 4.1.2.1.1, Observed Release, and Tables 17, 18, and 20 for Source No. 1 in Section 5.0.1 of this HRS documentation record).

Hazardous Substances in the Release

Arsenic
Lead

Surface Water Observed Release Factor Value: 550.00

4.1.2 DRINKING WATER THREAT

The drinking water threat was not scored because it is not expected to contribute significantly to the overall score.

4.1.3.2 HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

The toxicity, persistence, and bioaccumulation factor values for arsenic and lead detected in Source No. 1 with containment factor values of greater than 0 are summarized in Table 9. The combined toxicity, persistence, and bioaccumulation factor values are assigned in accordance with Reference 1, Section 4.1.3.2.1.

TABLE 9: Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Toxicity Factor Value	Persistence Factor Value[1]	Human Food Chain Bioaccumulation Value[2]	Toxicity/ Persistence/ Bioaccumulation Factor Value (Ref. 1, Table 4-16)	Reference
Arsenic	1	10,000	1	5	5×10^4	2, p. BI-1
Lead	1	10,000	1	5,000	5×10^7	2, p. BI-7

Notes:

[1] Persistence factor value for rivers
[2] Bioaccumulation factor value for fresh water

For the human food chain threat, lead has the highest toxicity/persistence/bioaccumulation factor value of 5×10^7 (Ref. 2, p. BI-7).

Toxicity/Persistence/Bioaccumulation Factor Value: 50,000,000.00
(Ref. 1, Section 4.1.3.2.1.4)

4.1.3.2.2 HAZARDOUS WASTE QUANTITY

TABLE 10: Hazardous Waste Quantity		
Source No.	**Source Type**	**Source Hazardous Waste Quantity**
1	Contaminated soil (Source No. 1)	3.88

Total Source Hazardous Waste Quantity: 3.88

The hazardous constituent quantity for Source No. 1 is not adequately determined. Source No. 1 is composed of arsenic- and lead-contaminated soil on about 32 residential and commercial properties (Ref. 55, p. 2) (see Figure 2 and Tables 17 to 20 of this HRS documentation record). The approximate area of observed contamination, excluding impervious surfaces, on each property was determined and the area of all properties was summed to obtain the source HWQ for Source No. 1 (Ref. 55, p. 2). The combined HWQ for Source No. 1 is approximately 132,252 square feet. (Ref. 55, p. 1, 2). In addition, the hazardous waste quantity receives a minimum factor value of 100 for the surface water migration pathway because actual contamination at Level II concentrations is present in HRS-eligible palustrine forested wetlands and hazardous constituent quantity is not adequately determined (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Table 2-6)

4.1.3.2.3 CALCULATION OF HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

For the human food chain threat, lead is evaluated for the waste characteristics. The waste characteristics factor category was obtained by multiplying the toxicity, persistence, and hazardous waste quantity (HWQ) factor values, subject to a maximum product of 1×10^8. Then, this product was multiplied by the human food chain bioaccumulation potential factor value, subject to a maximum product of 1×10^{12}. Based on this product, a value was assigned in accordance with Reference 1, Table 2-7.

Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 100

Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value: 1×10^6

Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value × Bioaccumulation Factor Value (5,000): 5×10^9

Waste Characteristics Factor Category Value: 180
(Ref. 1, Table 2-7)

4.1.3.3 HUMAN FOOD CHAIN THREAT TARGETS

4.1.3.3.1 Food Chain Individual

An observed release of a hazardous substance having a bioaccumulation factor value of 500 or greater is documented in perennial surface water with a fishery downstream — specifically, an observed release to Tarkiln Branch with the Maurice River and Union Lake as downstream fisheries (Refs. 3; 44, pp. 59, 75, 82, 83, 85, 89, 90, 226, 227, 228, 229; 64; 68; 74) (see also Figure 4 of this HRS documentation record). Tarkiln Branch flows southwest for about 2.3 miles and converges with Parvin Branch, which flows southwest for about 1.5 miles before converging with the Maurice River (Ref. 3). The Maurice River widens to form the Union Lake, which flows for about 2 miles, before the Maurice River exits to the south (Refs. 3; 68). Union Lake and the Maurice River are fished (Refs. 64, p. 1; 74).

Fish species caught from the Maurice River for consumption include trout, Largemouth bass, Chain pickerel, and sunfish (Ref. 74). Fish caught from Union Lake for consumption include, Black crappie , Largemouth and Smallmouth bass, White and Yellow perch, Channel catfish, and two species of anadromous (migratory) fish (Alewife and Blue Black herring) (Ref. 74). During the spring, the NJDEP Division of Fish and Wildlife stock the Maurice River upstream of Union Lake with trout (Ref. 74). The NJDEP, Department of Health has issued fish consumption advisories for Maurice River downstream of Millville and Union Lake at Millville, which are within the 15-mile surface water migration pathway TDL (Refs. 65, p. 67; 68). The advisories provide consumption guidelines for high risk groups including infants, children, pregnant women, nursing mothers, and women of child bearing age; it also includes consumption guidelines for the general population including all others that are not in the high risk group (Ref. 65, p. 1). The advisories provide do-not-eat recommendations for high-risk individuals for fish species including: Largemouth bass, White catfish, and Channel catfish in the Maurice River; and Largemouth bass, White perch, Chain pickerel, and Brown bullhead from Union Lake (Ref. 65, p. 67). The advisories recommend that high-risk individuals consume one meal per month of White perch form the Maurice River and Bluegill sunfish from Union Lake (Ref. 65, p. 67). Consumption advisories for the general population are as follows: from the Maurice River, one meal per week of Largemouth bass and White perch, and one meal per month of White catfish and Channel catfish; and from Union Lake, one meal per week of White perch, Bluegill sunfish, and Brown bullhead, and one meal a month of Largemouth bass and Chain pickerel (Ref. 65, p. 67).

Food Chain Individual Factor Value: 20
(Ref. 1, Section 4.1.3.3.1)

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

No Level I samples were collected.

4.1.3.3.2.2 Level II Concentrations

No Level II samples were collected.

4.1.3.3.2.3 Potential Human Food Chain Contamination

The entire portions of Union Lake and the Maurice River within the 15-mile surface water migration pathway TDL are fished (Ref. 74). Information is not available on the annual production of fish caught in the Maurice River and Union Lake; therefore, the annual production is assumed to be at greater than 1 pound per year (Ref. 72).

TABLE 11: Potential Population Targets

Identity of Fishery	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Population Value (P_i) (Ref. 1, Table 4-18)	Dilution Weight (D_i) (Ref. 1, Table 4-13)	$P_i \times D_i$	References
Maurice River	>1	Moderate to large stream	165	0.03	0.01	0.0003	1, Tables 4-13, Table 4-18; 3; 60, p. 3
Union Lake	>1	Moderate to large stream	165	0.03	0.01	0.0003	1, Tables 4-13, Table 4-18; 3; 60, p. 3
					Total	**0.0006**	

Notes:

cfs Cubic feet per second

For the potential human food chain contamination factor value, the sum of $P_i \times D_i$ is divided by 10.

Potential Human Food Chain Factor Value: 0.00006
(Ref. 1, Section 4.1.3.3.2.3)

4.1.4.2 ENVIRONMENTAL THREAT WASTE CHARACTERISTICS

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

The ecosystem toxicity, persistence, and bioaccumulation factor values for arsenic and lead detected in Source No. 1, with a containment factor value of greater than 0, are summarized in Table 12. The combined ecosystem toxicity, persistence, and bioaccumulation factor values are assigned in accordance with Reference 1, Section 4.1.4.2.1.

TABLE 12: Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substances	Source No.	Ecosystem Toxicity Factor Value[1]	Persistence Factor Value[2]	Environmental Bioaccumulation Value[3]	Ecosystem Toxicity/ Bioaccumulation Factor Value (Ref. 1, Table 4-21)	Reference
Arsenic	1	10	1	50,000	5×10^5	2, p. BI-1
Lead	1	1,000	1	50,000	5×10^7	2, p. BI-7

Notes:

[1] Ecotoxicity for fresh water
[2] Persistence value for rivers
[3] Bioaccumulation factor value for fresh water, environmental threat

For the environmental threat, lead has the highest ecosystem toxicity/persistence/ecosystem bioaccumulation factor value of 5×10^7 (Ref. 2, p. BI-7).

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^7
(Reference 1, Section 4.1.4.2.1.4)

4.1.4.2.2 HAZARDOUS WASTE QUANTITY

TABLE 13: Hazardous Waste Quantity		
Source No.	**Source Type**	**Source Hazardous Waste Quantity**
1	Contaminated soil	3.88

Total Source Hazardous Waste Quantity: 3.88

The hazardous constituent quantity for Source No. 1 is not adequately determined. Source No. 1 is composed of arsenic- and lead-contaminated soil on about 32 residential and commercial properties. The approximate area of observed contamination, excluding impervious surfaces, on each property was determined and the area of all properties was summed to obtain the source HWQ for Source No. 1 (Ref. 55, p. 2). The combined HWQ for Source No. 1 is about 132,252 square feet. In addition, the HWQ receives a minimum factor value of 100 for the surface water migration pathway because actual contamination at Level II concentrations is present in HRS-eligible palustrine forested wetlands and the hazardous constituent quantity is not adequately determined (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Table 2-6)

4.1.4.2.3 CALCULATION OF ENVIRONMENTAL CHAIN THREAT WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

For the environment threat, lead is evaluated for the waste characteristics. The waste characteristics factor category was obtained by multiplying the ecosystem toxicity, persistence, and HWQ factor values, subject to a maximum product of 1×10^8. Then, this product was multiplied by the environmental bioaccumulation potential factor value, subject to a maximum product of 1×10^{12}. Based on this product, a value was assigned in accordance with Reference 1, Table 2-7.

Ecosystem Toxicity/Persistence Factor Value: 1,000.00
Hazardous Waste Quantity Factor Value: 100

Ecosystem Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value: 1×10^5

Ecosystem Toxicity/Persistence Factor Value ×
Hazardous Waste Quantity Factor Value × Bioaccumulation Factor Value (50,000): 5×10^9

Waste Characteristics Factor Category Value: 180
(Ref. 1, Table 2-7)

4.1.4.3 Environmental Threat Targets

Level I Concentrations

No Level I concentrations have been documented.

Level II Concentrations

Actual contamination has been documented in wetland areas along Tarkiln Branch in Section 4.1.2.1.1 of this HRS documentation record. The sampling locations are depicted on Figure 4 of this HRS documentation record. During the April 2015 sampling event, EPA conducted an assessment of wetlands mapped by the National Wetlands Inventory and NJDEP (Ref. 62, p. 1). A wetlands specialist reviewed the soils, plants, and hydrology of 10 segments along Tarkiln and Parvin Branches to verify the presence or absence of wetlands (Ref. 62, p. 1). The wetland areas assessed were palustrine forested wetlands (Ref. 62, pp. 35 to 76). During the same sampling event, EPA collected surface water and sediment samples along the entire reach of Tarkiln Branch, and along Parvin Branch, both upstream and downstream of the confluence with Tarkiln Branch (Ref. 43, p. i). Most of the samples collected were located in wetlands mapped by the NWI and NJDEP, and some were located within the wetland areas verified by a wetlands specialist during the sampling event (Ref. 62, pp. 3 through 10, 14 through 19, 26 through 31) (see also Figure 4 of this HRS documentation record). The zone of contamination begins at the PPE (headwaters of Tarkiln Branch) and ends at sediment sampling location FKT-SD-64, just upstream of where Tarkiln Branch merges with Parvin Branch (see Figure 4 of this HRS documentation record). The contaminated wetlands within the zone of contamination along Tarkiln Branch were measured based on five non-contiguous wetland segments as follows: 1) downstream of S. West Avenue to upstream of S. Delsea Drive, 2) small segment downstream of S. Delsea Drive, 3) downstream of S. Delsea Drive to upstream of S. Orchard Avenue, 4) downstream of S. Orchard Avenue to upstream of Elm Road, and 5) downstream of Elm Road to the end of the zone of contamination at sediment sample FKT-SD-64 (Ref. 82, pp. 1, 3, 4, 5). The estimated wetland frontage for all five wetland segments on both sides of Tarkiln Branch is 16,078 feet or 3.04 miles (Refs. 62, pp. 3 through 10, 14 through 19, 26 through 28; 68; 82, pp. 1, 2).

Most Distant Level II Sample

Investigation:	April 2015 Removal Assessment Sampling
Sample ID:	FKT-SD-64
Sample Medium:	Sediment
Hazardous Substance:	Arsenic
Location:	Tarkiln Branch, about 8,039 feet or 1.52 miles downstream of the S. West Avenue
References:	43, pp. i, 100, 181; 44, p. 136; 47, p. 12 (see also Tables 7 and 8 of this HRS documentation record)

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

Sensitive Environments

Sensitive environments other than wetlands have not been identified within the 15-mile TDL.

Wetlands

Level I wetlands were not scored in this HRS documentation record.

4.1.4.3.1.2 Level II Concentrations

Sensitive Environments

Sensitive environments other than wetlands have not been identified within the 15-mile TDL.

Wetlands

The wetlands were identified from Reference 62, Wetland Presence/Absence Determination. Reference 62 presents the NJDEP and NWI mapped wetlands as well as field verified wetlands (Ref. 62, pp. 3 through 10, 14 through 19, 26 through 31, 35 through 76). The wetlands evaluated are palustrine forested (Ref. 62, pp, 3 through 10, 14 through 19, 26 through 28, 35 through 76). Sediment samples (FKT-SD-02, FKT-SD-03, FKT-SD-05, FKT-SD-07, FKT-SD-08, FKT-SD-17, FKT-SD-20, FKT-SD-25, FKT-SD-25-DUP, FKT-SD-38, FKT-SD-39, FKT-SD-44, FKT-SD-45, FKT-SD-46, FKT-SD-46-DUP, FKT-SD-48, FKT-SD-56, FKT-SD-63, FKT-SD-118, FKT-SD-122, and FKT-SD-64) evaluated at Level II concentrations are located in palustrine forested wetlands along Tarkiln Branch starting about 175 feet downstream from S. West Avenue (about 0.5 mile downstream of the PPE) (Ref. 62, pp, 3 through 10, 14 through 19, 26 through 28, 35 through 76) (see also Figure 4 of this HRS documentation record). The total wetland frontage, which begins about 0.5 mile downstream of the PPE, to the most downstream sample that contained Level II concentrations (FKT-SD-64) is about 16,078 feet or 3.04 miles (Ref. 62, pp, 3 through 10, 14 through 19, 26 through 31, 35 through 76; 82, pp. 1 through 5). Both sides of Tarkiln Branch within this segment contain HRS eligible wetlands and were included in the calculation of the wetland frontage (Ref. 82, pp. 1 through 5; 62, pp, 3 through 10, 14 through 19, 26 through 31, 35 through 76) (see also Figure 4 of this HRS documentation record).

TABLE 14: Level II Wetland Frontage

Wetland	Water Body	Wetland Frontage	References
Palustrine forested	Tarkiln Branch	16,078	62, pp., 3 through 10, 14 through 19, 26 through 28 35 through 76
	Total Wetland Frontage	16,078 feet or 3.04 mile	

Total Wetland Frontage: 16,078 (3.04 mile)

The wetland ratings value for 0.11 mile is obtained from Reference 1, Table 4-24 and is 100.

Wetland Value: 100
(Ref. 1, Table 4-24)

For wetlands subject to Level II concentrations, the wetland value (100) is multiplied by 1 (Ref. 1, Section 4.1.4.3.1.1).

Wetland Value: 100 × 1
Level II Concentrations Factor Value: 100
(Ref. 1, Section 4.1.4.3.1.1)

4.1.4.3.1.3 Potential Contamination

Sensitive Environments

Potential sensitive environments were not evaluated because the presence of sensitive environments other than wetlands have not been identified.

Wetlands

Potential contamination of wetlands were not evaluated because potential contamination does not contribute significantly to the site score.

5.0 SOIL EXPOSURE PATHWAY

5.0.1 General Considerations

According to the HRS, the soil exposure pathway evaluation is based on areas of observed contamination (Ref. 1, Sect 5.0.1). All soil samples evaluated for the area of observed contamination were collected at a depth of 2 feet or less (Refs. 9; 51) (see also Tables 15, 17, and 19 of this HRS documentation record). The area of observed soil contamination is currently defined based on analytical results for soil samples collected in the area during the NJDEP August 2014 SI sampling event and the EPA January and February 2015 removal assessment residential sampling event (Refs. 5; 9; 12; 24; 51). Analytical results for hazardous substances (arsenic and lead) in the soil samples are present at concentrations three times greater than the designated background levels and at concentrations greater than the corresponding sample quantitation limits (SQL) (Refs. 5; 24) (see also Tables 5 and 9 of this HRS documentation record).

Letter by which this area is to be identified: A

Name and description of the area: Area of Observed Contamination (AOC) A on the FKT Property and Surrounding Commercial and Residential Properties

Type of the area: Contaminated soil

Location of the area, with reference to a map of the site:

AOC A is contaminated soil that contains arsenic and lead above background levels, throughout the FKT property, as well as on residential and commercial properties surrounding FKT (Refs. 5, pp. 13, 17, 20, 35, 38, 44, 45, 47, 52, 54, 66, 68, 73, 75, 78, 83, 86, 103, 134, 150, 153, 160, 190, 200; 24, pp. 15, 16, 22, 23, 26, 27, 31, 32, 35, 36, 44, 48, 49) (see Figure 2 of this HRS documentation record). Soil samples that meet observed contamination criteria were used to delineate AOC A (Ref. 1, Table 2-3; see Tables 18, and 20 of this HRS documentation record). In accordance with Section 5.0.1 General Considerations, of the HRS, areas lying between sampling locations, except those areas that are covered by an impenetrable material, are included in AOC A (Ref. 1, Section 5.0.1) (see also Figure 2 of this HRS documentation record). Soil within AOC A likely became contaminated because of the use of fill material, surface water runoff, and air deposition (Refs. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33; 21, pp. 1, 2; 23, pp. 1, 2, 3, 4) (see also section 4.1.2.1.1 Observed Release – Direct Observation, of this HRS documentation record). During sampling activities, fill material was observed on the FKT property and several residential properties within AOC A. Fill material observed during soil sampling included concrete, red brick, coarse sand, coarse black sand, coarse orange and orange black sand with asphalt, brick shards, plastic, terra cotta, dark brown soil fill, various types of variegated dark brown soil and fill, coal fragments, coal ash, silt, small shards of coal, porcelain, rock shards, slag, and trash (Refs. 23, pp. 1, 2, 3, 4; 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). The fill material was mixed with the soil, which was primarily course sandy loams (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Fill material is not continuous throughout individual properties or on all properties that comprise AOC A (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Arsenic and lead have been detected at varying concentrations in soil samples collected from AOC A (Ref. 5, pp. 12 through 210). This inconsistent nature of arsenic and lead contamination in the soils of AOC A is characteristic for deposition by wind-blown particulates (Ref. 76, pp. 3, 15, 313, 315). The soil and fill material are mixed; however, the soil samples collected primarily consisted of course sands, loamy sands, and sandy loams; therefore, AOC A is evaluated as contaminated soil (Ref. 8, pp. 1 through 33).

Kil-Tone began operations at the property in the late 1910s manufacturing the pesticide arsenate of lead (Ref. 12, p. 2). Lead arsenate is a pentavalent form of inorganic arsenic (Ref. 32, p. 1). In a 1989 affidavit, a resident confirmed that while Kil-Tone was in operation, a green and white dust typically

coated the ground and rooftops, as well as along the shore of Tarkiln Branch, near the FKT property (Ref. 21, pp. 1, 2).

Arsenic and lead also have been detected in AOC A, which is comprised of the FKT property, and about 32 residential and commercial properties that surround the FKT property. The extent of AOC A is determined by contaminated soil samples contained in Tables 18 and 20 of this HRS documentation record. EPA is evaluating analytical results of samples collected during the removal assessment to determine what properties are located in impacted areas and which ones will need to be considered for a removal action (Ref. 67, p. 1).

Background Levels

To establish background levels for arsenic and lead, an evaluation of samples collected from two local parks, a cemetery, and the soil samples collected in August 2014 and January and February 2015 was conducted. Analytical results indicate that the parks and cemetery, located north, northwest, and southwest of AOC A, have not been impacted by past operations at the FKT property (Refs. 5, pp. 56, 57, 58, 59, 63, 114 through 121, 122 through 130). In addition to the samples collected from areas outside the influence of the FKT property, soil samples collected within AOC A that did not meet observed release criteria were evaluated to establish background levels. The texture of all soil samples evaluated to establish background levels and the contaminated soil samples collected from AOC A consisted primarily of course sand, sandy loam, and loamy sand (Refs. 8, pp. 3 through 33; 23, pp. 2 through 5; 51, pp. 5, 6, 8). Therefore, the background levels and the contaminated soil samples collected from AOC A are of similar soil types.

The background evaluation revealed that some soil samples contained low levels of arsenic and lead at concentrations that ranged from 1.4 mg/kg (615SE-SUB-1A) to 6.5 mg/kg for arsenic (FKT-030-04-A, FKT-033-02-A, and FKT-034-02-A) and 4.0 mg/kg (728SS-SUB-1A) to 7.1 mg/kg (511 PAUL-SUB-6A) for lead (Refs. 5, pp. 88, 110, 111; 24, pp. 91, 142, 165). Also, between 1996 and 2001, NJDEP conducted a study to determine the ambient levels of metals in New Jersey soils (Ref. 73, p. 1). For this study, NJDEP collected urban soil samples from various parks because those soils likely had not been disturbed for some time (Ref. 73, p. 2). The study revealed that the average concentrations of arsenic and lead were 5.2 mg/kg and 37.6 mg/kg, respectively (Ref. 73, p. 3).

As a result of the background evaluation, it was determined that arsenic and lead concentrations detected in soil samples collected at Landis Park (FKT-018) located approximately 5,280 feet or 1 mile north of the FKT property (Refs. 3; 5, pp. 56 through 59, 63; 9, pp. 48 through 50; 28, p. 7) (also see Figure 3 of this HRS documentation record) are adequate to establish background levels for comparison to samples collected in AOC A. Samples collected from Landis Park were collected during the EPA January and February 2015 removal assessment (Ref. 9, pp. 1, 48, 49, 50) and are presented as the background samples in Tables 15 and 16 of this HRS documentation record.

Background Samples

As stated above, soil samples collected from Landis Park were determined adequate to represent background levels for arsenic and lead for comparison to contaminated soil samples. The background soil samples FKT-018-01-A, FKT-018-01-B, FKT-018-01-C, FKT-018-02-C, and FKT-018-01-D listed in Table 15 were collected by EPA during the January and February 2015 removal assessment residential sampling event (Refs. 5, pp. i, 1 through 8; 28, p. 7). The background soil samples were collected from Landis Park (FKT-018) located about 5,280 feet or 1 mile north of the FKT property (Refs. 3; 5, pp. 56 through 59, 63; 9, pp. 48 through 50; 28, p. 7) (also see Figure 3 of this HRS documentation record). The background soil samples were collected from two sampling stations within the park and at multiple depth intervals including 0 to 2 inches bgs, 2 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 24 inches bgs (Refs. 9, pp. i, 48, 49; 15, pp. 4, 5).

Background and contaminated soil samples are similar because they were collected during the same time frame, in accordance with the same sampling procedures (hand augers and macro core samplers) and from the same type of soils, Downer-Urban land and Hammonton-Urban land complex – both of which are primarily loamy sands and sandy loams (Refs. 9, pp. 48, 59; 22, pp. 8, 12, 14; 29, pp, 2, 4, 6). During sampling activities, the soil types observed at the background and contaminated sampling locations included course sands, course sandy loams, course loamy sands, course sandy clays, and course loamy sand to sand (Refs. 8, pp. 3 through 33; 23, pp. 2 through 5; 51, pp. 5, 6, 8). In addition, background and contaminated soil samples collected in 2015 were analyzed for grain size. The grain size analysis indicated that the background and contaminated soils samples are primarily sand (Ref. 79, pp. 9 through 25). The percentage of sand in the background soil samples ranged from 63.9 percent in sample FKT-018-01-D to 61.4 percent in sample FKT-018-01-B (Ref. 79, pp. 17, 18). The percentage of sand in the

contaminated soil samples ranged from 54.4 percent in sample FKT-001-07-B to 85 percent in sample FKT-030-03-A (Ref. 79, pp. 9, 22). The grain size analysis indicated that the background and contaminated soil samples contained silt, clay, and colloids (Ref. 79, pp. 9 through 25). The percentage of silt, clay, and colloids in the background samples ranged from 30.7 percent in sample FKT-018-01-D to 37.3 percent in sample FKT-018-01-A (Ref. 79, pp. 17, 18). The percentage of silt, clay, and colloids in the contaminated soil samples ranged from 9.7 in sample FKT-016-06-D to 38.2 percent in sample FKT-028-05-A (Ref. 79, pp. 16, 17, 22). The background and contaminated soil samples were grab samples and were analyzed using the same analytical methods by the EPA Region 2 laboratory (Refs. 5, pp. 1 through 10; 9, p. i; 24, pp. 1 to 10). Chain-of-custody records for the background soil samples collected from Landis Park (FKT-018) are provided in Reference 28 (Ref. 28, p. 7). Field sample collection sheets are provided in Reference 9 pp. 48 to 50).

TABLE 15: Background Soil Sample Description – January and February 2015					
Sample ID	**Sample Location**	**Physical Characteristics**	**Depth (inches bgs)**	**Date Sampled**	**References**
Background for Contaminated Samples Collected from 0 to 2 Inches bgs					
FKT-018-01-A	Landis Park, north of the FKT property at 600 East Park Avenue.	Black organic coarse sandy loam	0 to 2	1/28/2015	5, p. 3; 8, p. 15; 9, pp. 48, 49, 50; 28, p, 7
Background for Contaminated Samples Collected from 0 to 6 and 2 to 6 Inches bgs					
FKT-018-01-B	Landis Park, north of the FKT property at 600 East Park Avenue.	Black organic coarse sandy loam	2 to 6	1/28/2015	5, p. 3; 8, p. 15; 9, pp. 48, 49, 50; 28, p, 7
Background for Contaminated Samples Collected from 6 to 12 Inches bgs					
FKT-018-01-C	Landis Park, north of the FKT property at 600 East Park Avenue.	Dark yellow brown coarse sandy loam and brown fine sandy clay	6 to 12	1/28/2015	5, p. 3; 8, p. 15; 9, pp. 48, 49, 50; 28, p, 7
FKT-018-02-C	Landis Park, north of the FKT property at 600 East Park Avenue.	Organic coarse sandy loam and dark yellowish brown coarse sandy loam	6 to 12	1/28/2015	5, p. 3; 8, p. 15; 9, pp. 48, 49, 50; 28, p, 7
Background for Samples Collected from 12 to 24 and 18 to 24 Inches bgs					
FKT-018-01-D	Landis Park, north of the FKT property at 600 East Park Avenue.	Brown fine sandy clay and brown coarse loamy sand	12 to 24	1/28/2015	5, p. 3; 8, p. 15; 9, pp. 48, 49, 50; 28, p, 7

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for FKT project
A	Depth of 0 to 2 inches bgs (Ref. 9, p. 49)
B	Depth of 2 to 6 inches bgs (Ref. 9, p. 49)
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs (Ref. 9, p. 49)
D	Depth of 12 to 24 inches bgs (Ref. 9, p. 49)
FKT	Former Kil-Tone Company
ID	Identification number

Background Concentrations

The background soil samples listed in Table 16 were collected by EPA during the January and February 2015 sampling event (Refs. 5, pp. i, 1 through 8; 28, p. 7). The concentrations of arsenic and lead presented in Table 16 were determined to be adequate to establish background levels for AOC A (Refs. 5, pp. 56, 57, 58, 59, 63). The EPA Region 2 Laboratory analyzed the background soil samples for EPA TAL metals using EPA Method 200.7 and in accordance with SOP C-109 Revision 3.3 (Refs. 5, p. 10; 40, p. 3). The EPA Region 2 laboratory reviewed the data in accordance with SOP G-26, Revision 1.3 (Refs. 31; 41, pp. 5 to 11). The data review checklists are provided in Reference 52. The RLs are listed on the analytical data sheets in Reference 5, pp. 56, 57, 58, 59. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation; it is adjusted for preparation weights and volumes, and any dilutions performed. The RLs are equivalent to SQL as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31).

TABLE 16: Analytical Results for Background Soil Samples

Sample ID	Hazardous Substance	Concentration (mg/kg)	RL (mg/kg)	References
Background for Samples Collected from 0 to 2 Inches bgs				
FKT-018-01-A	Arsenic	6.4	0.81	5, p. 56
FKT-018-01-A	Lead	57	0.81	5, p. 56
Background for Samples Collected from 0 to 6 and 2 to 6 and Inches bgs				
FKT-018-01-B	Arsenic	5.7	0.75	5, p. 57
FKT-018-01-B	Lead	47	0.75	5, p. 57
Background for Samples Collected from 6 to 12 Inches bgs				
FKT-018-01-C	Arsenic	3.1	0.71	5, p. 58
FKT-018-02-C	Lead	19	0.72	5, p. 63
Background for Samples Collected from 12 to 24 and 18 to 24 Inches bgs				
FKT-018-01-D	Arsenic	3.3	0.68	5, p. 59
FKT-018-01-D	Lead	8.7	0.68	5, p. 59

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for FKT project
A	Depth of 0 to 2 inches bgs (Ref. 9, p. 49)
B	Depth of 2 to 6 inches bgs (Ref. 9, p. 49)
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs (Ref. 9, p. 49)
D	Depth of 12 to 24 inches bgs (Ref. 9, p. 49)
FKT	Former Kil-Tone Company
ID	Identification number
mg/kg	Milligrams per kilogram
RL	Reporting limit

Contaminated Samples – NJDEP 2014 Site Investigation

The soil samples listed in Table 17 were collected by NJDEP, BEMSA during the August 2014 SI (Refs. 24, pp. i, 1 to 9; 27, pp. 1 to 16). The work plan for the NJDEP SI is contained in Reference 6. The work plan provided a general outline for sampling activities. Sampling activities were revised in response to field conditions and deviations were documented in the SI report (Ref. 63). The soil samples were collected throughout the FKT property and from residential and commercial properties located within a 1 block radius of the FKT property (Ref. 12, pp. 8, 38 to 41). The soil samples were collected at 0 to 0.5 foot (0 to 6 inches) bgs and 1.5 to 2 feet (18 to 24 inches) bgs (Refs. 12, pp. 9, 10, 16; 51, pp. 3 to 46). The contaminated soil samples were collected away from common sources of lead contamination such as road, driveways, and roof drain lines (Ref. 85, p. 1). The contaminated soil samples were collected from similar soil types as the background soil samples (Refs. 8, pp. 3 through 33; 23, pp. 2 through 5; 51, pp. 5, 6, 8). The locations of the samples are depicted in Reference 12, pp. 38 to 41 (see also Figure 2 of this HRS documentation record). The chain-of-custody records are provided in Reference 27 (specific pages for each sample are provided below).

TABLE 17: AOC Soil Sample Description – August 2014

Sample ID	Sample Location	Depth (inches bgs)	Date Sampled	References
Compared to Background Samples FKT-018-01-A and FKT-018-01-B				
USC-SUR-2	Eastern portion of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 2; 27, p. 1; 51, p. 3
USC-SUR-3	Northeastern corner of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 2; 27, p. 1; 51, p. 7
USC-SUR-4	Northeastern corner of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 7
USC-SUR-5	Central portion of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 9
USC-SUR-6	South-central portion of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 9
USC-SUR-9	Northwestern portion of FKT property	0 to 6	8/18/2014	12, p. 38; 24, p. 3; 27, p. 3; 51, p. 13
531EC-SUR-1	Northern portion property	0 to 6	8/19/2014	12, p. 41; 24, p. 3; 27, p. 4; 51, p. 13
708SS-SUR-2	Back yard of residential property	0 to 6	8/19/2014	12, p. 39; 24, p. 3; 27, p. 4; 51, p. 15
722SS-SUR-2	Back yard of residential property	0 to 6	8/19/2014	12, p. 40; 24, p. 4; 27, p. 5; 51, p. 17
726SS-SUR-1	Front yard of residential property	0 to 6	8/19/2014	12, p. 40; 24, p. 4; 27, p. 6; 51, p. 17

TABLE 17: AOC Soil Sample Description – August 2014				
Sample ID	**Sample Location**	**Depth (inches bgs)**	**Date Sampled**	**References**
726SS-SUR-2	Back yard of residential property	0 to 6	8/19/2014	12, p. 40; 24, p. 4; 27, p. 6; 51, p. 19
510WA-SUR-3	Northwest corner of vacant lot located south of the FKT property	0 to 6	8/20/2014	12, p. 40; 24, p. 5; 27, p. 7; 51, p. 25
510WA-SUR-4	Southwest corner of vacant lot located south of the FKT property	0 to 6	8/20/2014	12, p. 40; 24, p. 5; 27, p. 7; 51, p. 27
VS-SUR-2	Northeastern portion of Vineland Syrup property	0 to 6	8/20/2014	12, p. 40; 24, p. 5; 27, p. 8; 51, p. 29
511PAUL-SUR-1	Northwestern corner of former gasoline station	0 to 6	8/20/2014	12, p. 40; 24, p. 5; 27, p. 8; 51, p. 29
511PAUL-SUR-3	North-center portion of former gasoline station	0 to 6	8/20/2014	12, p. 40; 24, p. 6; 27, p. 9; 51, p. 31
511PAUL-SUR-5	Northeastern corner of former gasoline station	0 to 6	8/20/2014	12, p. 40; 24, p. 6; 27, p. 9; 51, p. 33
527EC-SUR-2	Front yard of residential property	0 to 6	8/22/2014	12, p. 41; 24, p. 8; 27, p. 15; 51, p. 44
610SS-SUR-2	Back yard of residential property	0 to 6	8/22/2014	12, p. 41; 24, p. 9; 27, p. 16; 51, p. 46
615SE-SUR-1	Front yard of residential property	0 to 6	8/21/2014	12, p. 41; 24, p. 7; 27, p. 11; 51, p. 39
615SE-SUR-2	Back yard of residential property	0 to 6	8/21/2014	12, p. 41; 24, p. 7; 27, p. 11; 51, p. 39
615SE-SUR-3	Back yard of residential property	0 to 6	8/21/2014	12, p. 41; 24, p. 7; 27, p. 12; 51, p. 39
513EC-SUR-2	Back yard of residential property	0 to 6	8/21/2014	12, p. 41; 24, p. 8; 27, p. 13; 51, p. 40
Compared to Background Sample FKT-018-01-D Collected from 12 to 24 Inches bgs				
USC-SUB-2A	Eastern portion of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 2; 27, p. 1; 51, p. 3; 85, pp. 1, 2

TABLE 17: AOC Soil Sample Description – August 2014				
Sample ID	**Sample Location**	**Depth (inches bgs)**	**Date Sampled**	**References**
USC-SUB-3A	Northeastern corner of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 2; 27, p. 1; 51, p. 7; 85, pp. 1, 2
USC-SUB-4A	Northeastern corner of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 7; 85, pp. 1, 2
USC-SUB-5A	Central portion of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 9; 85, pp. 1, 2
USC-SUB-6A	South-central portion of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 2; 27, p. 2; 51, p. 9; 85, pp. 1, 2
USC-SUB-8A	Western portion of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 3; 27, p. 3; 51, p. 11; 85, pp. 1, 2
USC-SUB-9A	Northwestern portion of FKT property	18 to 24	8/18/2014	12, p. 38; 24, p. 3; 27, p. 3; 51, p. 13; 85, pp. 1, 2
722SS-SUB-1A	Front yard of residential property	18 to 24	8/19/2014	12, p. 40; 24, p. 4; 27, p. 4; 51, p. 17; 85, pp. 1, 2
722SS-SUB-2A	Back yard of residential property	18 to 24	8/19/2014	12, p. 40; 24, p. 4; 27, p. 5; 51, p. 17; 85, pp. 1, 2
728SS-SUB-2A	Back yard of residential property	18 to 24	8/19/2014	12, p. 40; 24, p. 4; 27, p. 5; 51, p. 19; 85, pp. 1, 2
510WA-SUB-1A	Southeastern corner of vacant lot located south of the FKT property	18 to 24	8/20/2014	12, p. 40; 24, p. 4 27, p. 7; 51, p. 23; 85, pp. 1, 2
510WA-SUB-2A	Northeastern corner of vacant lot located south of the FKT property	18 to 24	8/20/2014	12, p. 40; 24, p. 5; 27, p. 7; 51, p. 23; 85, pp. 1, 2
VS-SUB-1A	Southeastern portion of Vineland Syrup property	18 to 24	8/20/2014	12, p. 40; 24, p. 5; 27, p. 8; 51, p. 27; 85, pp. 1, 2
511PAUL-SUB-1A	Northwestern corner of former gasoline station property	18 to 24	8/20/2014	12, p. 40; 24, p. 5; 27, p. 8; 51, p. 29; 85, pp. 1, 2
511PAUL-SUB-2A	Southwestern corner of former gasoline station property	18 to 24	8/20/2014	12, p. 40; 24, p. 5; 27, p. 9; 51, p. 31; 85, pp. 1, 2

TABLE 17: AOC Soil Sample Description – August 2014				
Sample ID	**Sample Location**	**Depth (inches bgs)**	**Date Sampled**	**References**
511PAUL-SUB-3A	North-central portion of former gasoline station property	18 to 24	8/20/2014	12, p. 40; 24, p. 6; 27, p. 9; 51, p. 31; 85, pp. 1, 2
511PAUL-SUB-5A	Northeastern corner of former gasoline station property	18 to 24	8/20/2014	12, p. 40; 24, p. 6; 27, p. 9; 51, p. 33; 85, pp. 1, 2
EC-SUB-2A	Southern portion of empty lot	18 to 24	8/21/2014	12, p. 41; 24, p. 8; 27, p. 13; 51, p. 42; 85, pp. 1, 2
527EC-SUB-2A	Front yard of residential property	18 to 24	8/22/2014	12, p. 41; 24, p. 8; 27, p. 15; 51, p. 44; 85, pp. 1, 2
610SS-SUB-1A	Front yard of residential property	18 to 24	8/22/2014	12, p. 41; 24, p. 9; 27, p. 16; 51, p. 45; 85, pp. 1, 2
610SS-SUB-2A	Back yard of residential property	18 to 24	8/22/2014	12, p. 41; 24, p. 9; 27, p. 16; 51, p. 46; 85, pp. 1, 2
614SS-SUB-2A	Back yard of residential property	18 to 24	8/22/2014	12, p. 41; 24, p. 9; 27, p. 15; 51, p. 45; 85, pp. 1, 2
615SE-SUB-2A	Back yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 11; 51, p. 39; 85, pp. 1, 2
619SE-SUB-1A	Front yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 11; 51, p. 38; 85, pp. 1, 2
619SE-SUB-2A	Back yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 11; 51, p. 38; 85, pp. 1, 2
511EC-SUB-1A	Front yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 12; 51, p. 40; 85, pp. 1, 2
511EC-SUB-2A	Back yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 12; 51, p. 40; 85, pp. 1, 2
513EC-SUB-1A	Front yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 7; 27, p. 12; 51, p. 40; 85, pp. 1, 2
513EC-SUB-2A	Back yard of residential property	18 to 24	8/21/2014	12, p. 41; 24, p. 8; 27, p. 12; 51, p. 40; 85, pp. 1, 2

Notes:

#	Sampling station on property
A	Depth of 1.5 to 2 feet bgs (Ref. 12, p. 12)
AOC	Area of observed contamination
bgs	Below ground surface
EC	East Chestnut Avenue

Table 17 – Notes Continued:

FKT	Former Kil-Tone
ID	Identification number
SE	South East Boulevard
SS	South Sixth Street
SUB	Subsurface soil (18 to 24 inches bgs)
SUR	Surface soil (0 to 6 inches bgs)
USC	Urban Sign & Crane, Inc.
VS	Vineland Syrup
WA	Washington Street

Contaminated Concentrations – NJDEP 2014 Site Investigation

The soil samples listed in Table 18 were collected by NJDEP, BEMSA during the August 2014 SI sampling event (Refs. 24, pp. i, 4; 27, p. 7). All samples in Table 18 meet the criteria for observed contamination in accordance with Reference 1, Section 5.01, General Consideration and Table 2-3. Background levels used in Table 18 are provided according to depth (for more information on how background levels were established, see section 5.0.1 General Considerations – Background Levels, of this HRS documentation record). The samples were analyzed by the EPA Region 2 Laboratory for TAL metals using EPA Method 200.7 and in accordance with SOP C-109 Revision 3.2 (Refs. 24, p. 10; 58, p. 3). The EPA Region 2 laboratory reviewed the data in accordance with EPA SOP G-26 Revision 1.2 (Refs. 31; 59, pp. 4 through 9). The data review checklists are provided in Reference 49. The RLs are listed on the analytical data sheets in Reference 24. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation and is adjusted for preparation weights and volumes, dilutions, and percent moisture in soil. The RLs are equivalent to SQL as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31).

TABLE 18: Analytical Results for AOC Soil Samples – August 2014

Sample ID	Hazardous Substance	Concentration (mg/kg)	RL (mg/kg)	Reference
Compared to Background Sample FKT-018-01-A and FKT-018-01-B Collected from 0 to 6 and 2 to 6 Inches bgs (Arsenic, 6.4 mg/kg and Lead, 57 mg/kg) (Ref. 5, pp. 56, 57)				
USC-SUR-2	Arsenic	110	0.77	24, p. 15
USC-SUR-2	Lead	190	0.77	24, p. 15
USC-SUR-3	Arsenic	100	0.76	24, p. 22
USC-SUR-3	Lead	190	0.76	24, p. 22
USC-SUR-4	Arsenic	130	0.78	24, p. 26
USC-SUR-5	Arsenic	320	0.81	24, p. 31
USC-SUR-5	Lead	230	0.81	24, p. 31
USC-SUR-6	Arsenic	420	0.62	24, p. 35
USC-SUR-9	Arsenic	740	0.78	24, p. 48
USC-SUR-9	Lead	370	0.78	24, p. 48
531EC-SUR-1	Arsenic	21	0.79	24, p. 55
708SS-SUR-2	Arsenic	39	0.8	24, p. 64
708SS-SUR-2	Lead	230	0.8	24, p. 64
722SS-SUR-2	Arsenic	49	0.78	24, p. 72
722SS-SUR-2	Lead	190	0.78	24, p. 72
726SS-SUR-1	Arsenic	23	0.76	24, p. 76
726SS-SUR-2	Lead	260	0.82	24, p. 87
510WA-SUR-3	Arsenic	39	0.83	24, p. 103

TABLE 18: Analytical Results for AOC Soil Samples – August 2014				
Sample ID	**Hazardous Substance**	**Concentration (mg/kg)**	**RL (mg/kg)**	**Reference**
510WA-SUR-3	Lead	470	0.83	24, p. 103
510WA-SUR-4	Arsenic	37	0.77	24, p. 107
VS-SUR-2	Arsenic	50	0.83	24, p. 116
511PAUL-SUR-1	Arsenic	40	0.73	24, p. 121
511PAUL-SUR-3	Arsenic	25	0.76	24, p. 129
511PAUL-SUR-5	Arsenic	200	0.80	24, p. 137
527EC-SUR-2	Lead	1,100	0.80	24, p. 210
610SS-SUR-2	Lead	300	0.76	24, p. 228
615SE-SUR-1	Lead	280	0.72	24, p. 164
615SE-SUR-2	Arsenic	83	0.74	24, p. 168
615SE-SUR-2	Lead	570	0.74	24, p. 168
615SE-SUR-3	Arsenic	90	0.79	24, p. 172
615SE-SUR-3	Lead	530	0.79	24, p. 172
513EC-SUR-2	Lead	270	0.81	24, p. 186
Compared to Background Sample FKT-018-01-D Collected from 18 to 24 Inches bgs (Arsenic, 3.3 mg/kg and Lead, 8.7 mg/kg) (Ref. 5, p. 59)				
510WA-SUB-1A	Arsenic	10	0.87	24, p. 95
USC-SUB-2A	Arsenic	38	0.57	24, p. 16
USC-SUB-3A	Arsenic	68	0.69	24, p. 23
USC-SUB-4A	Arsenic	170	0.76	24, p. 27
USC-SUB-4A	Lead	180	0.76	24, p. 27
USC-SUB-5A	Arsenic	220	0.61	24, p. 32
USC-SUB-5A	Lead	140	0.61	24, p. 32
USC-SUB-6A	Arsenic	590	0.73	24, p. 36
USC-SUB-6A	Lead	190	0.73	24, p. 36
USC-SUB-8A	Arsenic	360	0.78	24, p. 44
USC-SUB-8A	Lead	410	0.78	24, p. 44
USC-SUB-9A	Arsenic	3,000	0.79	24, p. 49
USC-SUB-9A	Lead	3,100	0.79	24, p. 49
722SS-SUB-1A	Arsenic	37	0.71	24, p. 69

TABLE 18: Analytical Results for AOC Soil Samples – August 2014				
Sample ID	**Hazardous Substance**	**Concentration (mg/kg)**	**RL (mg/kg)**	**Reference**
722SS-SUB-1A	Lead	75	0.71	24, p. 69
722SS-SUB-2A	Arsenic	23	0.66	24, p. 73
722SS-SUB-2A	Lead	41	0.66	24, p. 73
728SS-SUB-2A	Arsenic	12	0.82	24, p. 80
728SS-SUB-2A	Lead	100	0.82	24, p. 80
510WA-SUB-1A	Arsenic	10	0.87	24, p. 95
510WA-SUB-2A	Arsenic	9.9	0.83	24, p. 100
VS-SUB-1A	Arsenic	12	0.87	24, p. 113
VS-SUB-1A	Lead	56	0.87	24, p. 113
511PAUL-SUB-1A	Arsenic	80	0.96	24, p. 122
511PAUL-SUB-2A	Arsenic	20	0.84	24, p. 126
511PAUL-SUB-2A	Lead	190	0.84	24, p. 126
511PAUL-SUB-3A	Arsenic	21	0.79	24, p. 130
511PAUL-SUB-3A	Arsenic	38	0.79	24, p. 130
511PAUL-SUB-5A	Arsenic	27	0.77	24, p. 138
EC-SUB-2A	Arsenic	18	0.80	24, p. 196
EC-SUB-2A	Lead	220	0.80	24, p. 196
527EC-SUB-2A	Arsenic	12	0.80	24, p. 211
527EC-SUB-2A	Lead	77	0.80	24, p. 211
610SS-SUB-1A	Lead	73	0.72	24, p. 225
610SS-SUB-2A	Arsenic	15	0.75	24, p. 229
610SS-SUB-2A	Lead	320	0.75	24, p. 229
614SS-SUB-2A	Arsenic	44	0.72	24, p. 220
614SS-SUB-2A	Lead	33	0.72	24, p. 220
615SE-SUB-2A	Arsenic	95	0.75	24, p. 169
615SE-SUB-2A	Lead	360	0.75	24, p. 169
619SE-SUB-1A	Arsenic	38	0.75	24, p. 157
619SE-SUB-2A	Arsenic	120	0.81	24, p. 161
619SE-SUB-2A	Lead	750	0.81	24, p. 161

TABLE 18: Analytical Results for AOC Soil Samples – August 2014				
Sample ID	**Hazardous Substance**	**Concentration (mg/kg)**	**RL (mg/kg)**	**Reference**
511EC-SUB-1A	Lead	52	0.81	24, p. 174
511EC-SUB-2A	Arsenic	17	0.85	24, p. 178
513EC-SUB-1A	Lead	120	0.78	24, p. 182
513EC-SUB-2A	Lead	96	0.79	24, p. 187

Notes:

#	Sampling station on property
A	Depth of 1.5 to 2 feet bgs (Ref. 12, pp. 9, 10, 16)
AOC	Area of observed contamination
bgs	Below ground surface
EC	East Chestnut Avenue
ID	Identification number
mg/kg	Milligrams per kilogram
RL	Reporting limit
SE	South East Boulevard
SS	South Sixth Street
SUB	Subsurface soil (18 to 24 inches bgs)
SUR	Surface soil (0 to 6 inches bgs)
USC	Urban Sign and Crane
VS	Vineland Syrup
WA	Washington Avenue

Contaminated Samples - EPA January and February 2015 Removal Assessment

The soil samples listed in Table 19 were collected by EPA during the January and February 2015 removal assessment residential sampling event (Refs. 5, pp. i, 1–8; 28, , pp. 4, 5, 6, 7, 8, 9, 10, 13, 14, 16, 17). The soil samples were collected from residential properties located in the immediate vicinity of the FKT property (Ref. 9, p. i) (see also Figure 2 of this HRS documentation record). The soil samples were collected from multiple sampling stations on each property and at multiple depth intervals including 0 to 2 inches bgs, 2 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 24 inches bgs (Refs. 9, p. i, 1, 4, 7, 10, 13, 16, 19, 22, 25, 26, 30, 33, 36, 39, 42, 45, 51, 54, 57, 60, 63, 66, 69, 75, 75, 78, 81, 84; 15, pp. 3, 4). The residential soil samples were collected away from common sources of lead contamination such as road, driveways, and roof drain lines (Ref. 84). The field sample collection sheets that provide the descriptions of the locations of the soil samples are provided in Reference 9, pp. 2, 5, 8, 11, 14, 17, 20, 23, 27, 28, 31, 34, 37, 40, 43, 46, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85. Chain-of-custody records are provided in Reference 28, pp. 4, 5, 6, 7, 8, 9, 10, 13, 14, 16, and 17.

TABLE 19: AOC A Soil Sample Description – January and February 2015

Sample ID	Sample Location	Physical Characteristics	Depth (inches bgs)	Date Sampled	References
Compared to Background Sample FKT-018-A Collected from 0 to 2 Inches bgs					
FKT-003-02-A	FKT-003	Dark brown topsoil, coarse sandy loam	0 to 2	1/26/2015	5, p. 6; 8, p. 12; 9, pp. 7, 8, 9; 28, p. 13
FKT-005-06-A	FKT-005	Dark brown topsoil, organic sandy loam	0 to 2	1/26/2015	5, p. 2; 8, pp. 10, 11; 9, pp. 13, 14, 15; 28, p. 4
FKT-006-02-A	FKT-006	Dark brown topsoil, sandy loam	0 to 2	1/23/2015	5, p. 2; 8, p. 7; 9, pp. 16, 17, 18; 28, p. 4
FKT-020-01-A	FKT-020	Dark brown topsoil, organic sandy loam	0 to 2	1/26/2015	5, p. 3; 8, p. 8; 9, pp. 51, 52, 53; 28, p. 7
FKT-027-02-E	FKT-027	Dark brown organic sandy loam	0 to 2	1/30/2015	5, p. 8; 8, p. 29; 9, pp. 69, 70, 71; 28, p. 17
FKT-028-05-A	FKT-028	Dark brown organic sandy loam	0 to 2	1/30/2015	5, p. 4; 8, p. 30; 9, pp. 72, 73, 74; 28, p. 8
FKT-028-02-A	FKT-028	Dark brown organic sandy loam	0 to 2	1/30/2015	5, p. 4; 8, p. 30; 9, pp. 72, 73, 74; 28, p. 8
FKT-030-04-A	FKT-030	Dark brown coarse organic sandy loam	0 to 2	2/4/2015	5, p. 4; 8, p. 33; 9, pp. 75, 76, 77; 28, p. 8
FKT-033-04-E	FKT-033	Very dark brown organic coarse sandy loam	0 to 2	1/29/2015	5, p. 4; 8, p. 20; 9, pp. 81, 82, 83; 28, p. 9
Compared to Background Sample FKT-018-01-B Collected from 2 to 6 Inches bgs					
FKT-001-07-B	FKT-001	Dark brown topsoil, organic sandy loam	2 to 6	1/26/2015	5, p. 2; 8, p. 10; 9, pp. 1, 2, 3; 28, p. 4
FKT-001-04-B	FKT-001	Dark brown topsoil, organic sandy loam	2 to 6	1/26/2015	5, p. 4; 8, p. 10; 9, pp. 1, 2, 3; 28, p. 4
FKT-002-04-B	FKT-002	Dark brown topsoil, coarse sandy loam	2 to 6	1/26/2015	5, p. 2; 8, pp. 12, 14; 9, pp. 4, 5, 6; 28, p. 4

TABLE 19: AOC A Soil Sample Description – January and February 2015					
Sample ID	**Sample Location**	**Physical Characteristics**	**Depth (inches bgs)**	**Date Sampled**	**References**
FKT-007-03-F	FKT-007	Variegated dark brown fill	2 to 6	1/23/2015	5, p. 7; 8, p. 7; 9, pp. 19, 20, 21; 28, p. 14
FKT-012-03-B	FKT-012	Black organic sandy loam	2 to 6	1/28/2015	5, p. 3; 8, p. 16; 9, pp. 33, 34, 35; 28, p. 5
FKT-020-04-B	FKT-020	Yellow brown coarse sandy loam	2 to 6	1/26/2015	5, p. 3; 8, p. 8; 9, pp. 51, 52, 53; 28, p. 7
FKT-021-05-B	FKT-021	Organic coarse sandy loam and coarse sandy loam	2 to 6	1/29/2015	5, p. 3; 8, p. 24; 9, pp. 54, 55, 56; 28, p. 7
FKT-021-08-B	FKT-021	Dark brown organic coarse sandy loam	2 to 6	1/29/2015	5, p. 8; 8, p. 25; 9, pp. 54, 55, 56; 28, p. 16
FKT-022-03-B	FKT-022	Dark brown topsoil, organic sandy loam	2 to 6	1/26/2015	5, p. 4; 8, p. 9; 9, pp. 57, 58, 59; 28, p. 8
FKT-026-02-B	FKT-026	Dark greyish brown organic coarse sandy loam	2 to 6	1/30/2015	5, p. 4; 8, p. 26; 9, pp. 66, 67, 68; 28, p. 8
FKT-034-02-B	FKT-034	Black organic coarse sandy loam	2 to 6	1/30/2015	5, p. 4; 8, p. 31; 9, pp. 84, 85, 86; 28, p. 9
Compared to Background Samples FKT-018-01-C and FKT-018-02-C Collected from 6 to 12 Inches bgs					
FKT-004-05-G	FKT-004	Topsoil with some coal and ash	6 to 12	1/26/2015	5, p. 2; 8, p. 13; 9, pp. 10, 11, 12; 28, p. 4
FKT-005-06-C	FKT-005	Dark brown topsoil, organic sandy loam	6 to 12	1/26/2015	5, p. 6; 8, pp. 10, 11; 9, pp. 13, 14, 15; 28, p. 14
FKT-006-03-C	FKT-006	Dark brown topsoil, sandy loam	6 to 12	1/23/2015	5, p. 6; 8, p. 7; 9, pp. 16, 17, 18; 28, p. 14
FKT-007-04-C	FKT-007	Variegated dark brown fill	6 to 12	1/23/2015	5, p. 7; 8, p. 7; 9, pp. 19, 20, 21; 28, p. 14
FKT-008-07-C	FKT-008	Dark brown organic topsoil, fill	6 to 12	1/23/2015	5, p. 2; 8, p. 6; 9, pp. 22, 23, 24; 28, p. 5
FKT-009-01-C	FKT-009	Dark brown coarse loamy sand	6 to 12	1/23/2015	5, p. 2; 8, p. 3; 9, pp. 25, 27, 29; 28, p. 5
FKT-010-02-C	FKT-010	Very dark brown coarse sandy loam	6 to 12	1/28/2015	5, p. 5; 8, pp. 18, 19; 9, pp. 30, 31, 32; 28, p. 10
FKT-010-01-C	FKT-010	Very dark brown organic coarse sandy loam	6 to 12	1/28/2015	5, p. 3; 8, p. 19; 9, pp. 30, 31, 32; 28, p. 5
FKT-014-08-C	FKT-014	Black organic sandy loam	6 to 12	1/28/2015	5, p. 7; 8, p. 18; 9, pp. 39, 40, 41; 28, p. 16

TABLE 19: AOC A Soil Sample Description – January and February 2015					
Sample ID	**Sample Location**	**Physical Characteristics**	**Depth (inches bgs)**	**Date Sampled**	**References**
FKT-015-05-C	FKT-015	Brown coarse sandy loam and dark yellowish brown coarse sandy loam	6 to 12	1/29/2015	5, p. 3; 8, p. 21; 9, pp. 42, 43, 44; 28, p. 7
FKT-016-09-C	FKT-016	Black organic sandy loam and dark brown yellowish brown coarse sandy loam	6 to 12	1/29/2015	5, p. 3; 8, p. 22; 9, pp. 45, 46, 47; 28, p. 7
FKT-021-07-C	FKT-021	Dark brown organic coarse sandy loam	6 to 12	1/29/2015	5, p. 4; 8, p. 24; 9, pp. 54, 55, 56; 28, p. 8
FKT-023-02-C	FKT-023	Yellowish red coarse sandy loam and dark greyish brown coarse loamy sand	6 to 12	2/4/2015	5, p. 4; 8, p. 32; 9, pp. 60, 61, 62; 28, p. 8
FKT-023-05-C	FKT-023	Dark yellowish brown organic coarse sandy loam and dark yellowish brown coarse sandy loam	6 to 12	2/4/2015	5, p. 4; 8, p. 32; 9, pp. 60, 61, 62; 28, p. 8
FKT-025-02-C	FKT-025	Dark brown organic coarse sandy loam and brownish yellow coarse sandy loam	6 to 12	1/30/2015	5, p. 4; 8, p. 28; 9, pp. 63, 64, 65; 28, p. 8
FKT-027-02-C	FKT-027	Dark brown organic sandy loam	6 to 12	1/30/2015	5, p. 8; 8, p. 29; 9, pp. 69, 70, 71; 28, p. 17
FKT-032-01-C	FKT-032	Black organic coarse sandy loam	6 to 12	1/29/2015	5, p. 4; 8, p. 25; 9, pp. 78, 79, 80; 28, p. 8
FKT-032-04-C	FKT-032	Variegated coarse sandy loam	6 to 12	1/29/2015	5, p. 4; 8, p. 25; 9, pp. 78, 79, 80; 28, p. 9
Compared to Background Sample FKT-018-01-D Collected from 12 to 24 Inches bgs					
FKT-002-04-D	FKT-002	Dark brown coarse sandy loam to sandy clay loam	12 to 24	1/26/2015	5, p. 6; 8, p. 14; 9, pp. 4, 5, 6; 28, p. 13
FKT-003-01-D	FKT-003	Dark brown topsoil, coarse sandy loam and brown yellow coarse sandy loam	12 to 24	1/26/2015	5, p. 2; 8, pp. 10, 12; 9, pp. 7, 8, 9; 28, p. 4
FKT-004-02-D	FKT-004	Dark yellow brown coarse loamy sand and yellowish brown coarse loamy sand	12 to 24	1/26/2015	5, p. 6; 8, p. 13; 9, pp. 10, 11, 12; 28, p. 13
FKT-009-06-D	FKT-009	Dark brown coarse sandy loam	12 to 24	1/23/2015	5, p. 2; 8, pp. 3, 4; 9, pp. 26, 28, 29; 28, p. 5

TABLE 19: AOC A Soil Sample Description – January and February 2015					
Sample ID	**Sample Location**	**Physical Characteristics**	**Depth (inches bgs)**	**Date Sampled**	**References**
FKT-012-03-D	FKT-012	Brown coarse sandy loam (12 to 16 inches bgs) and brown coarse sandy clay loam (16 to 24 inches bgs)	12 to 24	1/28/2015	5, p. 3; 8, p. 16; 9, pp. 33, 34, 35; 28, p. 5
FKT-013-03-D	FKT-013	Dark yellow brown coarse sandy loam with fill	12 to 24	1/28/2015	5, p. 3; 8, p. 17; 9, pp. 36, 37, 38; 28, p. 5
FKT-014-02-D	FKT-014	Coarse sandy loam with some organics	12 to 18	1/28/2015	5, p. 3; 8, p. 18; 9, pp. 39, 40, 41; 28, p. 6
FKT-015-03-D	FKT-015	Yellowish red coarse sandy loam (12 to 14 inches bgs) and dark yellowish brown sandy loam (14 to 24 inches bgs)	12 to 24	1/29/2015	5, p. 3; 8, p. 21; 9, pp. 42, 43, 44; 28, p. 6
FKT-016-06-D	FKT-016	Dark yellowish brown coarse sandy loam	12 to 24	1/29/2015	5, p. 3; 8, p. 23; 9, pp. 45, 46, 47; 28, p. 7
FKT-022-04-D	FKT-022	Yellow brown sandy clay loam	12 to 24	1/26/2015	5, p. 8; 8, p. 9; 9, pp. 57, 58, 59; 28, p. 17
FKT-030-03-D	FKT-030	Dark brown organic sandy loam containing fill	12 to 24	2/4/2015	5, p. 8; 8, p. 33; 9, pp. 75, 76, 77; 28, p. 18

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for project
A	Depth of 0 to 2 inches bgs (Ref. 9, p. 2)
AOC	Area of observed contamination
B	Depth of 2 to 6 inches bgs (Ref. 9, p. 2)
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs (Ref. 9, p. 2)
D	Depth of 12 to 24 inches bgs (Ref. 9, p. 2)
E	Depth of 0 to 2 inches bgs; duplicate of A depth interval (Ref. 9, p. 2)
F	Depth of 2 to 6 inches bgs; duplicate of B depth interval (Ref. 9, p. 2)
FKT	Former Kil-Tone Company
G	Depth of 6 to 12 inches bgs; duplicate of C depth interval (Ref. 9, p. 2)
ID	Identification number

Contaminated Concentrations – EPA January and February 2015 Removal Assessment

The soil samples listed in Table 20 were collected by EPA during the January and February 2015 removal assessment residential sampling event (Refs. 5, pp. i, 1 through 8; 28, pp. 4 through 18). All samples in Table 20 meet the criteria for observed contamination in accordance with Reference 1, Section 5.01, General Consideration and Table 2-3. Background levels used in Table 20 are provided according to depth (for more information on how background levels were established, see section 5.0.1 General Considerations – Background Levels, of this HRS documentation record). All soil samples were analyzed by the EPA Region 2 Laboratory for TAL metals using EPA Method 200.7 (Refs. 5, p. 10; 40, p. 3). The EPA Region 2 laboratory reviewed the data in accordance with SOP G-26, Revision 1.3 (Refs. 31; 41, pp. 5 to 11). The data review checklists are provided in Reference 52. The RLs are listed on the analytical data sheets in Reference 5, pp. 13, 15, 17, 20, 23, 26, 35, 37, 38, 40, 43, 45, 47, 50, 52, 54, 55, 65, 66, 67, 68, 70, 73, 74, 75, 78, 82, 83, 84, 86, 87, 89, 90, 103, 134, 139, 144, 153, 163, 172, 187, 190, 200, 201, and 207. Each RL is sample-specific and corresponds to the lowest demonstrated level of acceptable quantitation; it is adjusted for preparation weights and volumes, and any dilutions performed. The RLs are equivalent to SQLs as defined in HRS Section 1.1, Definitions (Refs. 1, p. 51586; 31).

TABLE 20: Analytical Results for AOC A Soil Samples – January and February 2015

Sample ID	Hazardous Substance	Concentration (mg/kg)	RL (mg/kg)	References
Compared to Background Sample FKT-018-01-A Collected from 0 to 2 Inches bgs (Arsenic, 6.4 mg/kg and Lead, 57 mg/kg) (Ref. 5, pp. 56)				
FKT-003-02-A	Lead	210	0.76	5, p. 139
FKT-005-06-A	Lead	1,300	0.76	5, p. 23
FKT-006-02-A	Lead	1,400	0.76	5, p. 26
FKT-020-01-A	Lead	500	0.75	5, p. 65
FKT-028-05-A	Arsenic	24	0.81	5, p. 83
FKT-028-02-A	Lead	290	0.79	5, p. 82
FKT-030-04-A	Lead	1,800	0.87	5, p. 84
FKT-027-02-E	Lead	210	0.76	5, p. 201
FKT-033-04-E	Lead	530	0.71	5, p. 89
Compared to Background Sample FKT-018-01-B Collected from 2 to 6 Inches bgs (Arsenic, 5.7 mg/kg and Lead, 47 mg/kg) (Ref. 5, p. 57)				
FKT-001-07-B	Arsenic	81	0.78	5, p. 13
FKT-001-04-B	Lead	1,100	0.78	5, p. 93
FKT-002-04-B	Lead	270	0.74	5, p. 15
FKT-012-03-B	Lead	750	0.70	5, p. 43
FKT-020-04-B	Arsenic	67	0.71	5, p. 66
FKT-021-05-B	Arsenic	100	0.77	5, p. 68
FKT-021-08-B	Lead	440	0.72	5, p. 187
FKT-022-03-B	Lead	1,300	0.74	5, p. 70
FKT-026-02-B	Arsenic	75	0.71	5, p. 78
FKT-034-02-B	Lead	910	0.74	5, p. 90
FKT-007-03-F	Arsenic	1,000	0.82	5, p. 160

TABLE 20: Analytical Results for AOC A Soil Samples – January and February 2015				
Sample ID	**Hazardous Substance**	**Concentration (mg/kg)**	**RL (mg/kg)**	**References**
Compared to Background Samples FKT-018-01-C and FKT-018-02-C Collected from 6 to 12 Inches bgs (Arsenic, 3.1 mg/kg and Lead, 19 mg/kg) (Ref. 5, pp. 58, 63)				
FKT-005-06-C	Arsenic	100	0.79	5, p. 150
FKT-006-03-C	Arsenic	300	0.69	5, p. 153
FKT-007-04-C	Lead	2,000	0.72	5, p. 163
FKT-008-07-C	Arsenic	69	0.73	5, p. 35
FKT-008-07-C	Lead	1,300	0.73	5, p. 35
FKT-009-01-C	Lead	380	0.68	5, p. 37
FKT-010-02-C	Arsenic	44	0.83	5, p. 103
FKT-010-01-C	Lead	2,500	0.72	5, p. 40
FKT-014-08-C	Lead	250	0.68	5, p. 172
FKT-015-05-C	Arsenic	32	0.77	5, p. 52
FKT-016-09-C	Lead	340	0.72	5, p. 55
FKT-021-07-C	Lead	440	0.73	5, p. 69
FKT-023-02-C	Arsenic	65	0.66	5, p. 73
FKT-023-05-C	Lead	310	0.71	5, p. 74
FKT-025-02-C	Arsenic	35	0.68	5, p. 75
FKT-027-02-C	Arsenic	35	0.70	5, p. 200
FKT-032-01-C	Arsenic	12	0.68	5, p. 86
FKT-032-04-C	Lead	1,700	0.69	5, p. 87
FKT-004-05-G	Arsenic	64	0.71	5, p. 20
Compared to Background Sample FKT-018-01-D Collected from 12 to 24 Inches bgs (Arsenic 3.3 mg/kg and Lead, 8.7 mg/kg) (Ref. 5, p. 59).				
FKT-002-04-D	Arsenic	61	0.76	5, p. 134
FKT-003-01-D	Arsenic	37	0.64	5, p. 17
FKT-004-02-D	Lead	260	0.70	5, p. 144
FKT-009-06-D	Arsenic	28	0.70	5, p. 38
FKT-012-03-D	Arsenic	27	0.70	5, p. 44
FKT-013-03-D	Arsenic	29	0.74	5, p. 45
FKT-013-03-D	Lead	920	0.74	5, p. 45
FKT-014-02-D	Arsenic	18	0.73	5, p. 47
FKT-015-03-D	Lead	680	0.71	5, p. 50
FKT-016-06-D	Arsenic	110	0.68	5, p. 54
FKT-022-04-D	Arsenic	120	0.68	5, p. 190
FKT-030-03-D	Arsenic	23	0.72	5, p. 207

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for project
A	Depth of 0 to 2 inches bgs (Ref. 9, p. 2)
AOC	Area of observed contamination

Table 20 – Notes Continued:

B	Depth of 2 to 6 inches bgs (Ref. 9, p. 2)
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs (Ref. 9, p. 2)
D	Depth of 12 to 24 inches bgs (Ref. 9, p. 2)
E	Depth of 0 to 2 inches bgs; duplicate of A depth interval (Ref. 9, p. 2)
F	Depth of 2 to 6 inches bgs; duplicate of B depth interval (Ref. 9, p. 2)
FKT	Former Kil-Tone Company
G	Depth of 6 to 12 inches bgs; duplicate of C depth interval (Ref. 9, p. 2)
ID	Identification number
mg/kg	Milligrams per kilogram
RL	Reporting limit

Attribution

The Former Kil-Tone Company (Kil-Tone) began operations at the property in late 1910s manufacturing the pesticide arsenate of lead (Ref. 12, p. 2). Lead arsenate is a pentavalent form of inorganic arsenic, which exists naturally as white crystals with no discernible odor, and contains about 22 percent arsenic and is slightly soluble in cold water (Ref. 32, p. 1). However, based on the Sanborn Fire Insurance Maps dated 1919 and 1925, buildings previously located on the property included an acid plant, a tank room, an engine room, and a manufacturing building for grinding, mixing, pressing, and storage of pesticides (Refs. 12, pp. 2, 3; 16, pp. 7, 8). A laboratory was constructed around 1919 on the southwestern corner of the property (Ref. 16, p. 8). In August 1988, the EPA banned all insecticidal uses of lead arsenate (Ref. 33, p. 2).

Information obtained from the Vineland Chamber of Commerce and the New Jersey Experiment Stations that date between 1917 and 1926 indicate that specific products manufactured by Kil-Tone included Green Cross Dry Powdered Arsenate of Lead, Green Cross Standard Arsenate of Lead (paste), Green Cross Sulpho-arsenate Powder, Green Cross Sulphur and Arsenate of Lead Mixture, Modified Kil-Tone, Improved Kil-Tone, Fruit Kil-Tone, Bordeaux Mixture, Dry Powdered Arsenite of Zinc, and Beetle Mort (Refs. 17, pp. 1, 2; 34, pp. 9, 13, 14; 35, pp. 9, 19, 20; 36, pp. 10, 17, 18; 37, pp. 10, 13, 19, 20; 38, pp. 26-(106), 26-(154)). Based on the timeframe during which FKT operated, these products were regulated under the Insecticide Act of 1910 (Ref. 69, p. 1; 70, p. 126).

Early pesticide control laws were aimed at protecting consumers against ineffective products and deceptive labeling (Ref. 69, p. 2). From 1929 to 1932, the USDA issued Notices of Judgment under the Insecticide Act against the Lucas Kil-Tone Co. of Vineland, New Jersey for the adulteration and misbranding of various products including Beetle Mort, Green Cross Nico-Tone, Paris Green and Bordo Lead Arsenate (Refs. 57, pp. 125, 126, 127, 133, 134; 70, p. 66, 67, 69, 70; 71, p. 88). Arsenic in water-soluble form, expressed as metallic, was present at higher concentrations than declared on the labels (Refs. 57, pp. 125, 127, 133; 70, p. 70; 71, p. 88). In some cases, the products were misbranded because they contained ingredients that were not declared (for example calcium arsenate) on the label (Ref. 57, p. 127). The ATSDR Toxicological Profile for arsenic indicates that arsenic is expected to accumulate in soil in areas where it was used in agriculture (Ref. 76, pp. 324, 363). Any pesticide in AOC A that was created in violation of the pesticide control laws or used in any way other than the labeled use would be a CERCLA hazardous substance.

In August 2014, NJDEP collected surface soil samples from AOC A, which is comprised of contaminated soil on the FKP property, as well residential and commercial properties located about 1 block north, south, and east of the FKT property (Ref. 12, pp. 32, 33, 38 through 42). Analytical results of the AOC A samples indicated the presence of arsenic (up to 3,000 mg/kg in sample USC-SUB-9A) and lead (up to 3,100 mg/kg in USC-SUB-9A) above background levels (Refs. 24, pp. 16, 49, 152; 51, pp. 3, 13, 38). Sample USC-SUB-9A was collected in the northwestern portion of the FKT property (Ref. 12, pp. 10, 38). Based on the Sanborn maps of the FKT property, the former rail spurs entered the FKT property in the northwestern corner (Ref. 16, pp. 5, 6, 7, 8).

EPA collected surface soil samples from AOC A in January and February 2015 (Ref. 9, p. i). The AOC A samples contained arsenic and lead above background levels (see also Tables 18 and 20 of this HRS documentation record). The highest concentration of arsenic (1,000 mg/kg) was detected in the 2- to 6-inch interval on a property located about 190 feet northwest of the FKT property (Refs. 5, p. 160; 9, pp. 19 to 21). The highest concentration of lead (2,500 mg/kg) was detected in the 6- to 12-inch interval on a property located about 380 feet northwest of the FKT property (Refs. 5, p. 40; 9, pp. 30 to 33) (see also Figure 5 of this HRS documentation record).

Information regarding actual operational activities at Kil-Tone is limited; therefore, information regarding modes of deposition and waste disposal is limited. In a 1989 affidavit, a resident confirmed that while Kil-Tone was in operation, a green and white dust typically coated the ground and rooftops, as well as

along the shore of Tarkiln Branch, near the FKT property (Ref. 21, pp. 1, 2). Kil-Tone manufactured arsenate of lead (lead arsenate), which is a powdered insecticide (Refs. 34, p. 9; 35, p. 9).

In June 2015, EPA ERT initiated a high resolution characterization study using CPT/XRF to determine the horizontal and vertical extent of arsenic and lead contamination in soil on the FKT property (Ref. 67, pp. 2, 3, 5). XRF screening results using the CPT/XRF equipment during the characterization study indicated arsenic concentrations as high as 47,000 ppm and lead concentrations as high as 119,280 ppm in the soils near the former rail spur (Ref. 67, pp. 2, 3, 5). According to the Sanborn Fire Insurance maps of 1919, 1925, 1949, and 1968, there were rail spurs on the north and west sides of the FKT property (Ref. 16, p. 5, 6, 7, 8). Also, field XRF of soil borings collected near the location of the former grinding house recorded concentrations of both arsenic and lead at 100 percent (Ref. 67, p. 2). The 1919 and 1925 Sanborn maps depict the grinding room (house) in the southern portion of the property along E. Chestnut Avenue (Ref.; 16, pp. 7, 8). In addition, product was observed in a soil sample at 18 to 24 inches bgs (Ref. 67, p. 8). During the NJDEP 2014 and the EPA 2015 sampling events, fill material similar to that observed on the FKT property, also was observed while collecting soil samples on the residential and commercial properties (Refs. 8, pp. 5, 6, 7, 8, 11, 13, 16, 17, 19, 20, 21, 22, 31, 32, 33; 23, pp. 1, 2, 3, 4; 51, pp. 5, 6, 8).

To attribute arsenic and lead contamination to AOC A, concentrations of arsenic and lead in soil samples collected from un-impacted areas (two local parks and a cemetery) and soil samples collected within AOC A with low arsenic and lead concentrations were evaluated (Ref. 9, pp. 48, 49, 50). The background evaluation established background levels and identified samples that were adequate for comparison to contaminated samples collected within AOC A (see section 5.0.1 General Considerations – Background Levels, of this HRS documentation record). It was determined that arsenic and lead concentrations in soil samples collected from Landis Park (FKT-018), located about 1 mile north of the FKT property, are adequate to represent background levels (Refs. 3; 5, pp. 56 through 59, 63; 9, pp. 48 through 50; 28, p. 7) (also see Figure 3 of this HRS documentation record). The background levels for arsenic range from 3.1 mg/kg to 6.4 mg/kg and the background levels for lead ranged from 8.3 to 57 mg/kg (Refs. 5, pp. 56, 57, 58, 59, 63; 9, pp. i, 48, 49, 50). Using the established background levels, about 32 commercial and residential properties were found to be contaminated and comprise AOC A (see Figure 5 of this HRS documentation record).

Soil within AOC A likely became contaminated because of the use of fill material, surface water runoff, and air deposition (see Refs. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33; 21, pp. 1, 2; 23, pp. 1, 2, 3, 4 (see also Section 4.1.2.1.1 Observed Release – Direct Observation, of this HRS documentation record). During sampling activities, fill material was observed on the FKT property and several residential properties within AOC A (Refs. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33, 34; 23, pp. 1, 2, 3, 4). The fill material was mixed with the soil, which was primarily course sandy loams (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Fill material is not continuous throughout individual properties or on all properties that comprise AOC A (Ref. 8, pp. 4, 5, 6, 7, 8, 11, 13, 16, 17, 19, 21, 22, 24, 25, 27, 29, 31, 33). Arsenic and lead have been detected at varying concentrations in soil samples collected from AOC A (Ref. 5, pp. 12 through 210). This inconsistent nature of arsenic and lead contamination in the soils of AOC A is characteristic for deposition by wind-blown particulates (Ref. 76, pp. 3, 15, 313). Additionally, EPA conducted isotope analysis on isotopes of copper found in on-site surface water and off-site surrounding residential soil, Tarkiln Branch sediment, and Tarkiln and Parvin confluence sediment samples. The results of this analysis indicate that the copper in these samples originated from the FKT property (Ref. 83).

Kil-Tone began operations at the property in the late 1910s manufacturing the pesticide arsenate of lead (Ref. 12, p. 2). Lead arsenate is a pentavalent form of inorganic arsenic (Ref. 32, p. 1). In a 1989 affidavit, a resident confirmed that while Kil-Tone was in operation, a green and white dust typically coated the ground and rooftops, as well as along the shore of Tarkiln Branch, near the FKT property (Ref. 21, pp. 1, 2).

Potential off-site sources of contamination in the Vineland area that were evaluated for attribution purposes include the Lerco Fuel Company (Lerco), Vineland Chemical Company, and Iceland Coin and Laundry (Refs. 3; 25, p. 1; 42, pp. i, 7, 14; 68).

Lerco is a former fuel distribution facility located at 520 East Chestnut Avenue about 75 feet north of the FKT property (Refs. 12, pp. 4, 16, 17; 19, pp. 14, 15; 25, p. 1). Initial environmental investigations regarding petroleum releases and removal of an underground storage tank at the Lerco property began in 1989 (Ref. 25, p. 1). Since then, Lerco has conducted several investigations to remediate petroleum-related contamination related to the petroleum releases (Refs. 25, pp. 1, 3, 17 to 29). In addition to petroleum-related contaminants, arsenic and lead have been detected in soil and ground water samples at the Lerco property (Refs. 19, pp. 14, 15, 17 through 20; 25, pp. 20 to 29). Arsenic was detected up to 1,940 milligrams per kilogram (mg/kg) and lead was detected up to 3,280 mg/kg is soil samples collected within 2 feet of the ground surface (Ref. 19, p. 14). The highest concentrations of arsenic and lead in soil and ground water samples were as follows: arsenic, up to 20,500 parts mg/kg in soil and up to 33,000 micrograms per liter (µg/L) in ground water; and lead, up to 28,700 mg/kg in soil and up to 630 µg/L in ground water (Ref. 19, pp. 14, 15, 18, 19). Based on the results of samples collected at Lerco, high concentrations of arsenic have been detected in conjunction with high lead concentrations (Ref. 19, pp. 14, 15). The presence of arsenic in conjunction with lead indicates that it is likely that some portion of the lead contamination may not be petroleum related.

Vineland Chemical Company, located about 2.7 miles northwest of the FKT property, and Iceland Coin Laundry, located about 1.65 miles southwest of the FKT property are NPL sites located in Vineland, New Jersey (Ref. 42, pp. i, 7, 14). Vineland Chemical Company manufactured arsenic-based herbicides from about 1950 to 1994 (Ref. 11, p. 1). The contaminant of concern is arsenic and the media impacted include ground water, sediment, and on-site soils (Refs. 11, p. 1; 42, p. 5). Cleanup of the Vineland Chemical Company NPL site is underway (Refs. 11, pp. 2, 3; 42, p. 3). Vineland Chemical is located about 2.7 miles northwest of the FKT property (Ref. 42, p. 7). During the EPA January and February 2015 removal assessment, EPA collected background samples from two locations (Vineland Cemetery [FKT-036] and Landis Park [FKT-018]) between Vineland Chemical Company and the FKT property (Ref. 9, pp. 48, 49, 50, 87, 88, 89) (see Figure 3 of this HRS documentation record). Because of their locations and arsenic and lead concentrations, the background sampling locations are not likely impacted by past operation at Vineland Chemical Company and represent background levels for the FKT property (Ref. 5, pp. 56 through 63 and 114 through 121).

Iceland Coin Laundry is a ground water plume that is contaminated with mercury and volatile organic compounds (VOCs) including tetrachloroethylene, trichloroethylene, and 1,2-dichloroethene (Refs. 7, p. 1; 42, pp. i, 12). Lead and arsenic, which were detected in AOC A, are not contaminants of concern for the Iceland Coin Laundry NPL site (Ref. 42, p. 12). Iceland Coil and Laundry is located about 1.65 miles southwest of the FKT property (Ref. 42, p. 7).

Bob's Transmission, located at 611 S. East Boulevard, and a former gasoline station, located at 511 Paul Street, may be potential sources of contamination in the vicinity of Source No. 1. Bob's Transmission or the address of 611 S East Boulevard is not listed in any EPA or New Jersey regulatory databases (Ref. 86, pp. 1 through 23). Also, samples were not collected from this property in 2014 or 2015 (Ref. 9, p. ii; 12, pp. through 17). The 511 Paul Street property is listed in the EPA Resources Conservation and Recovery Act and Air Facility System, and in the New Jersey Environmental Management System (Refs. 86, p. 2; 87). The address is listed as Agway, Inc. Energy Products Vineland Bulk Plant (Ref. 86, p. 2; 87). Agway is listed as a petroleum products wholesaler, except for bulk stations and terminals; and as a fuel oil dealer (Ref. 87). Information regarding environmental investigations at Agway were not available at the time of this HRS documentation record; however, it appears that New Jersey led remedial and cleanup activities have been conducted at this property (Ref. 87). Currently, the property appears to be vacant (see Figure 2 of this HRS documentation record). Samples collected from the 511 Paul Street property in 2014 contained arsenic at concentrations that ranged from 1.6 mg/kg to 200 mg/kg and lead at concentrations that ranged from 3.9 mg/kg to 190 mg/kg (Ref. 12, pp. 13, 14; 24, pp. 121 to 144). These concentrations are lower than arsenic (up to 3,000 mg/kg) and lead (up to 3,100 mg/kg) concentrations

detected at the Former Kil-Tone property in 2014 (Ref. 12, pp. 11, 12; 24, pp. 11 through 18, 22 through 51).

The hazardous substances listed below (arsenic and lead) have been detected in shallow soils (less than 2 feet bgs) on residential and commercial properties that comprise AOC A, indicating the likelihood of exposure to resident population at residences or work places that reside at the residences property (see also Tables 17, 18, and 20 for AOC A in Section 5.0.1 of this HRS documentation record).

Hazardous Substances in the Release

Arsenic
Lead

5.1 RESIDENT POPULATION THREAT

5.1.1 LIKELIHOOD OF EXPOSURE

Table 21 lists shallow (less than 2 feet bgs) soil samples collected in January and February 2015 from residential properties located within AOC A (Refs. 5, pp. 1 through 9; 9, pp. 1 through 47, 51, 52, 54 through 87). All residential soil samples listed in Table 21 are part of AOC A; therefore the distance of the population at each residence from the area of observed contamination is 0 feet (Ref. 9, pp. 2, 5, 8, 11, 14, 17, 20, 23, 27, 28, 31, 34, 37, 40, 43, 46, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85) (see also Figure 2 of this HRS documentation record).

Table 21: Likelihood of Exposure

Sample Number	Date Sampled	Number of Resident Targets	References
FKT-001-07-B	1/26/2015	9	5, p. 2; 9, pp. 1, 2, 3
FKT-001-04-B	1/26/2015		5, p. 4; 9, pp. 1, 2, 3
FKT-003-01-D	1/26/2015	1	5, p. 2; 9, pp. 7, 8, 9
FKT-003-02-A	1/26/2015		5, p. 6; 9, pp. 7, 8, 9
FKT-004-05-G	1/26/2015	5	5, p. 2; 9, pp. 10, 11, 12
FKT-004-02-D	1/26/2015		5, p. 6; 9, pp. 10, 11, 12
FKT-005-06-C	1/26/2015	5	5, p. 6; 9, pp. 13, 14, 15
FKT-005-06-A	1/26/2015		5, p. 2; 9, pp. 13, 14, 15
FKT-006-03-C	1/23/2015	3	5, p. 6; 9, pp. 16, 17, 18
FKT-006-02-A	1/23/2015		5, p. 2; 9, pp. 16, 17, 18
FKT-007-03-F	1/23/2015	1	5, p. 7; 9, pp. 19, 20, 21
FKT-007-04-C	1/23/2015		5, p. 7; 9, pp. 19, 20, 21
FKT-008-07-C	1/23/2015	8	5, p. 2; 9, pp. 22, 23, 24
FKT-009-06-D	1/23/2015	5	5, p. 2; 9, pp. 26, 28, 29
FKT-009-01-C	1/23/2015		5, p. 2; 9, pp. 25, 27, 29
FKT-010-02-C	1/28/2015	2	5, p. 5; 9, pp. 30, 31, 32
FKT-010-01-C	1/28/2015		5, p. 3; 9, pp. 30, 31, 32
FKT-012-03-D	1/28/2015	5	5, p. 3; 9, pp. 33, 34, 35
FKT-012-03-B	1/28/2015		5, p. 3; 9, pp. 33, 34, 35
FKT-013-03-D	1/28/2015	4	5, p. 3; 9, pp. 36, 37, 38
FKT-014-02-D	1/28/2015	2	5, p. 3; 9, pp. 39, 40, 41
FKT-014-08-C	1/28/2015		5, p. 7; 9, pp. 39, 40, 41
FKT-015-05-C	1/29/2015	5	5, p. 3; 9, pp. 42, 43, 44
FKT-015-03-D	1/29/2015		5, p. 3; 9, pp. 42, 43, 44
FKT-016-06-D	1/29/2015	20	5, p. 3; 9, pp. 45, 46, 47
FKT-016-09-C	1/29/2015		5, p. 3; 9, pp. 45, 46, 47
FKT-020-04-B	1/26/2015	2	5, p. 3; 9, pp. 51, 52, 53
FKT-020-01-A	1/26/2015		5, p. 3; 9, pp. 51, 52, 53
FKT-021-05-B	1/29/2015	7	5, p. 3; 9, pp. 54, 55, 56
FKT-021-07-C	1/29/2015		5, p. 4; 9, pp. 54, 55, 56
FKT-021-08-B	1/29/2015		5, p. 8; 9, pp. 54, 55, 56

Table 21: Likelihood of Exposure			
Sample Number	**Date Sampled**	**Number of Resident Targets**	**References**
FKT-022-04-D	1/26/2015	9	5, p. 8; 9, pp. 57, 58, 59
FKT-022-03-B	1/26/2015		5, p. 4; 9, pp. 57, 58, 59
FKT-023-02-C	2/4/2015	3	5, p. 4; 9, p. 60, 61, 62
FKT-023-05-C	2/4/2015		5, p. 4; 9, pp. 60, 61, 62
FKT-025-02-C	1/30/2015	4	5, p. 4; 9, pp. 63, 64, 65
FKT-026-02-B	1/30/2015	2.86[1]	5, p. 4; 9, pp. 66, 67, 68; 30
FKT-027-02-C	1/30/2015	2.86[1]	5, p. 8; 9, pp. 69, 70, 71; 30
FKT-027-02-E	1/30/2015		5, p. 8; 9, pp. 69, 70, 71; 30
FKT-028-05-A	1/30/2015	2.86[1]	5, p. 4; 9, pp. 72, 73, 74; 30
FKT-028-02-A	1/30/2015		5, p. 4; 9, pp. 72, 73, 74; 30
FKT-030-03-D	2/4/2015	6	5, p. 8; 9, pp. 75, 76, 77
FKT-030-04-A	2/4/2015		5, p. 4; 9, pp. 75, 76, 77
FKT-033-04-E	1/29/2015	4	5, p. 4; 9, pp. 81, 82, 83
FKT-034-02-B	1/30/2015	7	5, p. 4; 9, pp. 84, 85, 86

Notes:

[1] Population is the Cumberland County, New Jersey persons per household factor value from the U. S. Census Bureau (2009 to 2013) (Ref. 30)

Number of sampling station on property

Site-specific property ID assigned for project

A Depth of 0 to 2 inches bgs (Ref. 9, p. 2)

B Depth of 2 to 6 inches bgs (Ref. 9, p. 2)

bgs Below ground surface

C Depth of 6 to 12 inches bgs (Ref. 9, p. 2)

D Depth of 12 to 24 inches bgs (Ref. 9, p. 2)

E Depth of 0 to 2 inches bgs; duplicate of A depth interval (Ref. 9, p. 2)

F Depth of 2 to 6 inches bgs; duplicate of B depth interval (Ref. 9, p. 2)

FKT Former Kil-Tone Company

G Depth of 6 to 12 inches bgs; duplicate of C depth interval (Ref. 9, p. 2)

Resident Population Threat Likelihood of Exposure Factor Category Value: 550
(Ref. 1, Section 5.1.1)

5.1.2 WASTE CHARACTERISTICS

5.1.2.1 Toxicity

The toxicity values for the hazardous substances detected in the area of observed contamination samples are summarized in Table 22.

TABLE 22: Soil Exposure Toxicity

Hazardous Substance	Toxicity Factor Value	Reference
Arsenic	10,000	2, p. BI-1
Lead	10,000	2, p. BI-7

For the soil exposure resident threat, arsenic and lead have the highest toxicity factor value of 10,000 (Ref. 2, pp. BI-1, BI-7).

Toxicity Factor Value: 10,000
(Ref. 1, Section 5.1.2.1)

5.1.2.2 Hazardous Waste Quantity

TABLE 23: Hazardous Waste Quantity

Area of Observed Contamination Letter	Type	Area Hazardous Waste Quantity
A	Contaminated Soil	3.88

The hazardous constituent quantity for AOC A is not adequately determined. AOC A is comprised of contaminated soil on about 32 residential and commercial properties that contain elevated concentrations of arsenic and lead (see Tables 18 and 20 of this HRS documentation record). The approximate area of observed contamination, excluding impervious surfaces, on each property was determined and the area of all properties was summed to obtain the source HWQ for AOC A (Ref. 55). The combined HWQ for AOC A is about 51,827 square feet. Per HRS Section 2.4.2.2, for the soil exposure pathway, the HWQ factor value is the higher of either the value from HRS Table 2-6 or 10.

Hazardous Waste Quantity Factor Value: 10
(Ref. 1, Section 2.4.2.2)

5.1.2.3 Calculation of Waste Characteristics Factor Category Value

For the waste characteristics, both arsenic and lead have the highest toxicity factor value of 10,000 (Ref. 2, pp. BI-1, BI-7). The waste characteristics factor category was 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 (see Table 22 of this HRS documentation record): 10,000
Hazardous Waste Quantity Factor Value: 10

Toxicity Factor Value ×
Hazardous Waste Quantity Factor Value: 1×10^5

Waste Characteristics Factor Category Value: 18
(Ref. 1, Table 2-7)

5.1.3 RESIDENT POPULATION THREAT TARGETS

The soil samples listed in Table 24 were collected during the EPA January and February 2015 removal assessment residential sampling event (Refs. 5, pp. 1 to 9; 9, pp. 1 to 47, 51, 52, 54 to 87) (see also Figure 2 of this HRS documentation record). Properties included in AOC A that were vacant at the time of sampling were not evaluated as Level I targets (Ref. 9, pp. 4, 78).

Level I Concentrations

During the EPA January and February 2015 removal assessment residential sampling event, soil samples were collected from residential properties located north, east, and southeast of the FKT property (Ref. 9, pp. 1 to 47, 51, 52, 54 to 87) (see also Figure 2 of this HRS documentation record). The soil samples were collected from multiple stations across each property and at multiple depth intervals including 0 to 2 inches bgs, 2 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 24 inches bgs (Ref. 15, pp. 3, 4, 5). Sample analysis and data review were conducted by the EPA Region 2 Laboratory (Refs. 5, pp. i, 1; 28, p. i).

TABLE 24: AOC A Level I Concentrations

Sample ID	Hazardous Substance	Concentration	Background Level	Benchmark Concentration	Benchmark	References
Compared to Background Sample FKT-018-01-A Collected from 0 to 2 Inches bgs						
FKT-028-05-A	Arsenic	24 mg/kg	6.4 mg/kg	0.71 mg/kg	CRSC[2]	2, p. BII-14; 5, pp. 56, 83
Compared to Background Sample FKT-018-01-B Collected from 2 to 6 Inches bgs						
FKT-001-07-B	Arsenic	81 mg/kg[1]	5.7 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 13, 57
FKT-020-04-B	Arsenic	67 mg/kg[1]	5.7 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 57, 66
FKT-021-05-B	Arsenic	100 mg/kg[1]	5.7 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 57, 68
FKT-026-02-B	Arsenic	75 mg/kg[1]	5.7 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 57, 78
FKT-007-03-F	Arsenic	1,000 mg/kg[1]	5.7 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 57, 160
Compared to Background Sample FKT-018-01-C and FKT-018-02-C Collected from 6 to 12 Inches bgs						
FKT-005-06-C	Arsenic	100 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 150
FKT-006-03-C	Arsenic	300 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 153
FKT-008-07-C	Arsenic	69 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 35, 58, 63
FKT-010-02-C	Arsenic	44 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 103
FKT-015-05-C	Arsenic	32 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 52, 58, 63
FKT-023-02-C	Arsenic	65 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 73
FKT-025-02-C	Arsenic	35 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 75
FKT-027-02-C	Arsenic	35 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 58, 63, 200
FKT-004-05-G	Arsenic	64 mg/kg[1]	3.1 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 20, 58, 63

		TABLE 24: AOC A Level I Concentrations				
Sample ID	**Hazardous Substance**	**Concentration**	**Background Level**	**Benchmark Concentration**	**Benchmark**	**References**
Compared to Background Sample FKT-018-01-D Collected from 12 to 24 Inches bgs						
FKT-003-01-D	Arsenic	37 mg/kg[1]	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 17, 59
FKT-009-06-D	Arsenic	28 mg/kg	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 38, 59
FKT-012-03-D	Arsenic	27 mg/kg	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 44, 59
FKT-013-03-D	Arsenic	29 mg/kg	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 45, 59
FKT-014-02-D	Arsenic	18 mg/kg	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 47, 59
FKT-016-06-D	Arsenic	110 mg/kg[1]	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 54, 59
FKT-022-04-D	Arsenic	120 mg/kg[1]	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 59, 190
FKT-030-03-D	Arsenic	23 mg/kg	3.3 mg/kg	0.71 mg/kg	CRSC	2, p. BII-14; 5, pp. 59, 207

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for project
[1]	These concentrations also exceed the reference dose HRS benchmark of 30 mg/kg (Ref. 2, p. BII-14
[2]	Cancer risk screening concentration (Ref. 2, p. BII-14).
A	Depth of 0 to 2 inches bgs (Ref. 9, p. 2)
AOC	Area of observed contamination
B	Depth of 2 to 6 inches bgs (Ref. 9, p. 2)
bgs	Below ground surface
C	Depth of 6 to 12 inches bgs (Ref. 9, p. 2)
CRSC	Cancer Risk Screening Concentration
D	Depth of 12 to 24 inches bgs (Ref. 9, p. 2)
F	Depth of 2 to 6 inches bgs; duplicate of B depth interval (Ref. 9, p. 2)
FKT	Former Kil-Tone Company
G	Depth of 6 to 12 inches bgs; duplicate of C depth interval (Ref. 9, p. 2)
ID	Identification number
mg/kg	Milligrams per kilogram

5.1.3.1 Resident Individual

Area of Observed Contamination Letter: A
Level of Contamination (Level I/Level II): I
About 116.49 residents on 32 residential and commercial properties meet the criteria for resident individual; 116.49 residents are evaluated as actual contamination targets at Level I and II concentrations. All residential soil samples listed in Table 25 are part of AOC A; therefore the residents at these properties are evaluated as resident individuals (Refs. 1, p. 9, pp. 2, 5, 8, 11, 14, 17, 20, 23, 27, 28, 31, 34, 37, 40, 43, 46, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85) (see Figure 2 of this HRS documentation record). The closest resident individuals to the FKT property are located at FKT-001, FKT-020, and FKT-022 (Ref. 9, pp. 2, 3, 51, 52, 57, 58).
References: 1, p. 51647; 2, p. BII-14; 5, pp. 13, 17, 20, 35, 38, 44, 45, 47, 52, 54, 66, 68, 73, 75, 78, 83, 103, 150, 153, 160, 190, 200).

Resident Individual Factor Value: 50
(Ref. 1, Section 5.1.3.1)

5.1.3.2 Resident Population

The soil samples listed in Table 25 were collected during the EPA January and February 2015 removal assessment residential sampling event. The shallow soil samples were collected within 24 inches (2 feet) of the ground surface (Ref. 15, pp. 3, 4, 5). The population at the residences were obtained by EPA while conducting site access interviews with residents and verified during sampling activities if the residents were available (Refs. 9, p. 1; 56, p. 1). If the resident was not available, the U.S. Census Bureau persons per household factor value of 2.86 for Cumberland County, New Jersey was used (Ref. 30, p. 1). Properties included in AOC A that were vacant at the time of sampling were not evaluated as Level I targets (Ref. 9, pp. 4, 78).

5.1.3.2.1 Level I Population

TABLE 25: Level I Resident Population Targets

Area of Observed Contamination Letter	Sample Number	Number of Residences	Total Number of Residents	References
AOC A	FKT-001-07-B	1	9	5, p. 2; 9, pp. 1, 2
AOC A	FKT-003-01-D	1	1	5, p. 2; 9, pp. 7, 8
AOC A	FKT-004-05-G	1	5	5, p. 2; 9, pp. 10, 11
AOC A	FKT-005-06-C	1	5	5, p. 6; 9, pp. 13, 14
AOC A	FKT-006-03-C	1	3	5, p. 6; 9, pp. 16, 17
AOC A	FKT-007-03-F	1	1	5, p. 7; 9, pp. 19, 20
AOC A	FKT-008-07-C	2	8	5, p. 2; 9, pp. 22, 23
AOC A	FKT-009-06-D	1	5	5, p. 2; 9, pp. 26, 28
AOC A	FKT-010-02-C	1	2	5, p. 5; 9, pp. 30, 31
AOC A	FKT-012-03-D	1	5	5, p. 3; 9, pp. 33, 34
AOC A	FKT-013-03-D	1	4	5, p. 3; 9, pp. 36, 37
AOC A	FKT-014-02-D	1	2	5, p. 3; 9, pp. 39, 40
AOC A	FKT-015-05-C	1	5	5, p. 3; 9, pp. 42, 43
AOC A	FKT-016-06-D	3	20	5, p. 3; 9, pp. 45, 46
AOC A	FKT-020-04-B	1	2	5, p. 3; 9, pp. 51, 52
AOC A	FKT-021-05-B	2	7	5, p. 3; 9, pp. 54, 55
AOC A	FKT-022-04-D	2	9	5, p. 8; 9, pp. 57, 58

TABLE 25: Level I Resident Population Targets				
Area of Observed Contamination Letter	**Sample Number**	**Number of Residences**	**Total Number of Residents**	**References**
AOC A	FKT-023-02-C	1	3	5, p. 4; 9, pp. 60, 61
AOC A	FKT-025-02-C	1	4	5, p. 4; 9, pp. 63, 64
AOC A	FKT-026-02-B	1	2.86[1]	5, p. 4; 9, pp. 66, 67; 30, p. 1
AOC A	FKT-027-02-C	1	2.86[1]	5, p. 8; 9, pp. 69, 70; 30, p. 1
AOC A	FKT-028-05-A	1	2.86[1]	5, p. 4; 9, pp. 72, 73; 30, p. 1
AOC A	FKT-030-03-D	2	6	5, p. 8; 9, pp. 75, 76, 77

Notes:

[1] Population is the Cumberland County, New Jersey persons per household factor value from the U. S. Census Bureau 2009 to 2013 (Ref. 30, p. 1)
Number of sampling station on property
Site-specific property ID assigned for project
A Depth of 0 to 2 inches bgs (Ref. 9, p. 2)
B Depth of 2 to 6 inches bgs (Ref. 9, p. 2)
C Depth of 6 to 12 inches bgs (Ref. 9, p. 2)
D Depth of 12 to 24 inches bgs (Ref. 9, p. 2)
F Depth of 2 to 6 inches bgs; duplicate of B depth interval (Ref. 9, p. 2)
FKT Former Kil-Tone Company
G Depth of 6 to 12 inches bgs; duplicate of C depth interval (Ref. 9, p. 2)

Sum of individuals subject to Level I concentrations: 114.58
Sum of individuals subject to Level I concentrations × 10: 1,145.80

Level I Concentrations Factor Value: 1,145.80
(Ref. 1, Section 5.1.3.2.1)

5.1.3.2.2 Level II Concentrations

The soil samples listed in Table 26 were collected during the EPA January and February 2015 removal assessment sampling event (Refs. 5, p. 4; 9, pp. 81, 82, 84, 85) (see also Figure 2 of this HRS documentation record). Properties included in AOC A that were vacant at the time of sampling were not evaluated as Level II targets (Ref. 9, pp. 4, 78).

Level II Concentrations

The soil samples listed in Table 26 were collected from residential properties during the NJDEP August 2014 SI and the EPA January and February 2015 removal assessment (Ref. 9, pp. 81, 82, 84, 85) (see also Figure 2 of this HRS documentation record). The soil samples were collected from multiple stations across each property and at multiple depth intervals including 0 to 2 inches bgs and 2 to 6 inches bgs (Ref. 15, pp. 3, 4, 5). Sample analysis and data review were conducted by the EPA Region 2 Laboratory (Refs. 5, pp. i, 1, 89, 90; 28, p. i).

TABLE 26: AOC A Level II Concentrations

Sample ID	Hazardous Substance	Hazardous Substance Concentration	Background Sample	Background Concentration	Benchmark	References
FKT-033-04-E	Lead	530 mg/kg	FKT-018-1-A	57 mg/kg	NE	2, p. BII-21; 5, pp. 56, 89; 9, pp. 81, 82
FKT-034-02-B	Lead	910 mg/kg	FKT-018-01-B	47 mg/kg	NE	2, p. BII-21; 5, pp. 57, 90; 9, pp. 84, 85

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for project
AOC	Area of observed contamination
B	Depth of 2 to 6 inches bgs (Ref. 9, p. 82)
E	Depth of 0 to 2 inches bgs (Ref. 9, p. 85)
FKT	Former Kil-Tone Company
mg/kg	milligrams per kilogram
NE	Not established

Level II Resident Population Targets

The soil samples listed in Tale 27 were collected by EPA during the January and February 2015 removal assessment residential sampling event. The surface soil samples were collected within 24 inches of the ground surface (Refs. 9, pp. i, 81, 82, 84; 15, pp. 3, 4, 5). Properties included in AOC A that were vacant at the time of sampling and those previously evaluated as Level I targets are not included in Table 27 (Ref. 9, pp. 4, 78).

TABLE 27: Level II Resident Population Targets

Area of Observed Contamination Letter	Sample ID	No. of Residences	Total No. of Residents	References
A	FKT-033-04-E	1	4	Refs. 5, p. 4; 9, pp. 81, 82
A	FKT-034-02-B	1	7	Refs. 5, p. 4; 9, pp. 84, 85

Notes:

##	Number of sampling station on property
###	Site-specific property ID assigned for project
B	Depth of 2 to 6 inches bgs (Ref. 9, pp. 81, 82)
E	Depth of 0 to 2 inches bgs; duplicate of A depth interval (Ref. 9, pp. 84, 85)
FKT	Former Kil-Tone Company

Sum of individuals subject to Level II concentrations: 11 persons

Level II Concentrations Factor Value: 11 persons
(Ref. 1, Section 5.1.3.2.2)

5.1.3.3 Workers

Table 28 identifies workers whose workplace area is on AOC A or within 200 feet of AOC A on the respective workplace property (Ref. 1, Section 5.1.3). The FKT property located at 527 East Chestnut Avenue is currently owned by Urban Manufacturing, LLC (Ref. 13, pp. 2, 3). Urban Sign & Crane, Inc., a tenant of Urban Manufacturing, LLC, currently operates at the FKT property (Refs. 12, p. 5; 18, pp. 2, 4; 39, p. 28). Urban Sign & Crane employs 5 people (Ref. 39, p. 28). Vineland Syrup is located at 723 South East Boulevard. Vineland Syrup employs 33 people (Ref. 39, p. 25).

TABLE 28: Workers

Area of Observed Contamination Letter	Location	No. of Workers	References
A	Urban Sign & Crane, Inc.	5	1, Table 5-4; 39, p. 28
A	Vineland Syrup, Inc.	33	1, Table 5-4; 39, p. 25

Total Workers: 38

Workers Factor Value: 5
(Ref. 1, Table 5-4)

5.1.3.4 Resources

Description of Resource(s): No resources as stated in the HRS, Section 5.1.3.4, have been documented on AOC A.

Resources Factor Value: 0

5.1.3.5 Terrestrial Sensitive Environments

No terrestrial sensitive environments have been documented on AOC A.

Terrestrial Sensitive Environments Factor Value: 0

5.2 NEARBY POPULATION THREAT

The Nearby Population Threat was not scored because the Resident Population Threat is sufficient to qualify the site for the NPL. However, this threat is of concern to EPA and may be considered during a future evaluation (Ref. 1, Table 5-6). The removal assessment, which involves sampling of residential properties surrounding the FKT property, is on-going. Properties are sampled as site access is granted (Refs. 9, p. i; 43, p .i). In June 2015, the removal assessment was expanded and EPA sampled about 35 additional properties in the vicinity of the FKT property (Ref. 67, p. 1).