HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: Peters Cartridge Factory
EPA ID No.: OHD987051083

Contact Person

Site Investigation and
Documentation Record: Jeanne Griffin (312) 886-3007
NPL Coordinator
U.S. Environmental Protection Agency, Region V
77 West Jackson Boulevard
Chicago, IL 22202

Pathways, Components, or Threats Not Scored

Ground Water Pathway
Although there is some evidence of a release to ground water at the site and a significant possible target population, the present information is insufficient to satisfy the HRS requirements for scoring. Thus, the ground water pathway has not been scored as part of this HRS package.

Soil Exposure Pathway
Based on the lack of data and a limited number of documented targets, the soil exposure pathway has not been scored as part of this HRS package.

Air Migration Pathway
There is insufficient documentation to satisfy HRS requirements for scoring, and this pathway minimally impacts the listing decision. As such, the air migration pathway has not been scored as part of this HRS package.

HRS DOCUMENTATION RECORD

Name of Site:	Peters Cartridge Factory	Date Prepared: 11/8/2002
EPA Region:	Region 5	
Street Address of Site:	1415 Grandin Road (south side of the Little Miami River)	
City, County, State:	Kings Mills, Warren County, Ohio 45039	
General Location in the State:	In the southwestern portion of the state, north of Cincinnati and south of Dayton	
Topographic Map:	South Lebanon, Ohio Quadrangle	

Latitude: 39° 21' 2.5" North Longitude: 84° 14' 32 West (Ref. 3; 4, Figure 3)
(Measured from Building I)

Scores	
Air Pathway	Not Scored
Ground water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Surface Water Pathway	100.00
HRS Site Score	50.00

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	___	___
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100.00	10,000
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	___	___
2c.	Surface Water Migration Pathway Score (S_{sw} Enter the larger of lines 2a and 2b as the pathway score.	100.00	10,000
3.	Soil Exposure Pathway Score (S_s (from Table 5-1, line 22)	___	___
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	___	___
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

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

Factor Categories and Factors	Maximum Value	Value Assigned
DRINKING WATER THREAT		
Likelihood of Release		
1. Observed Release	550	550
2. Potential to Release by Overland Flow		
2a. Containment	10	
2b. Runoff	25	
2c. Distance to Surface Water	25	
2d. Potential to Release by Overland Flow (lines 2a x [2b + 2c])	500	
3. Potential to Release by Flood		
3a. Containment (Flood)	10	
3b. Flood Frequency	50	
3c. Potential to Release by Flood (lines 3a x 3b)	500	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	
5. Likelihood of Release (higher of lines 1 and 4)	550	550
Waste Characteristics		
6. Toxicity/Persistence	a	10,000
7. Hazardous Waste Quantity	a	100
8. Waste Characteristics	100	32
Targets		
9. Nearest Intake	50	
10. Population		
10a. Level I Concentrations	b	
10b. Level II Concentrations	b	

10c. Potential Contamination	b	__
10d. Population (lines 10a + 10b + 10c)	b	__
11. Resources	5	5
12. Targets (lines 9 + 10d + 11)	b	5
Factor Categories and Factors	Maximum Value	Value Assigned
DRINKING WATER THREAT (Concluded)		
Drinking Water Threat Score		
13. Drinking Water Threat Score ([lines 5 x 8 x 12]/82,500, subject to a maximum of 100)	100	1.07
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	2×10^8
16. Hazardous Waste Quantity	a	100
17. Waste Characteristics	1,000	320
Targets		
18. Food Chain Individual	50	45
19. Population		
19a. Level I Concentrations	b	__
19b. Level II Concentrations	b	0.03
19c. Potential Human Food Chain Contamination	b	__
19d. Population (lines 19a + 19b + 19c)	b	0.03
20. Targets (lines 18 + 19d)	b	45.03
Human Food Chain Threat Score		

21. Human Food Chain Threat Score ([lines 14 x 17 x 20]/82,500, subject to a maximum of 100)	100	96.06
Factor Categories and Factors	Maximum Value	Value Assigned
ENVIRONMENTAL THREAT		
Likelihood of Release		
22. Likelihood of Release (same value as line 5)	550	550
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/ Bioaccumulation	a	2×10^8
24. Hazardous Waste Quantity	a	100
25. Waste Characteristics	1,000	320
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	b	__
26b. Level II Concentrations	b	50
26c. Potential Contamination	b	___
26d. Sensitive Environments (lines 26a + 26b + 26c)	b	50
27. Targets (value from 26d)	b	50.00
Environmental Threat Score		
28. Environmental Threat Score ([lines 22 x 25 x 27]/82,500, subject to a maximum of 60)	60	60
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED		
29. Watershed Score (lines 13 + 21 + 28, subject to a maximum of 100)	100	100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE		

30. Component Score (S_{of})[c], (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100	100

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

REFERENCES

Ref. No.	Description of the Reference
1.	U.S. Environmental Protection Agency (EPA), [Office of the Federal Register National Archives and Records Administration (OFRNARA)], December 14, 1990, 40 CFR Part 300, Hazard Ranking System (HRS).
2.	U.S. Environmental Protection Agency (EPA). Superfund Chemical Data Matrix. June 1996. (Excerpt of 64 pages).
3.	U.S. Geological Survey (USGS). 7.5-minute Series Topographic Quadrangle (South Lebanon, Ohio Quadrangle); and Latitude/Longitude Verification Worksheet (1 map and 1 page).
4.	Ohio Environmental Protection Agency, Division of Emergency & Remedial Response. Expanded Site Inspection Report. September 29, 1999. 103 pages.
5.	Floppe Thelen Group, Inc. Report on Septic System Remediation, LensCrafters Kings Mills Technical Center, Kings Mills, Ohio. November 4, 1993. 236 pages.
6.	PRC Environmental Management, Inc. Screening Site Inspection Site Evaluation Report, Peters Cartridge Factory (also Known as Kings Mills Technical Center), 1915 Grandin Road, Kings Mills, Ohio 45034. September 30, 1994. 50 pages.
7.	PRC Environmental Management, Inc. Screening Site Inspection Report, Peters Cartridge Factory, 1415 Grandin Road, Kings Mills, Warren County, Ohio. December 20, 1996. 67 pages.
8.	Ohio Environmental Protection Agency. Traffic Reports and Chain of Custody for 05/05/99 and 05/06/99 Peters Cartridge E.S.I. Site, OHD 987051083, Case Number 26980. 36 pages.
9.	Ohio Environmental Protection Agency. Traffic Reports and Chain of Custody for 05/12/99 Peters Cartridge E.S.I. Site, OHD 987051083, Cases # 26980 and 27007. 8 pages.
10.	U.S. EPA Region 5. Analytical Data Review, Case Number 26980. 1999. 68 pages.
11.	U.S. EPA Region 5. Analytical Data Review, Case Number 26980. 1999. 21 pages.
12.	U.S. EPA, (EPA, 1996), Using Qualified Data to Document an Observed Release and Observed Contamination (OSWER Directive 9285.7-24FS). November 1996. 18 pages.
13.	Qsource Engineering, Inc. Environmental Site Assessment, Kings Mills Technical Center, Kings Mills, Ohio. December 1987. 68 pages.
14.	U.S. EPA Region 5 Central Regional Laboratory. Analytical Data Review, Case Number 26980, SDG MEBRL4. 1999. 14 pages.
15.	U.S. EPA Region 5 Central Regional Laboratory. Analytical Data Review, Case Number 27007, SDG MEBRW6. 1999. 30 pages.

16. Martin, Steve, Ohio Environmental Protection Agency. Telephone Conversation with Ryan Peterson, Wildlife Officer, Division of Wildlife, Ohio Department of Natural Resources. Subject: Fishing in Little Miami River. May 18, 2001. 1 page.

17. Martin, Steve, Ohio Environmental Protection Agency. Maps with 1999 ESI Sample Locations and Area Estimates of Lead, Mercury and Copper Soil Contamination at Peters Cartridge Factory. 5 pages.

18. Gannon, Loren, S. Jr., Historian. U.S. Department of the Interior, National Park Service: National Register of Historic Places Inventory-Nomination Form (prepared for Peters Cartridge Factory). March 1, 1985. 9 pages.

19. Ohio EPA, Division of Emergency and Remedial Response. Sensitive Environments Map. 1999. 2 pages.

20. Ohio Department of Natural Resources. Little Miami State and National Scenic River. Web site accessed 10/5/01: http://www.dnr.state.oh.us/odnr/dnap/sr/lmiami.htm. 3 pages.

21. National Wild and Scenic Rivers Systems. River Milage Classifications for Components of the National Wild and Scenic Rivers Systems. Web site accessed 10/5/01: http://www.nps.gov/rivers/wildlriverstable.html. 2 pages.

22. U.S. Environmental Protection Agency. EnviroMapper: web site accessed 10/30/01. 8 pages.

23. U. S. Environmental Protection Agency. Summary of Major Changes Made to the Multi-Media, Multi-Concentration Organic Analytical Statement of Work (OLM03.2 to OLM04.2) (OWSER Publication 9240.0-33FS). January 2000. 4 pages.

24. Martin, Steve, Ohio Environmental Protection Agency. Correspondence to Josephine Williams, DynCorp; Telephone Conversations with Joe Tussey, City of Lebanon, and John Luallen, Village of Lebanon; and 1 map. April 2002. 4 pages.

25. Ohio Environmental Protection Agency. Non-Sampling Screening Site Inspection Kings Mills Army Reserve Center. May 16, 2002. 282 pages.

26. Ohio Environmental Protection Agency. Investigations and Sampling Logbook, Peters Cartridge ESI, Case # 26980 SED Samples. May 4, 1999. 16 pages.

27. Ohio Environmental Protection Agency. Investigations and Sampling Logbook, Peters Cartridge ESI, Case # 26980, Soil. May 4, 5, 11 1999. 24 pages.

28. Ohio Environmental Protection Agency. Investigations and Sampling Logbook, Peters Cartridge ESI, Case # 26980, Ground Water, Soil, Sediment Samples. May 4, 5, 1999. 14 pages.

29. U.S. EPA Region 5 Central Regional Laboratory. Analytical Data Review, Case Number 26980, SDG ECHJ6. 1999. 68 pages.

30. U. S. Environmental Protection Agency. Introduction to the Contract Laboratory Program, EPA 540-R-99-005, OSWER 9240.0-34P. February, 2000. 43 pages.

Site Summary

The Peters Cartridge Factory formerly operated on a 10 acre parcel of land at 1415 Grandin Road, on the south side of the Little Miami River in Warren County, Ohio. The facility is bordered by the Kings Mills United States Army Reserve Center (USARC) [formerly part of the Kings Mills Ordnance Plant] to the southwest, the Little Miami Scenic Trail and the Little Miami River to the north and west, and rural areas to the east and south (Figure 1 of HRS documentation record; Ref. 4, p. 1, Figure 2; Ref. 3; Ref. 25, p. 4).

The Peters Cartridge Factory operated as a manufacturer of semi-smokeless cartridge ammunition, including shotgun shells and rifle and pistol cartridges (Ref. 4, p. 2; Ref. 18, p. 4). The company expanded north across Grandin Road during World War I due to increased demand for ammunition from the European Powers and the United States (Ref. 7, p. 10). After the war, the frame buildings erected to keep up with the war demands were demolished, and the company was consolidated back to its original buildings at the present site location. Remington Arms purchased Peters Cartridge Factory in 1934 and continued to manufacture rifle and shotgun ammunition until near the end of World War II (Ref. 4, p. 2; Ref. 18, pp. 4, 5). In 1944, the facility was closed as part of a consolidation by Remington (Reg. 18, p. 5). The Columbia Records division of RCA occupied the facility from 1944 to 1948, mixing plastic materials and manufacturing phonograph record disks. Seagrams Distillers used the facility as a bonded warehouse during the 1950s. A small cabinet company used a portion of the facility around the 1970s (Ref. 18, p. 5). In 1979 the facility was purchased by Landmark Renaissance Corporation and is currently known as the Kings Mills Technical Center. LensCrafters leased the property from January 1987 to December 1991. LensCrafters utilized chemicals such as Freon 113, surfactants, phosphoric acid, n-hexane, paints, tints, and dyes in the manufacture of eyeglass lenses and frames. Several other companies owned or leased the present facility, but they did not use chemicals in their operations (Ref. 6, p. 11; Ref. 7, p. 10, 11; Ref. 13, p. 6).

In 1987 as part of an environmental assessment for the Kings Mills Technical Center, lead contamination was discovered at the site (Ref. 13, pp. 4, 5, 9, 12, 13). On-site soils were sampled at depths of 1, 4, 8, and 12 feet, and lead was found at concentrations reaching 33,500 ppm at a depth of 4 feet (Ref. 13, pp. 4, 12). Fill materials including boiler ash and slag were found buried in layers from 7 to 12 feet thick on the property (Ref. 6, p. 12; Ref. 13, p. 17). Monitoring wells were installed on-site in December 1987 and were sampled and analyzed for lead and total organic content. Lead was detected in well W-3 at 0.52 mg/l, well above the action level of 0.015 mg/L (Ref. 6, p. 11; Ref. 13, p. 15). In 1993, the facility was paved to prevent direct contact with lead contaminated soil (Ref. 4, p. 2; Ref. 6, p. 12).

An Expanded Site Inspection was conducted on May 4, 5, and 11th, 1999 by the Ohio EPA. Soil, sediment, ground water, and fish tissue samples were collected (Ref. 4, p. 1). Contaminated ground water was discovered in on-site monitoring wells. An observed release to the Little Miami River was documented. The Little Miami River, which is threatened by contamination from the site, is a fishery, State and National Scenic River, and home to several State endangered species.

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Source Number: 1

Source Type: Contaminated Soil

Description and Location of Source (Figures 2 and 3 of HRS documentation record; Ref. 4, Figure 3; Ref. 25):

Lead, copper, and mercury contaminated soils were discovered in areas near each of the buildings at the site; just across Grandin Road; and in vacant areas just south of the Peters Cartridge Factory. The approximate areas of contaminated soils were determined using GIS plotting and the area within samples from the XRF results from the 1999 ESI sampling event (Ref. 4, Appendix G, pages 1 to 3; Ref. 17, pp. 1-5).

This contaminated soil source is associated with the ammunition manufacturing activities at the Peters Cartridge Factory. The Peters Cartridge Factory manufactured semi-smokeless cartridge ammunition, including shotgun shells and rifle and pistol cartridges (Ref. 4, p. 2; Ref. 6, p. 10; Ref. 18, p. 4). Lead shot ammunition was manufactured by pouring lead into the shot tower, near Buildings 2 and 3 at the site, and letting it fall through a screen in order to form pellets. Building 6 was used to prepare volatile fulminate of mercury primers. Copper and mercury fulminate, were also used in the lead shot ammunition preparation (Ref. 6, p. 11; Ref. 18, p. 2). Contaminated soil was discovered in areas near each of the buildings at the site; just across Grandin Road; and in vacant areas just south of the Peters Cartridge Factory (Ref. 4, Appendix G, pages 1 to 3).

In 1987, as part of an environmental assessment, lead contaminated soil was discovered at the Peters Cartridge Factory site (Ref. 13, pp. 9). Nine trenches were dug, and samples were collected at a depth of 1, 4, 8, and 12 feet. During trenching, 7 to 12 feet of fill material was also found at seven of the nine trench locations. The fill was believed to be slag and boiler ash deposited during ammunition manufacturing (Ref. 6, p. 12). Lead concentrations reaching 33,500 ppm were detected in soils adjacent to the shot tower (Ref. 6, Figure 2). Due to the extent of lead in the soil, some areas of exposed soil were paved in 1993 to prevent direct soil contact (Ref. 4, p. 2; Ref. 6, Figure 2).

In 1999, an expanded site inspection (ESI) was conducted by the Ohio EPA. Source soil sampling was conducted in two phases. The first phase consisted of 53 samples collected using stainless steel spoons and a Geoprobe sampler. These samples were placed in plastic bags and analyzed for metals using a portable X-ray fluorescent (XRF) machine (Ref. 4, p. 4, Appendix G; Ref. 17). The XRF results were used to select locations for the second phase of sampling in which 9 soil samples (PC-SOX-05; PC-SO-09; PC-SO-05; Building 3; #6 Bunker; PC-SOX-17; Hearth Area; PC-SOX-42; PC-SO-26) were collected for analysis using U.S. EPA's contract laboratory program (CLP) methodology (Ref. 4, pp. 4, 6, Figure 3, Appendix E pp. 1 to 3; Ref. 27, pp. 2 - 21). A soil sample (PC-SO-01) was collected from the grassy area east of Building 6 and was analyzed for volatile organic compound (VOC) analysis by Ohio EPA Division of Environmental Services (DES) laboratory. The soil background sample (PC-SO-26) was also analyzed for VOCs by Ohio EPA DES laboratory (Ref. 4, pp. 4, 6).

Lead, copper, and mercury contaminated soils can be associated with site activity. The approximate areas of contaminated soils were determined using GIS plotting and the area within samples from the XRF results from the 1999 ESI sampling event. These areas are shown in Reference 17. Semivolatile, volatile, and

pesticide organic compounds were also detected in the 1999 ESI soil samples (Ref. 4, Appendix A, pp 1 to 9). Acenapthene, Anthracene, Carbazole, Di-n-butylphthalate, Dibenz(a, h)anthracene, Dibenzofuran, Fluorene, Methylene chloride, Naphthalene, Phenanthrene, alpha-BHC, alpha-Chlordane, gama-Chlordane, delta-BHC, Heptachlor Epoxide, 4,4-DDE, and Endosulfan Sulfate are among the organic compounds detected in the contaminated soil samples, but have not been documented to be associated with the processes at the Peters Cartridge Factory facility; these hazardous substances may be present as a result of the asphalt paving applied over parts of the source to avoid direct contact with the high levels of metals in this source.

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH SOURCE

BACKGROUND SOIL SAMPLE: PC-SO-26

The soil background sample was collected on May 5, 1999 approximately 500 feet northeast of the site outside the influence of the manufacturing activity conducted at the site, but within the vicinity of the local environment of the site (Ref. 4, Figure 3 and Appendix E, p. 3, Appendix G, page 3; Ref. 27, pp. 7, 8, 9). This sample was collected at 0 to 6 inches of depth and consisted of brownish black silt and clays, slightly moistened, with an organic odor (Ref. 27, pp. 7, 8, 9).

Hazardous Substance)	Evidence mg/kg	SQL_f mg/kg	References
Antimony	2.3J	19.6	4, Appendix A, p. 9; 14, pp. 2 to 8 and 10; 30, 9. A-4
Arsenic	11.8	3.3	4, Appendix A, p. 9; 14, pp. 2 to 8 and 10; 30, 9. A-4
Cadmium	0.33U	1.6	4, Appendix A, p. 9; 14, pp. 2 to 8 and 10; 30, 9. A-4
Copper	40.8	8.2	4, Appendix A, p. 10; 14 pp. 2 to 8 and 10 30, 9. A-4
Lead	149J**	0.98	4, Appendix A, p. 10; 14, pp. 2 to 8 and 10; 30, 9. A-4
Mercury	0.74J**	0.03	4, Appendix A, p. 10; 14, pp. 2 to 8 and 10; 30, 9. A-4
Silver	0.65U	3.27	4, Appendix A, p. 10; 14, pp. 2 to 8 and 10; 30, 9. A-4

J Value is estimated (Ref. 4. Appendix A, p. 11; Ref. 14, p. 8).

U Analyte was analyzed for but not detected above the sample quantitation limit. (Ref. 14 p. 8).

** While some of the values were qualified during QC review, the qualifiers only effect the accuracy of the quantification; the presence of these substances is not in doubt. The hazardous substances are listed to document the presence of the substance at the source.

f SQL estimated for inorganic analytes using the following equation: SQL = CRDL µg/L x 200 ml (final volume) x 1000 µg/mg x Dilution / 1000 ml/L x 1 gm (sample weight) x 1000 gm/kg x (%solids/100)
A final volume of 100 ml was used for mercury.

CONTAMINATED SOIL SAMPLES: Building 3; #6 Bunker; PC-SOX-17; Hearth Area; PC-SOX-42; PC-S-01

The contaminated soil source samples were collected on May 5, 1999 and May 11, 1999 during an Expanded Site Inspection. The sample depth ranged from 0 to 8 inches below ground surface. All samples were collected in a similar manner as the background sample collected on May 5, 1999 (Ref. 27, p. 1 to 21). The contaminated soil source samples consisted of one or more of the following descriptions. Black loamy, dark grey; brown, sandy gravel, slightly moist; brown/dark loam; silver grey clay, and grey gritty black material.

Hazardous Substance)	**Evidence mg/kg**	**SQL_f mg/kg**	**References**
Antimony	52.9 (Bunker 6)	18	4, Appendix A, p. 9; 15, pp. 2, 12; 27, p. 13; 30, pp. 8, A-4
	7,920 (PC-SOX-17)	14.7	15, pp. 2, 13; 27, p. 16; 30, pp. 8, A-4
	10,200 (Hearth Area)	15.0	15, pp 11; 27, pp. 16, 17; 30, pp. 8, A-4
	109 (PC-SOX-42)	15.5	15, p. 2, 14; 27, p. 19; 30, pp. 8, A-4
Arsenic	2,550 (PC-SOX-17)	3.0	4, Appendix A, p. 9; 15, pp. 2, 13; 30, pp. 8,. A-4
Cadmium	4.7 (PC-SOX-17)	1.5	4, Appendix A, p. 9; 15, p. 13; 27, p. 16; 30, pp. 8, A-4
	4.3 (Hearth Area)	1.3	15, p. 11; 27, pp. 16, 17; 30, pp. 8, A-4
	1.6 (PC-SOX-42)	1.3	15, p. 14; 27, p. 19; 30, pp. 8, A-4
Copper	186 (PC-SOX-42)	6.5	4, Appendix A, p. 10; 15, p. 2, 14; 27, p. 19; 30, pp. 8, A-4
Lead	561J** (Bldg. 3)	0.65	4, Appendix A, p. 10; 14, p. 10; 30, pp. 8, A-4
	1,790 (Bunker 6)	0.89	15, pp. 2, 12; 27, p. 13; 30, pp. 8, A-4
	294,000 (PC-SOX-17)	0.73	15, pp. 2, 13; 27, p. 16; 30, pp. 8, A-4
	301,000 (Hearth Area)	0.75	15, p. 2, 11; 27, pp. 16, 17; 30, pp. 8, A-4
	13,200 (PC-SOX-42)	0.77	15, pp. 2, 14; 27, p. 19; 30, pp. 8, A-4
Mercury	16.6 (Bunker 6)	0.029	4, Appendix A, p. 10; 15, p. 2, 12; 27, p. 13
	5.9 (PC-SOX-17)	0.024	15, pp., 2, 13; 27, p. 16; 30, pp. 9, A-4
	5.2 (Hearth Area)	0.025	15, pp. 2, 11; 27, p. 16; 30, pp. 9, A-4
	17.8 (PC-SOX-42)	0.026	15, pp. 2, 14; 27, p. 19; 30, pp. 9, A-4
Silver	11.5 (PC-SOX-17)	3.0	4, Appendix A, p. 10; 15, pp. 2, 13; 27, p. 16
	12.5 (Hearth Area)	2.5	15, pp. 2, 11; 27, pp. 16, 17; 30, pp. 9, A-4

J Value is estimate (Ref. 4. Appendix A, p. 11; Ref. 15, p. 4).

** While some of the values were qualified during QC review, the qualifiers only effect the accuracy of the quantification;, the presence of these substances is not in doubt. The hazardous substances are listed to document the presence of the substance at the source.

e SQL estimated for inorganic analytes using the following equation: SQL = CRDL µg/L x 200 ml (final volume) x 1000 µg/mg x Dilution/ 1000 ml/L x 1 gm (sample weight) x 1000 gm/kg x (%solids/100)
A final volume of 100 ml was used for mercury.

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Value	References
Gas release to air:	not scored	
Particulate release to air:	not scored	
Release to ground water:	not scored	
Neither of the following are present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system.	10	Ref . 1 Table 4-2, p. 51609; Ref. 4, p. 1, 2, 22, 23, and Figure 3; Ref. 3; Ref. 6, p. 10, Figure 2

2.2.4 HAZARDOUS WASTE QUANTITY

2.4.2.1.1 Hazardous Constituent Quantity

Description

Insufficient information is available to evaluate Hazardous Constituent Quantity.

Sum (pounds): Not available (NA)

Hazardous Constituent Quantity Assigned Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Description

Insufficient information is available to evaluate Hazardous Wastestream Quantity.

Sum (pounds): NA
Sum of Wastestream Quantity/5,000 (Table 2-5): NA

Hazardous Wastestream Quantity Assigned Value (W): NA

2.4.2.1.3 Volume

Description

Insufficient information is available to evaluate Volume.

Sum (yd^3) : 0

Volume Assigned Value (V): 0

2.4.2.1.4 Area

Description

The exact dimension of the contaminated soil has not been determined. An estimate of the copper, lead, and mercury contaminated areas were made using the 1999 XRF sampling data (Ref. 4, pp. 4, 6, Appendix G; Ref. 17). While the exact area of contaminated soil is unknown, it is known to be greater than zero based on 10 soil samples showing the presence of lead and other hazardous substances above background levels (Ref. 4, pp. 4, 6). Therefore, an area hazardous waste quantity of greater than zero is assigned.

Sum (ft^2) : (greater than zero) >0, but exact amount is unknown

Area Assigned Value (A): >0

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 1 is >0 for Tier D - Area (Ref. 1, Table 2-5).

Source Hazardous Waste Quantity Value: >0

2.2.1 SOURCE IDENTIFICATION

Source Number: 2

Source Type: Contaminated Soil

Description and Location of Source (Figure 4 of HRS documentation record; Ref. 5, Figures 2 ,3, 7, and 8, Appendix B, p. 6; Ref. 4, Figure 3):

This contaminated soil area is between Buildings 3 and 6 at the Peters Cartridge Factory. It consists of a septic system leach field contaminated with organic compounds from the manufacture of eyeglass frames and the coating of optical lenses (Ref. 5, pp. 1, 2; Ref. 6, p. 12).

LensCrafters, Inc. occupied a portion of the Kings Mills Technical Center at 1413 Grandin Road, Kings Mills, Ohio from 1986 to December 31, 1991 (Ref. 5, p. 1). LensCrafters' operations include the manufacture of eyeglass frames and coating of optical lenses within Buildings 3 and 6 at the Kings Mills Technical Center (Ref. 5, p. 1). LensCrafters' processes utilized Freon 113 (1,1,2-Trichloro-1,2,2-Trifluoroethane), surfactants, phosphoric acid, n-hexane, paints, tints, and dyes. Freon 113 was used in the Molded Frames' operation to dry eyeglass frames and in the Specialty Koatings' operations to dry optical lenses. Both of these operations were conducted in Building 3. A lens dryer was operated about 6 hours per day and used approximately 1 gallon of Freon 113 per day to dry lenses. The Freon 113 used in the lens dryer was recycled through the system and replaced as it evaporated over time. Water, displaced from the lenses, was decanted from the recycled Freon 113 in a water separator which was built into the system. The top water phase of the separator was at one time discharged into a floor drain which was piped to an on-site septic tank. In the Spring of 1990, after Freon 113 was detected in the septic tank, this connection was closed. The top phase of the separator was collected thereafter for off-site disposal (Ref. 5, p. 1). LensCrafters moved from the Kings Mills Technical Center on December 31, 1991 (Ref. 5, p. 1).

The original design and permit to install the septic system was issued by Ohio EPA, but the septic system was not installed according to the permit. The permit accounted for a two-compartment, 2000 gallon septic tank, a flow diversion box and three leach lines, each 125 feet long (Ref. 5, p. 8, Figure 5). During an on-site inspection, the septic tank and the flow diversion box where found to be installed south of the area shown on the original design plan (Ref. 5, p. 8). Also, at some point, a second influent line was connected to the septic system for wastewater from Building 3 (Ref. 5, p. 8). This influent line was installed near the northeast corner of Building 3 and enters the septic tank from the side and into the second (effluent) chamber of the septic tank, not the influent chamber (Ref. 5, Figure 6). The discharge of the influent pipe from Building 3 into the septic rank was found to be approximately 17 inches below the normal operating level of the tank and only approximately 4 inches above the effluent baffle (Ref. 5, p. 8).

The septic tank and the diversion box discharged to two 200-foot leach lines located east of the septic tank (Ref. 5, p. 15, Figure 6). Due to the under capacity of the septic tank, the septic system periodically had surface discharges of sewage around the leach field area (Ref. 5, p. 15). Source samples characterizing this source includes samples collected at depth in 1990, 1991, 1992, and 1993 (Ref. 5, pp 5, 6, Appendix G, p. 2, Appendix I, p. 2). Attempts were made by LensCrafters to remediate the influent line, diversion box, septic tank, and the leach fields (Ref. 5, p.1). Based on soil samples, the leach fields and the surrounding soils still contained Freon 113 after the initial response efforts (Ref. 4, p. 7; 5, pp 8 to 20, Figures 2, 3, 7, 8, and 26). Ground water samples collected in the 1999 ESI documented Freon 113 in on-site monitoring wells (Ref. 4, pp. iv, 6, 7, 12).

Freon 113, the associated hazardous substance for this source, is man-made and is not naturally occurring. A background sample, PCSO-26, for Source 1 did not document Freon 113 as ubiquitous in the area (Ref. 14, p. 10; 29, pp. 41, 50, 64).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH SOURCE

Hazardous Substance)	Evidence		Depth (feet)	CRQL	References
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113) Cas. No. 76-13-1 (See Ref. 5, Appendix B, p. 6) (November 1992)	SB-9 SB-11 SB-11 SB-11 SB-10 SB-10 SB-8	19 µg/kg 15 µg/kg 13 µg/kg 182 µg/kg 12 µg/kg 14 µg/kg 12 µg/kg	13.5 - 15.5 4.5 - 6.5 9 - 11 13.5 15.5 13.5 - 15.5 13.5 15.5 4.5 - 6.5	10 µg/kg	5 Appendix F, pp. 8, 12 5 Appendix F, pp. 8, 13 5 Appendix F, pp. 8, 14 5 Appendix F, pp. 8, 15 5 Appendix F, pp. 8, 18 5 Appendix F, pp. 8, 19 5 Appendix F, pp. 26
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113) Cas. No. 76-13-1 (See Ref. 5, Figure 8) (February 1993)	SB15 SB-15 SB16 SB-16 SB16 SB-19 SB-18 SB-18 SB17 SB17 SB17 SB17 Dup	10 µg/kg 11 µg/kg 23 µg/kg 39 µg/kg 77 µg/kg 12.9µg/kg 76.3µg/kg 24.1µg/kg 48 µg/kg 142 µg/kg 340 µg/kg 328 µg/kg	17 - 19 24.5 - 26.5 7 - 9 17 - 19 24.5 - 26.5 17 - 19 7 - 9 12 - 12.5 9.5 - 11.5 14.5 - 16.5 17 - 19 17 - 19	10 µg/kg	5, Appendix I, pp. 2, 5 5, Appendix I, pp. 2, 8 5, Appendix I, pp. 2, 9 5, Appendix I, pp. 3, 10 5, Appendix I, pp. 3, 11 5, Appendix I, pp. 13, 16 5, Appendix I, pp. 13, 18 5, Appendix I, pp. 13, 19 5, Appendix I, pp. 14, 20 5, Appendix I, pp. 14, 21 5, Appendix I, pp. 14, 22 5, Appendix I, pp. 14, 23 23, p. 4

Dup Duplicate
SB Soil boring

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Value	References
Gas release to air:	not scored	
Particulate release to air:	not scored	
Release to ground water:	not scored	
Neither of the following are present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system.	10	Ref . 1 Table 4-2, p. 51609; Ref. 5, pp. 4, 15 and Figure 5

2.2.4 HAZARDOUS WASTE QUANTITY

2.4.2.1.1 Hazardous Constituent Quantity

Description

Insufficient information is available to evaluate Hazardous Constituent Quantity.

Sum (pounds): Not available (NA)

Hazardous Constituent Quantity Assigned Value (C): NA

2.4.2.1.2 Hazardous Wastestream Quantity

Description

Insufficient information is available to evaluate Hazardous Wastestream Quantity.

Sum (pounds): NA
Sum of Wastestream Quantity/5,000 (Table 2-5): NA

Hazardous Wastestream Quantity Assigned Value (W): NA

2.4.2.1.3 Volume

Description

Insufficient information is available to evaluate Volume.

Sum (yd^3) : 0

Volume Assigned Value (V): 0

2.4.2.1.4 Area

Description

The exact dimension of the Freon 113 contaminated soils have not been determined. While the exact area of contamination is unknown, it is known to be greater than zero based on soil boring samples showing the presence of Freon 113 (Ref. 5, Figures 2 ,3, 7, and 8). Therefore, an area hazardous waste quantity of greater than zero, but extent unknown, is assigned.

Sum (ft^2) : (greater than zero) >0 , exact amount is unknown

Area Assigned Value (A): >0

2.4.2.1.5 Source Hazardous Waste Quantity Value

The source hazardous waste quantity value for Source 2 is >0 for Tier D - Area (Ref. 1, Table 2-5).

Source Hazardous Waste Quantity Value: >0

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Available to Pathway (X)				
			Ground water (GW)	Surface Water (SW)		Air	
				Overland	GW to SW	Gas	Particulate
1	>0	N	NS	10	NS	NS	NS
2	>0	N	NS	10	NS	NS	NS

NS Not scored

Other Possible Sources at the site:

Peters Cartridge Factory manufactured lead shot ammunition by pouring lead out of a shot tower, and letting it fall through a screen in order to form pellets (Ref. 7, p. 10; Ref. 13, p. 14). The shot tower is near Buildings 2 and 3 at the site (Ref. 5, Figure 3; Ref. 18, p. 2). The shot tower was not sampled during the 1999 ESI (Ref. 4, pp. 8 to 10, Figure 3). However, based on the use of the shot tower during the ammunition manufacturing process, it may be a possible source at the site.

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

The topography of the facility varies from approximately 620 to 730 feet above sea level (Ref. 3; Ref. 4, p 1). Drainage at the facility is towards the Little Miami River, which is adjacent to the north and west side of the facility. Three swales convey runoff water from the facility down the steeply sloping valley into storm sewers that run beneath the main buildings (Ref. 4. pp. 1, 2; Ref. 6, p. 10, Figure 2; Ref. 13, p. 17). These storm sewers drain directly into the Little Miami River (Ref. 4, p. 22; 6, p. 10). Culvert 1 is the most upstream culvert discharging drainage from the site to the Little Miami River (Ref. 4, Figure 3; Ref. 17, pp. 4, 5). Ditch 3 is considered the most downstream discharge from the site to the little Miami River. (Ref. 4, Figure 3; Ref. 17, pp. 4, 5). The discharge location of Culvert 1 will be considered the most upstream probable point of entry (PPE) for the surface water migration pathway, and the surface water migration pathway continues for 15 miles downstream of Ditch 3 in the Little Miami River (Ref. 4, Figure 3; Ref. 17, pp. 4, 5; Ref. 19).

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

4.1.2.1 Likelihood of Release

4.1.2.1.1 Observed Release

Seven sediment samples were collected by Ohio EPA as part of an Expanded Site Inspection on May 4, 5, and 11, 1999 (Ref. 4, pp. 1, 4, 6, and Appendix E, pp. 4 to 6; Ref. 26, pp 1 to16; Ref. 28, pp. 13, 14). Six of the seven sediment samples were collected from the Little Miami River, and one (Ditch 2) was collected from a ditch leading from the site to the Little Miami River (Ref. 4, Appendix E, p. 4; Ref. 28, p. 13). The sediment samples were collected in the Little Miami River and are named according to the general location of the sample in the River (See Reference 4, Appendix E, pages 4 to 6).

The background sediment sample, Upstream Bridge, was collected in the Little Miami River, approximately 120 yards upstream of the Grandin Road Bridge (Ref. 4, p. 6 and Appendix E, p. 6; Ref. 26, pp. 2, 3). The background sample, Upstream Bridge, was collected approximately 300 feet upstream of the PPE at Culvert 1, but approximately 1.6 miles downstream of a waste water discharge to the Little Miami River. The City of Lebanon has an NPDES permit to discharge waste water to the Little Miami River (Ref. 22 pp. 1 to 7). Mercury is suspected as a hazardous substance in this discharge (Ref. 22, pp. 1 to 7). Mercury has also been identified as hazardous substance in the Little Miami River that may not necessarily be attributable to the Peters Cartridge Factory site (Ref. 4, p. 10). For these reasons, mercury is not evaluated as part of the observed release for Peters Cartridge Factory surface water migration pathway.

The samples were analyzed by EPA Region 5 using contract laboratory program (CLP) methodology (Ref. 4, pp. 4, 7; 11, pp. 1, 2). Hazardous substances were documented in the five sediment samples (Downstream Culvert 1, Downstream Culvert 2, Ditch 3, Downstream Steel Pipe, and Little Miami River) collected in the Little Miami River downstream of the background sample (Ref. 4, Figure 3, Appendix B, pp. 1 to 11, & Appendix E, pp. 4 to 6; Ref. 26, pp. 5 to 16). A sediment sample collected from a ditch leading from the site to the Little Miami River (Ditch 2 sample) also documented the presence of hazardous substances (Ref. 4, Appendix B, p. 11; Ref. 11, pp. 2, 4, 5, 18; Ref. 28, p. 13). For purposes of HRS scoring for this site, two samples met observed release criteria.

The Little Miami River is a fishery (Ref. 4, Appendix F, p. 4; Ref. 16). A wildlife officer of Warren County, Ohio has frequently observed people fishing in the Little Miami River, adjacent to the Peters

Cartridge Factory (Ref.16). The Little Miami River is also a National and State designated scenic river and the habitat of several State endangered species (Ref. 4, pp iv, 22; Refs. 19, 20, 21). An observed release of copper, a hazardous substance with a bioaccumulation factor value 50,000, has been documented in the Little Miami River (Ref. 1, Section 4.1.3.3.1; Ref. 4, Appendix B, p. 10; Ref. 12, p.18). Level I contamination in the Little Miami River was not documented. The zone of Level II contamination extends from the most upstream PPE at sample location Downstream Culvert 1 to the most downstream sample documenting an observed release in the Little Miami River at the location of sediment sample Ditch 3 (Ref. 17, 19).

Chemical Analysis

The samples documenting an observed release were collected on May 4th, 1999 during an Expanded Site Inspection. The background sample was collected in 2 feet of water, and the observed release samples were collected in depths of 6 inches to 2 feet of water. The sample medium consisted of a range of medium brown/grey or greyish fine silt or silty clay, some with fine sand or pea size gravel (Reference 26, pp. 2 to 13).

Background Sediment Sample

Sample ID	% Solids	Depth	Description	Date	References
Upstream Bridge (Ustr. Bridge)	57.3	2 ft. water	Medium brown/grey silty clay and fine grain sands	05/04/99	4, Figure 3 & Appendix B; 12, p. 18; Ref. 26, pp. 2 to 4

Contaminated Sediment Samples

Sample ID	% Solids	Depth	Description	Date	References
Downstream Culvert 2 (Dstr. Culvert 2)	64.2	6 inches to 1 feet water; top 3 inches (sediment)	Medium brownish grey-fine sands, silty clays, pea size gravel	05/04/99	4, Figure 3 & Appendix B; 12, p. 18; 26, pp. 8 to 10
Ditch 3	69.3	Top 3 inches (sediment)	Medium brownish-fine sands, some silt	05/04/99	4, Figure 3 & Appendix B; 12, p. 18; 26, pp. 14 to 16

Hazardous Substance	Background Level $SQL_{inorganic}$	Background Location Ustr. Bridge	Observed Release $SQL_{inorganic}$	Observed Release Concentration & Sample	References
Copper	8.73 mg/kg	12.2 mg/kg	7.22 mg/kg	45.7 mg/kg **Ditch 3**	4, Appendix B, p. 10; 11 p.18; 30, 9. A-4
Lead	1.05 mg/kg	11.8_b mg/kg	0.935 mg/kg	192J mg/kg $(133.33 \text{ mg/kg})_a$ **Dstr. Culvert 2**	4, Appendix B, p. 10; 11, pp. 4, 18, 19; 30, 9. A-4

mg/kg milligrams per kilogram
J Value is estimate (Ref. 4. Appendix B, p. 11; Ref. 11, p. 7).
$()_a$ Original concentration is bias high. Concentration in parenthesis represents adjusted value according to Reference 12, (EPA, 1996), *Using Qualified Data to Document an Observed Release and Observed Contamination* (OSWER 9285.7-24FS).
b Background concentration biased high. No adjustment necessary (Ref. 12, p. 8)
$SQL_{inorganic}$ Sample quantitation limit (SQL) is estimated using the following equation (assuming a final volume of 200 milliliters and a sample weight of 1 gram; a final volume of 100 millimeters is assumed for mercury): SQL = CRDL (ug/L) x 200 ml x 1,000 ug/mg x dilution / 1,000 ml/L x 1 g x 1,000 g/kg x (% solids/100)

Attribution:

The Peters Cartridge Factory formerly operated on a 10 acre parcel of land located at 1415 Grandin Road, on the south side of the Little Miami River in Warren County, Ohio. The property is currently known as the Kings Mills Technical Center (Ref. 4, pp. 1, 2; Ref. 5, p. 4; Ref. 6, p. 1). An area of contaminated soil, a contaminated septic system, and contaminated ground water have been identified at the site (Ref. 4, pp. 7, 9; Ref. 5, p. 4, Figure 8).

Peters Cartridge Factory operated from around 1880 to 1944 and manufactured ammunition for military and sporting uses (Ref. 4, p. 2). After World War I, the factory was sold to Remington Arms, which continued to manufacture ammunition. Remington Arms continued to operate the facility until 1944, at which time The Columbia Records Division of RCA occupied the facility, mixing plastic materials and manufacturing phonograph records (Ref. 4, p. 2). Several small businesses occupied portions of the property over the years, among which was LensCrafters. LensCrafters leased the property from 1987 to 1991 (Ref. 4, p. 2; Ref. 5, p. 1). As part of an environmental site assessment for the Kings Mills Technical Center, ground water and soil were sampled, identifying contamination at the site (Ref. 13, pp. 4, 9 to 17).

Peters Cartridge Factory manufactured lead shot ammunition by pouring lead out of a shot tower, and letting it fall through a screen in order to form pellets (Ref. 6, p. 11; Ref. 7, p. 10). Copper and mercury fulminate were also used in the lead shot ammunition preparation (Ref. 6, p. 11). Building 6 was used to prepare volatile fulminate of mercury primers (Ref. 18, p. 2). The residual lead, remaining after the pellets were removed, is responsible for the lead contamination found at the site; much of the site appears to have bee used for disposal of boiler ash, slag, etc. over the operating life of Peters Cartridge Factory (Ref. 6, pp. 11, 12; Ref. 13, pp. 17, 18).

A 1987 environmental assessment identified lead contaminated soils and lead contaminated ground water. Nine trenches were dug and these trenches were sampled at 1, 4, 8, and 12 feet depths. Soil lead concentrations were as high as 33,500 ppm and ground water concentrations are above the drinking water action level of 0.015 mg/L (Ref. 13, pp. 4, 9 to 15).

The Little Miami River is adjacent to the site. Site topography and drainage culverts to the Little Miami River provides a direct overland flow for hazardous substances from the site sources to the Little Miami River (Ref. 3; Ref. 4, pp. 1, 2; Ref. 6, p. 10, Figure 2; Ref. 7, pp. 50 to 54). An expanded site assessment conducted by the Ohio DES in 1999 continued to confirmed the presence of hazardous substances in 2 sources at the site, and documented contaminated sediments in the Little Miami River (Ref. 4, pp. 3 to 10; Refs. 26, 27, 28).

Copper, lead, and mercury have been identified in sediment samples from the Little Miami River adjacent to the facility. Organic hazardous substances were also identified in sediment samples from the Little Miami River as well as in site source samples. Included among these organic substances are 2-Buteonine, Phenanthrene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(a)pyrene, and Indeno(1,2,3-cd)pyrene (Ref. 4, Appendix B, pp 1, 6, 7; 10, pp. 36, 49, 50). Copper and lead are evaluated as observed release hazardous substances in the HRS score for Peters Cartridge Factory. Mercury is suspected as a hazardous substance in this discharge (Ref. 22, pp. 1 to 7). Mercury has been identified as a hazardous substance in the Little Miami River that may not necessarily be attributable to the Peters Cartridge Factory site (Ref. 4, p. 10). For these reasons, mercury is not evaluated as part of the observed release for Peters Cartridge Factory surface water migration pathway.

The Kings Mills United States Arm Reserve Center (USARC) is located approximately 1000 feet southwest of the Peters Cartridge Factory site. The USARC property covers approximately 16 acres and was formerly part of the 110 acre Kings Mills Ordnance Plant. Currently, this facility houses several buildings and an AMSA (Army maintenance sport activity) vehicle maintenance facility (Ref. 25, p. 4). The activities at the vehicle maintenance facility involve the use of solvents, fuels, and antifreeze. In the past, waste may have been disposed of on the ground (Ref. 25, p. 5). At the USARC, surface water and storm water drainage is to the south, onto the adjacent property, and then to the west, down the bluff to the Little Miami River (Ref. 25, p. 6). Discharge from the USARC is south and downstream of the observed release evaluated for the Peters Cartridge Factory site.

Hazardous Substances Released:
Copper
Lead

Observed Release Factor Value: 550

4.1.2.1.2 Potential to Release

Potential to Release by overland flow was not evaluated because an observed release has been established (Ref. 1 Section 4.1.2.1.1, p. 51609).

4.1.2.2 Drinking Water Threat Waste Characteristics

Toxicity/Persistence

Hazardous substance	Source	Toxicity	Persistence (River)	Toxicity/Persistence	References
1,1,2-Trichloro-1,2,2-Trifluoroethane	2	1	0.4	0.4	Ref. 2, p. B-19
Antimony	1	10,000	1	1×10^4	Ref. 2, B-2
Arsenic	1	10,000	1	1×10^4	Ref. 2, B-2
Copper	1	---	1	---	Ref. 2, p. B-6
Lead	1	10,000	1	1×10^4	Ref. 2, p. B-13
Mercury	1	10,000	0.4	4,000	Ref. 2, p. B-13
Silver	1	100	1	1×10^2	Ref. 2, p. B-17

The hazardous substances with the highest Toxicity/Persistence Factor Value are antimony, arsenic, and lead.

Toxicity/Persistence Factor Value: 1×10^4

4.1.2.2.2 Hazardous Waste Quantity

The hazardous constituent quantity for the sources at the site has not been adequately determined. Because the Little Miami River is a fishery and sensitive environment subject to Level II concentrations, a hazardous waste quantity factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

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

4.1.2.2.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor : 1×10^4
Hazardous Waste Quantity Factor Value: 100

Toxicity/Persistence x Hazardous Waste Quantity Factor (subject to a maximum of 1×10^8) = 1×10^6

Waste Characteristics Factor Category Value: 32
(Table 2-7)

4.1.2.3 Drinking Water Targets

No drinking water intakes were identified within the 15-mile target distance limit.

4.1.2.3 .3 Resources

The Little Miami River is designated for recreational use (Ref. 4, pp. iv, 22; 20).

Resources Factor Value: 5

4.1.3.2 Human Food Chain Threat Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Hazardous substance	Source	Toxicity	Persistence (River)	Bioaccumulation (Fresh)	Tox/Persistence/Bioaccumulation	References
1,1,2-Trichloro-1,2,2-Trifluoroethane	2	1	0.4	50	20	Ref. 2, p. B-19
Antimony	1	10,000	1	0.5	5×10^3	Ref. 2, p. B-2
Arsenic	1	10,000	1	5	5×10^4	Ref. 2, p. B-2
Copper	1	---	1	50,000	--	Ref. 2, p. B-6
Lead	1	10,000	1	50	5×10^5	Ref. 2, p. B-13
Mercury	1	10,000	0.4	50,000	2×10^8	Ref. 2, p. B-13
Silver	1	100	1	50	5×10^3	Ref. 2, p. B-17

The hazardous substance with the highest Toxicity/Persistence/Bioaccumulation Factor Value is mercury.

Toxicity/Persistence/Bioaccumulation Factor Value: 2×10^8

4.1.3.2.2 Hazardous Waste Quantity

The hazardous constituent quantity for the sources at the site has not been adequately determined. Because targets are subjected to Level II concentrations, a hazardous waste quantity factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100

4.1.3.2.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor: 4,000
Bioaccumulation Factor Value: 50,000
Hazardous Waste Quantity Factor Value: 100

Toxicity/Persistence x Hazardous Waste Quantity Factor (subject to a maximum of 1×10^8) = 4×10^5
Toxicity/Persistence/Hazardous Waste Quantity Factor x Bioaccumulation Factor Value (subject to a maximum of 1×10^{12}) = 2×10^{10}

Waste Characteristics Factor Category Value: 320
(Table 2-7)

4.1.3.3 Human Food Chain Threat-Targets

Actual Human Food Chain Contamination
The Little Miami River is a fishery (Ref. 4, Appendix F, p. 4; Ref. 16). A wildlife officer of Warren County, Ohio has frequently observed people fishing in the Little Miami River, adjacent to the Peters Cartridge Factory (Ref. 16).

Level I Fisheries

No Level I Concentrations are scored.

Most Distant Level II Sample

Sample ID: Ditch 3 (Sample is Adjacent to Ditch 3 in the Little Miami River.)
Distance from probable point of entry: approximately 800 feet (Ref. 17, p. 5)
References: Ref. 4; Figure 3; Ref. 16; Ref. 17, pp. 4, 5.

Level II Fisheries

Actual contamination of the Little Miami River was documented with Level II concentrations of observed release hazardous substances having a bioaccumulation potential factor of 500 or greater (copper) in sediment samples Ditch 3 and Downstream Culvert 2. This fishery is subject to Level II concentrations (Ref. 1, Sec. 4.1.3.3.1).

Identity of fishery	Extent of the Level II Fishery (Relative to PPE)	References
Little Miami River	approximately 800 feet	Ref. 4, Figure 3; Ref. 16; Ref. 17, pp. 4, 9; Ref. 19

4.1.3.3.1 Food Chain Individual

Actual contamination of the Little Miami River was documented with Level II concentrations of observed release hazardous substances having a bioaccumulation potential factor of 500 or greater (copper) in sediment samples Ditch 3 and Downstream Culvert 2. This fishery is subject to Level II concentrations; therefore, a value of 45 is assigned to the Human Food Chain Individual Factor Value (Ref. 1, Sec. 4.1.3.3.1).

Food Chain Individual Factor Value: 45

4.1.3.3.2 Population

4.1.3.3.2.2 Level I Concentrations

There are no fisheries subject to Level I concentrations in the study area.

Level I Concentrations Factor Value: 0

4.1.3.3.2.2 Level II Concentrations

Actual contamination of the Little Miami River was documented with Level II concentrations of hazardous substances in sediment samples collected in the Little Miami River at a location adjacent to Downstream Culvert 2 and Ditch 3. An observed release of copper, a hazardous substance with a bioaccumulation factor value 50,000, has been documented in the Little Miami River (Ref. 1, Section 4.1.3.3.1; Ref. 4, Appendix B, p. 10; Ref. 12, p.18). The zone of Level II contamination extends from the most upstream PPE at sample location Downstream Culvert 1 to the most downstream sample documenting an observed release in the Little Miami River at the location of sediment sample at Ditch 3 (Ref. 17, pp. 4, 5; Ref. 19).

A wildlife officer of Warren County, Ohio has frequently observed people fishing in the Little Miami River, adjacent to the Peters Cartridge Factory (Ref. 16). Actual contamination of the Little Miami River was documented with Level II concentrations of hazardous substances having a bioaccumulation potential factor of 500 or greater (copper) in sediment samples Ditch 3 and Downstream Culvert 2. The annual production for Little Miami River has not been documented, but this segment is a known fishery (Ref. 4, Appendix F, p. 4; Ref. 16). Therefore, a minimum value of greater than 0 to 100 pounds is assigned as the human food chain production (Ref. 1, Section 4.1.3.3.2.2). For an annual production of greater than 0 to 100 pounds per year, a Human Food Chain Population Value of 0.03 is assigned for the fishery (Ref. 1, Table 4-18).

Identity of Fishery	Annual Production (pounds)	References	Human Food Chain Population Value (Ref. 1, Table 4-18)
Little Miami River	>0 lbs	24	0.03

Sum of Level II Human Food Chain Population Values: 0.03

Level II Concentrations Factor Value: 0.03

4.1.3.3.2.3 Potential Human Food Chain Contamination

Potential human food chain contamination is not evaluated.

4.1.4.2 Environmental Threat Waste Characteristics

4.1.4.2.1 Toxicity/Persistence/Bioaccumulation

Hazardous substance	Source	Ecotoxicity (Fresh)	Persis-tence (River)	Bioac cumu lation	Tox/Persis-tence/Bioacc umulation	References
1,1,2-Trichloro-1,2,2-Trifluoroethane	2	1	0.4	50	2×10^1	Ref. 2, p. B-19
Antimony	1	100	1	5	5×10^2	Ref. 2, p. B–2
Arsenic	1	10	1	500	5×10^3	Ref. 2, p. B-2
Copper	1	100	1	50,000	5×10^6	Ref. 2, p. B-6
Lead	1	1,000	1	5,000	5×10^6	Ref. 2, p. B-13
Mercury	1	10,000	0.4	50,000	2×10^8	Ref. 2, p. B-13
Zinc	1	10	1	500	5×10^3	Ref. 2, p. B-20

The hazardous substance with the highest Toxicity/Persistence/Bioaccumulation Factor Value is mercury.

Toxicity/Persistence/Bioaccumulation Factor Value: 2×10^8

4.1.4.2.2 Hazardous Waste Quantity

The hazardous waste quantity for the sources at the site has not been adequately determined. Because targets are subject to Level II concentrations, a hazardous waste quantity factor value of 100 is assigned (Ref. 1, Section 2.4.2.2).

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

4.1.4.2.3 Waste Characteristics Factor Category Value

Ecotoxicity/Persistence Factor (lead) : 4,000
Bioaccumulation Factor Value (lead): 50,000
Hazardous Waste Quantity Factor Value: 100

Ecotoxicity/Persistence x Hazardous Waste Quantity Factor (subject to a maximum of 1×10^8) = 4×10^5
Ecotoxicity/Persistence/Hazardous Waste Quantity Factor x Bioaccumulation Factor Value (subject to a maximum of 1×10^{12}) = 2×10^{10}

Waste Characteristics Factor Category Value: 320
(Table 2-7)

4.1.4.3 Environmental Threat Targets

Level I Concentrations

No Level I targets are scored.

Level II Concentrations

Most Distant Level II Sample

Sample ID: Ditch 3 (Sample is Adjacent to Ditch 3 in the Little Miami River.)
Distance from the probable point of entry: approximately 800 feet**.**
References: Ref. 4, Figure 3; Ref.17, pp. 4, 5; Refs. 19, 20, 21.

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1. Level I Concentrations

Sensitive Environments

No Level I targets are scored.

4.1.4.3.1.2. Level II Concentrations

Sensitive Environments

The Little Miami River is a National and State designated scenic river (Ref. 4, p. iv, 22; Ref. 20; Ref. 21). An observed release of copper and lead have been documented in the Little Miami River (Ref. 1, Section 4.1.3.3.1; Ref. 4, Appendix B, p. 10; Ref. 12, p.18). The zone of Level II contamination extends from the most upstream PPE at sample location Downstream Culvert 1 in the Little Miami River to the most downstream sample documenting an observed release in the Little Miami River at the location of sediment sample at Ditch 3 (Ref. 17, 19).

Sensitive Environment	Distance from PPE to Nearest Sensitive Environment	References	Sensitive Environment Value (Table 4-23)
Little Miami River (National designated scenic river)	0	Ref. 4, p. iv, 22; Ref. 20; Ref. 21	50

Sum of Level II Sensitive Environments Value: 50

Wetlands

There is insufficient information to determine the wetland frontage subject to actual or potential contamination. Not scoring this factor does not impact the site score.

Sum of Level II Sensitive Environments Value + Wetlands Value: 50

Level II Concentrations Factor Value: 50

4.1.4.3.1.3 Potential Contamination

Sensitive Environments

There are several endangered species identified along the surface water migration pathway, but evaluation of these sensitive environments for potential contamination does not impact the HRS score for the Peters Cartridge Factory site (Ref. 19).

A copy of *Figure 1: Peters Cartridge Factory Site Location Map* is available at the EPA Headquarters Superfund Docket:

U.S. EPA CERCLA Docket Office
1301 Constitution Avenue
EPA West, Room B102
Washington, DC 20004

Telephone: (202) 566-0276
E-Mail: superfund.docket@epa.gov

A copy of *Figure 2: Peters Cartridge Factory Source 1 Location Map* is available at the EPA Headquarters Superfund Docket:

U.S. EPA CERCLA Docket Office
1301 Constitution Avenue
EPA West, Room B102
Washington, DC 20004

Telephone: (202) 566-0276
E-Mail: superfund.docket@epa.gov

A copy of *Figure 3: Peters Cartridge Factory Source 1 Location Map* is available at the EPA Headquarters Superfund Docket:

U.S. EPA CERCLA Docket Office
1301 Constitution Avenue
EPA West, Room B102
Washington, DC 20004

Telephone: (202) 566-0276
E-Mail: superfund.docket@epa.gov

A copy of *Figure 4: Peters Cartridge Factory Source 2 Location Map* is available at the EPA Headquarters Superfund Docket:

U.S. EPA CERCLA Docket Office
1301 Constitution Avenue
EPA West, Room B102
Washington, DC 20004

Telephone: (202) 566-0276
E-Mail: superfund.docket@epa.gov