

HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: Copley Square Plaza
EPA ID No.: OH0 000 563 122

Contact Persons:

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Pathways, Components, or Threats Not Scored:

The Hazard Ranking System (HRS) evaluation performed for the Copley Square Plaza focused only on threats associated with ground water contamination.

The surface water pathway was not scored because although the Ohio Environmental Protection Agency demonstrated through a dye test that wastewater from the Copley Square Plaza's wastewater pits was releasing to a creek located approximately 25 yards east of the pits, the creek is intermittent and surface water sample analytical data were not available when the HRS evaluation was performed (Ref. 6, p. 7; Ref. 8a, pp. 8, 9, and Table 6; and Ref. 8b, pp. 99, 100, and 104).

The soil exposure pathway was not scored because significant surface soil contamination has not been detected at the Copley Square Plaza.

The air migration pathway was not scored because the sample analytical and target data available when the HRS evaluation was performed were insufficient to score this pathway. However, the site score is above 28.50 without including the surface water migration, soil exposure, and air migration pathway scores.

HRS DOCUMENTATION RECORD

Name of Site: Copley Square Plaza
EPA Region: 5 Date Prepared: June 2004
Street Address of Site*: 2777 through 2799 Copley Road
City, County, State: Copley, Summit County, Ohio, 44321
General Location in the State: Northeast Ohio
Topographic Map: Akron West Quadrangle
Latitude: 41° 5' 34.2168" North Longitude: 81° 37' 2.856" West
(Ref. 3, p. 7; Ref. 6, p. i; and Ref. 11)

Scores

Air Pathway	0
Ground Water Pathway	100
Soil Exposure Pathway	0
Surface Water Pathway	0
HRS SITE SCORE	50

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

WORKSHEET FOR COMPUTING HRS SITE SCORE

	<u>S</u>	<u>S²</u>
1. Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	<u>100</u>	<u>10,000</u>
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	<u>Not Scored</u>	
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	<u>Not Scored</u>	
2c. Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	<u>Not Scored</u>	
3. Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	<u>Not Scored</u>	
4. Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	<u>Not Scored</u>	
5. Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		<u>10,000</u>
6. HRS Site Score Divide the value on line 5 by 4 and take the square root	<u>50</u>	

GROUND WATER MIGRATION PATHWAY SCORESHEET
REF.1, TABLE 3-1

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release	550	550
2. Potential to Release:		
2a. Containment	10	Not Evaluated
2b. Net Precipitation	10	Not Evaluated
2c. Depth to Aquifer	5	Not Evaluated
2d. Travel Time	35	Not Evaluated
2e. Potential to Release [lines 2a x (2b + 2c + 2d)]	500	Not Evaluated
3. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility	a	10,000
5. Hazardous Waste Quantity	a	100
6. Waste Characteristics	100	32
Targets:		
7. Nearest Well	50	50
8. Population:		
8a. Level I Concentrations	b	130
8b. Level II Concentrations	b	9
8c. Potential Contamination	b	294.9
8d. Population (lines 8a + 8b + 8c)	b	433.9
9. Resources	5	5
10. Wellhead Protection Area	20	5
11. Targets (lines 7 + 8d + 9 + 10)	b	493.9

Factor Categories and Factors	Maximum Value	Value Assigned
GROUND WATER MIGRATION SCORE FOR AN AQUIFER		
12. Aquifer Score [(lines 3 x 6 x 11)/82,500] ^c	100	100
GROUND WATER MIGRATION PATHWAY SCORE		
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated) ^c	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). Hazard Ranking System, 40 CFR Part 300, Appendix A, 55 FR 51533. December 14, 1990. Available from the Following Web Site: http://www.epa.gov/superfund/sites/npl/hrsres/index.htm#HRS%20Rule [1 page excerpt.] |
| 2. | EPA. Superfund Chemical Data Matrix (SCDM). January 28, 2004. [6 page excerpt.] |
| 3. | Ohio Environmental Protection Agency (OEPA). 2003. "Expanded Site Inspection Report, Copley Square Plaza, a.k.a. Danton Cleaners." September 20. [195 pages.] |
| 4. | OEPA. 2002. "Site Inspection Report, Copley Square Plaza, a.k.a. Danton Cleaners." September 20. [171 pages.] |
| 5. | EPA. 1994. Action Memorandum-Request to Conduct a Time-Critical Removal Action at the Copley Square Plaza Site, Copley Township, Summit County, Ohio. From Steven L. Renninger, On-Scene Coordinator, Emergency and Enforcement Response Branch - Section 1. To William E. Muno, Director, Waste Management Division. August 18. [9 pages.] |
| 6. | EPA. 1996. "Removal Action at the Copley Square Plaza Site, Copley, Summit County, Ohio." On-Scene Coordinator's Report. From Richard Karl, Chief, Emergency Response Branch. To Paul Nadeau, R5 - R7 Accelerated Response Center. May 31. [36 pages.] |
| 7. | EPA. 2002. "2002 Edition of the Drinking Water Standards and Health Advisories." Office of Water. Washington, DC. Summer. [19 pages.] |
| 8a. | Earth Tech. 1995. "Hydrogeologic Investigation at the Copley Square Plaza Shopping Center." Project No. 6185.01. Volume I. June. [95 pages.] |
| 8b. | Earth Tech. 1995. "Hydrogeologic Investigation at the Copley Square Plaza Shopping Center." Project No. 6185.01. Volume II. June. [407 pages.] |
| 9. | EPA. 1995. Superfund Fact Sheet. Copley Square Plaza Site. Copley, Ohio. May. [6 pages.] |
| 10a. | EPA. 2003. "Data Validation Report for SDG Number E0721 for OEPA Expanded Site Inspection Report." Includes Analytical Results for Field Samples MW-11 and MW-1S. October 24. [105 pages.] |
| 10b. | EPA. 2003. "Data Validation Report for SDG Number E0723 for OEPA Expanded Site Inspection Report." Includes Analytical Results for Field Samples MW-1I, MW-1D, MW-2S, MW-2D, MW-3S, MW-3I, MW-3D, MW-4S, MW-4I, MW-4D, USEPA MW-5S, USEPA MW-7D, and MW-12. October 24. [138 pages.] |

REFERENCES (Continued)

- | Ref. No. | Description of the Reference |
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| 10c. | EPA. 2003. "Data Validation Report for SDG Number E0762 for OEPA Expanded Site Inspection Report." Includes Analytical Results for Field Samples RW-03-ESI, RW-04-ESI, RW-06-ESI, RW-10-ESI, RW-11-ESI, and RW-12-ESI. October 28. [116 pages.] |
| 10d. | EPA. 2003. "Data Validation Report for SDG Number E0781 for OEPA Expanded Site Inspection Report." Includes Analytical Results for Field Samples RW-20-ESI and RW-21-ESI. October 28. [68 pages.] |
| 11. | Topozone. Maps Identifying Location of Specific Latitude and Longitude Coordinates Obtained from the Following Web Site: www.topozone.com [1 page.] |
| 12. | Anagnostopoulos, S., Tetra Tech EM Inc. (Tetra Tech). Record of Telephone Conversation with Michael Bolas, OEPA, Regarding Population Served by Residential Wells. August 13, 2004. [1 page.] |
| 13. | DynCorp Systems and Solutions, LLC, a CSC Company. Electronic Mail Transmission from Tanya Amme to Sandy Anagnostopoulos, Tetra Tech, Regarding SCDM Values for Trichlorethylene. August 9, 2004. [4 pages.] |
| 14. | Anagnostopoulos, S., Tetra Tech EM Inc. (Tetra Tech). Record of Telephone Conversation with Michael Bolas, OEPA, Regarding Data Used to Generate Population Data Included in Appendix C of the OEPA ESI. August 13, 2004. [1 page.] |
| 15. | OEPA. Excerpt from OEPA Web Site Indicating That Ohio's Wellhead Protection Program Has Been Approved by EPA. Obtained from the Following Web Site: http://www.epa.state.oh.us/ddagw/pdu/swap_faqs.html [1 page.] |
| 16. | EPA Office of Solid Waste and Emergency Response (OSWER). Quick Reference Fact Sheet: Using Qualified Data to Document an Observed Release and Observed Contamination. EPA 540-F-94-028. PB94-963311. November 1996. [18 pages.] |
| 17. | EPA Office of Solid Waste and Emergency Response (OSWER). Quick Reference Fact Sheet: Low Concentration Organic Analytical Service for Superfund (Water Matrix) (OLC03.2). EPA 540-F-01-013. Publication 9240.0-37FS. June 2001. [4 pages.] |
| 18. | EPA Office of Solid Waste and Emergency Response (OSWER). Quick Reference Fact Sheet: Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (OLM04.3). OSWER Document 9240.1-42-FSD. EPA Publication 540-03-005. August 2003. [4 pages.] |
| 19. | Tetra Tech EM Inc. (Tetra Tech). Residential Water Well Sampling Results, Copley, Ohio. October 28, 2002. [74 pages.] |

REFERENCES (Continued)

- | Ref. No. | <u>Description of the Reference</u> |
|----------|---|
| 20. | OEPA Communication Memorandum: Copley Square Plaza Project HRS confirmation of Ground Water Wells. To: Laura Ripley, USEPA Region V. From: Michael Bolas, OEPA. September 7, 2004. [2 pages.] |
| 21. | OEPA Email Regarding Table of Sampling Addresses to Sampling Numbers. To: Laura Ripley, USEPA Region V. From Mike Bolas, OEPA. September 3, 2004. [4 pages.] |
| 22. | OEPA Copley Square Sampling Location Map for Background, Monitoring and Residential Wells. [1 page.] |
| 23. | OEPA Standard Operating Procedure (SOP) for Drinking Water. [2 pages.] |
| 24. | OEPA Residential Ground Water Analytical Results for Background RW-20 Samples. May 2002. [5 pages.] |
| 25. | OEPA Communication Memorandum: Copley Square Plaza Project HRS confirmation of Ground Water Wells. To: Laura Ripley, USEPA Region V. From: Michael Bolas, OEPA. September 9, 2004. [1 page.] |
| 26. | U.S. EPA Region 5. From: Laura Ripley. To: Dr. William Chantry. QA/QC Analytical Data Sheets for RW-20. [20 pages.] |

COPLEY SQUARE PLAZA
Copley, Summit County, Ohio

SITE SUMMARY

Copley Square Plaza is located near the intersection of Copley and Jacoby Roads at 2777 through 2799 Copley Road, Copley Township, Summit County, Ohio (see Figure 1). Copley Square Plaza encompasses two buildings located on approximately 1 acre and includes the former Danton Dry Cleaners, a vacant grocery store, a dental office, and a hair care center (see Figure 2). An area of ground water contamination has been identified immediately east and southeast of Copley Square Plaza. Waste pits located in the former Danton Dry Cleaners have been identified as the source of contamination. Copley Square Plaza is bordered on the south by Copley Road, on the north by a vacant lot, on the east by a condominium development property, and on the west by commercial businesses (Ref. 6, p. 1). Currently, the front portion of the building where the former Danton Dry Cleaners was located is used as a dance studio and the portion of the building where the waste pits were located is used as a storage area for other tenants in the building (Ref. 14).

In April 1990, the Ohio Environmental Protection Agency (OEPA) responded to a complaint regarding an odor in the water from two wells on a property in Copley Square Plaza. OEPA representatives sampled the wells and found the ground water to be contaminated with volatile organic compounds (VOC) at concentrations exceeding the U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCL) for drinking water. The principal VOC detected was tetrachloroethene, an industrial solvent used to dry clean fabrics and remove grease from metal parts. OEPA directed the tenants of the two affected properties to cease using the contaminated wells. Beginning in late April 1990, the tenants were supplied with clean water from the City of Akron public drinking water supply. Continued sampling of the public and private wells in the area in 1991, 1992, and 1993 indicated that the VOC contamination was not affecting local well water (Ref. 9, p. 2).

In January 1994, OEPA began a long-term investigation at Copley Square Plaza to determine the extent of contamination and to evaluate it as a potential threat to private wells in the area. The investigation also attempted to identify the potentially responsible parties (PRP) for the ground water contamination. Because tetrachloroethene, the principal contaminant detected in the samples, is a solvent used in dry cleaning, the investigation included an inspection of the Danton Dry Cleaners at Copley Square Plaza. The former Danton Dry Cleaners location had been operating as a dry cleaner since 1963 (Ref. 9, p. 2).

As part of the OEPA investigation, 11 monitoring wells were installed around the area of known ground water contamination. OEPA also inspected eight concrete block tanks (pits) inside the dry cleaning facility and performed a dye test to determine the discharge points of the wastewater in the tanks (pits). Sample analytical results of the wastewater in the tanks (pits) indicated the presence of tetrachloroethylene; cis-1,2-dichloroethylene; trichloroethylene; vinyl chloride; chloroform, ethylbenzene; trans-1,2-dichloroethene; and xylene (Ref. 8a, Tables 4 and 5; and Ref. 9 pp. 2 and 3). OEPA conducted ground water, soil, and wastewater sampling during this investigation, and tentatively identified two possible sources of the VOC contamination in the ground water in this area: the dry cleaning facility and three adjacent properties on the south side of Copley Road. Additional sampling in Summer 1994 indicated that the area of ground water contamination was situated around the intersection of Copley and South Plainview Roads (Ref. 8a, p. 6; and Ref. 9, pp. 2 and 3). It has since been determined that the contamination east, southeast of Copley Square Plaza could not all be coming from the three properties south of Copley Road considered in 1994 as possible sources because these properties are downgradient of the Danton Dry Cleaners location and downgradient of contaminated monitoring wells.

A copy of the *Figure 1* is available at the EPA Headquarters Superfund Docket:

Public Reading Room, Room B102
EPA West Building
1301 Constitution Avenue, NW
Washington, DC 20004

Telephone: (202) 566-1744
E-Mail: superfund.docket@epa.gov

A copy of the *Figure 2* is available at the EPA Headquarters Superfund Docket:

Public Reading Room, Room B102
EPA West Building
1301 Constitution Avenue, NW
Washington, DC 20004

Telephone: (202) 566-1744
E-Mail: superfund.docket@epa.gov

OEPA requested EPA assistance in providing an alternative water source to the affected residents in the area in July 1994. As a permanent remedy, EPA installed water-treatment systems at the residences (Ref. 9, p. 3). EPA also removed the solvent-contaminated wastewater from the concrete block pits and capped the pits with concrete (Ref. 5, p. 3; Ref. 8a, p. 6, Ref. 9, p.3). A shallow ground water recovery trench was installed to collect contaminated ground water from around and beneath the building foundation. In April 1995, OEPA assumed the responsibility for maintaining both the trench system and the eight residential water-treatment systems (Ref. 9, p. 3).

Monitoring well analytical results from a November 2000 sampling event indicated that contamination had spread to monitoring wells that previously had not shown evidence of contamination. In January 2002, OEPA recommended that the site be brought back into the federal system and that a site inspection (SI) be performed (Ref. 4, p. 1). Ground water samples were again collected in May and August 2002 from the monitoring and residential wells (Ref. 4, p. 6). Samples from nine residential wells contained VOCs at concentrations exceeding drinking water MCLs; however, results for these samples were qualified as unusable because of high temperature upon receipt at the laboratory (Ref. 4, pp. 11 and 12).

OEPA conducted an expanded site inspection (ESI) in August 2003 to determine the current extent of ground water contamination at the site. During the ESI, 17 monitoring wells and 23 residential wells were sampled (Ref. 3, pp. 8 and 12). Eight monitoring well samples contained VOCs that can be attributed to the former Danton Dry Cleaners at concentrations exceeding three times the VOC concentrations of upgradient background samples (Ref. 3, pp. 8, 9, 10, and 11). In addition, two residential well samples contained vinyl chloride at concentrations exceeding the drinking water MCL (Ref. 3, p. 16). Vinyl chloride is a degradation product that can be attributed to the former Danton Dry Cleaners.

An observed release of vinyl chloride; cis-1,2-dichloroethene; trichloroethene; and tetrachloroethene is documented by chemical analytical results for ground water samples collected from the monitoring and residential wells during the OEPA ESI conducted at the Copley Square Plaza (Ref. 3, pp. 16, 34, 43, 45, and 47). Four of the residential well samples exhibit contamination above the EPA drinking water criteria (e.g., maximum contaminant levels, MCLs), and another two exhibit contamination. Ground water is primarily used for drinking water within the 4-mile target distance limit from the Copley Square Plaza, and a wellhead protection area exists within the 4-mile target distance limit (Ref. 3, p. 118).

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Name of Source: Concrete Block Wastewater Tanks (Pits)

Number of Source: 1

Source Type: Tanks and containers other than drums

Description of Source: Source 1 consists of eight concrete block wastewater tanks (pits) used to treat wastewater generated by operations at the former Danton Dry Cleaners. The pits have a total capacity of 6,400 gallons or greater (Ref. 5, p. 3; Ref. 8a, p. 6; and Ref. 9, p. 3). In 1994, OEPA discovered the floor covering the pits consisted of 2- by 4-inch and 2- by 6-inch wood planks overlaid with 0.5-inch-thick plywood. The liquid in the tanks (pits) ranged from 41 to 48 inches deep, and the combined volume of liquid in the tanks (pits) was approximately 6,400 gallons. The total depth of each tank (pits) was about 72 inches from the room's floor elevation (Ref. 8a, p. 6).

In 1994, OEPA collected wastewater samples from the eight tanks (pits). Sample analytical results indicated the presence of tetrachloroethylene; cis-1,2-dichloroethylene; trichloroethylene; vinyl chloride; chloroform, ethylbenzene; trans-1,2-dichloroethene; and xylene (Ref. 5, p. 3; and Ref 8a, Tables 4 and 5).

Location of Source: Source 1 is located inside a former dry cleaning facility, Danton Dry Cleaners, located in Copley Square Plaza (Ref. 4, p. 2; and Ref. 5, p. 3). Copley Square Plaza is bordered on the south by Copley Road, on the north by a vacant lot, on the east by a condominium development property, and on the west by commercial businesses. At the time of the expanded site inspection (ESI) in 2003, Copley Square Plaza was not fenced and was accessible on all sides (Ref. 3, p. 7). Figure 1 shows the Copley Square Plaza location on a topographic map, and Figure 2 shows Copley Square Plaza features.

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Source Samples

Sample Location (Sample No.)	Sample Type	Screened Interval (feet bgs)	Date	Hazardous Substance	Hazardous Substance Concentration (µg/L) ^a	Sample* Quantitation Limit (µg/L)	Reference
Tank #1; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	170 1,100 210	10 10 10	8a, Table 4; 8b, pp. 5, 6, and 8; and 18
Tank #2; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	70 6,600 80	50 50 50	8a, Table 4; 8b, pp. 5, 6, and 10; and 18
Tank #3; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene chloroform	20 1,700 20	10 10 10	8a, Table 4; 8b, pp. 5, 6, and 19; and 18
Tank #4; shallow	Wastewater	NA	2/1/94	tetrachloroethene	43,000	500	8a, Table 4; 8b, pp. 5, 6, and 20; and 18
Tank #5; shallow	Wastewater	NA	2/1/94	tetrachloroethene	68	1	8a, Table 4; 8b, pp. 5, 6, and 11; and 18
Tank #6; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	30 990 10	10 10 10	8a, Table 4; 8b, pp. 5, 6, and 15; and 18
Tank #7; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	200 2,300 100	20 20 100	8a, Table 4; 8b, pp. 5, 6, and 14; and 18
Tank #8; shallow	Wastewater	NA	2/1/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	10 64 19	1 1 1	8a, Table 4; 8b, pp. 5, 6, and 16; and 18
Tank #1; deep	Wastewater	NA	3/16/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	7,600 150,000 8,700	1,000 1,000 1,000	8a, Table 5; 8b, pp. 5, 64, and 68; and 18

Sample Location (Sample No.)	Sample Type	Screened Interval (feet bgs)	Date	Hazardous Substance	Hazardous Substance Concentration ($\mu\text{g/L}$) ^a	Sample* Quantitation Limit ($\mu\text{g/L}$)	Reference
Tank #2; deep	Wastewater	NA	3/16/94	tetrachloroethene	110,000	1,000	8a, Table 5; 8b, pp. 5, 64, and 69; and 18
Tank #3; deep	Wastewater	NA	3/16/94	tetrachloroethene	130,000	2,000	8a, Table 5; 8b, pp. 5, 64, and 72; and 18
Tank #4; deep	Wastewater	NA	3/16/94	tetrachloroethene	140,000	2,000	8a, Table 5; 8b, pp. 5, 64, and 74; and 18
Tank #5; deep	Wastewater	NA	3/16/94	tetrachloroethene	5,300	50	8a, Table 5; 8b, pp. 5, 64, and 73; and 18
Tank #6; deep	Wastewater	NA	3/16/94	tetrachloroethene	450	5	8a, Table 5; 8b, pp. 5, 64, and 71; and 18
Tank #7; deep	Wastewater	NA	3/16/94	trichloroethene tetrachloroethene cis-1,2-dichloroethene	55 1,200 110	10 10 10	8a, Table 5; 8b, pp. 5, 64, and 70; and 18
Tank #8; deep	Wastewater	NA	3/16/94	trichloroethene tetrachloroethene ethylbenzene vinyl chloride cis-1,2-dichloroethene trans-1,2-dichloroethene xylene, total	7.2 300 3.6 2.1 62 2.8 26	2 2 2 2 2 2 2	8a, Table 5; 8b, pp. 5, 64, and 75; and 18
COMP; deep	Wastewater	NA	3/16/94	tetrachloroethene	150,000	2,000	8a, Table 5; 8b, pp. 5, 64, and 76; and 18

Notes:

* Contract Required Quantitation Limit (CRQL) for CLP samples, MDL for others.

 $\mu\text{g/L}$ = Microgram per liter

bgs = Below ground surface

COMP = Composite sample of wastewater from Tanks 1 through 8
NA = Not applicable

- ^a For some samples, the laboratory prepared and analyzed a sample dilution. If the undiluted sample result was not qualified, the result is presented in the table. If the undiluted sample result was qualified, the diluted sample result is presented in the table.

List of Hazardous Substances Associated with Source

The following hazardous substances were detected in samples of wastewater collected from Source 1 by OEPA in 1994 (Ref. 5, p. 3; and 8a, Tables 4, 5, and 6):

- Vinyl chloride
- cis-1,2-Dichloroethene
- Trichloroethene
- Tetrachloroethene
- Chloroform
- Ethylbenzene
- trans-1,2-Dichloroethene
- Xylene

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Reference
Gas release to air:	NS	
Particulate release to air:	NS	
Release to ground water: Evidence of hazardous substance migration from Source 1 is documented. On July 22, 1994, OEPA performed a dye test that showed dye leaked directly into the soil and ground water surrounding the Danton Dry Cleaners building where the tanks were located.	10	1, p. 51596, Table 3-2; 3, pp. 12, 13, and 33; 6, pp. 7, 9, and 10
Release via overland migration and/or flood:	NS	

Note:

NS = Not scored

2.4.2 HAZARDOUS WASTE QUANTITY**2.4.2.1.1 Hazardous Constituent Quantity**Description

The information available is not sufficient to evaluate Tier A source hazardous waste quantity; therefore, hazardous constituent quantity is not scored.

Hazardous Constituent Quantity (C) Assigned Value: NS

2.4.2.1.2 Hazardous Wastestream QuantityDescription

The information available is not sufficient to evaluate Tier B, source hazardous waste quantity; therefore, hazardous constituent quantity is not scored.

Hazardous Wastestream Quantity (W) Assigned Value: NS

2.4.2.1.3 VolumeDescription

At the time the tanks (pits) were discovered, OEPA estimated the volume of liquid contained in the tanks was approximately 6,400 gallons (Ref. 8a, p. 6). This may not represent the total volume of the tanks as it is not known if the tanks were full at this time. It is also a conservative estimate of the amount of waste because it is based on a one time volume measurement. In reality, several volumes of wastewater may have been released from the pits over the years.

$$6,400 \text{ gallons} \times (1 \text{ yd}^3/200 \text{ gallons}) = 32 \text{ yds}$$

The source type is “tanks and containers other than drums”; therefore, the volume divided by 2.5 was used to assign a volume value as documented below (Ref. 1, Table 2-5, p. 51591):

$$32 \text{ yd}^3/2.5 = 12.8$$

Volume (V) Assigned Value: 12.8

2.4.2.1.4 Area

Description

Because the volume of Source 1 can be determined, an Area (A) value of 0 was assigned (Ref. 1, p. 51591, Section 2.4.2.1.3).

Area (A) Assigned Value: 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Description

The source hazardous waste quantity value is 12.8 for Tier C volume (Ref. 1, p. 51591, Section 2.4.2.1.5).

Highest assigned value assigned from Ref. 1, Table 2-5: 12.8

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway				
			Ground Water (GW) (Ref. 1, Table 3-2)	Surface Water (SW)		Air	
				Overland/flood (Ref. 1, Table 4-2)	GW to SW (Ref. 1, Table 3-2)	Gas (Ref. 1, Table 6-3)	Particulate (Ref. 1, Table 6-9)
1	12.8	N	10	NE	NE	NE	NE

Note:

NE = Not evaluated

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Ground Water Migration Pathway Description

The geologic deposits and associated aquifer system encountered beneath Copley Square Plaza are divided into two main categories: the unconsolidated glacial deposits of the Mogadore Till and the underlying bedrock (intermediate and deep) of the Meadville Member of the Cuyahoga Formation (Ref. 8a, pp. 15 and 16). These three units comprise a single water-bearing unit that exhibits a high degree of interconnectivity based on consistent ground water elevation and flow patterns and consistent detection of VOCs in each unit. The unconsolidated deposits and two bedrock zones and ground water flow are discussed below. This information and geotechnical data are based on the 11 soil borings associated with the monitoring well clusters MW-1 through MW-4, which were installed by the OEPA in 1994 (Ref. 8a, pp. 16 and 17). Figure 3 shows the monitoring well locations.

Surficial Unconsolidated Deposits

Geotechnical data obtained during drilling and existing water well logs from the area near Copley Square Plaza indicate that the unconsolidated materials are composed primarily of coarse-grained till deposits. These glacial deposits are brown clayey silt to silty clay with some to little sand and gravel, stiff to hard, damp to moist, and cohesive. Thickness ranges from 13.3 to 19 feet across Copley Square Plaza. The upper portion of the till deposits displays areas of prominent iron oxidation and black mineralization, possibly manganese. The oxidation and mineralization indicate weathering generally present along vertical and horizontal partings and as haloes around gravel and rock fragments within the till. Interbedded with the till are thin layers of "sand" that range from finely sandy silt to "clean" fine to medium sands. These interbedded layers range from less than 1 to approximately 4.8 feet thick. The saturated coarser grained deposits are typically encountered just above the contact between the unconsolidated glacial till and the bedrock. Four shallow ground water wells were installed to monitor these silts and sands (Ref. 8a, p. 18).

Intermediate Bedrock Zone

The intermediate bedrock zone is the area of fractured rock typically encountered between the weathered bedrock surface and the deeper more competent bedrock. The weathered bedrock is 5 to 7 feet thick at 13 to 20 feet below ground surface (bgs). The bedrock becomes less fractured and more competent at approximately 30 to 33 feet bgs. The intermediate bedrock zone consists of gray fissile to fossiliferous shale with interbedded layers of micaceous siltstone and very fine sandstone varying from less than 1 to 6 feet thick. Vertical and subvertical fracturing with ferric oxidation and some mineralization was noted throughout this zone. The fractures were wet and in some zones were filled with saturated silt or clay material. Three monitoring wells were installed within the intermediate zone: one upgradient (MW-1I) and two downgradient (MW-3I and MW-4I) wells (Ref. 8a, pp. 18 and 19).

A copy of the *Figure 3* is available at the EPA Headquarters Superfund Docket:

Public Reading Room, Room B102
EPA West Building
1301 Constitution Avenue, NW
Washington, DC 20004

Telephone: (202) 566-1744
E-Mail: superfund.docket@epa.gov

Deep Bedrock Zone

The deep bedrock zone is the area of competent rock below the fractured and weathered intermediate bedrock. The exact boundary between these two zones is not distinct and cannot be readily redefined solely on the extent of fracturing; however, geotechnical boring logs indicate that the fracturing ends in the proximity of a definitive lithological contact. A lithological unit composed primarily of fractured shale and thin interbeds of sandstone predominated in the intermediate bedrock zone, whereas sandstone with interbedded shale prevails as the lithological unit in the deep bedrock zone. This lithological change occurs at approximately 990 feet mean sea level (MSL) or approximately 40 feet bgs across Copley Square Plaza. See Figure 1 for MSL values in the vicinity of Copley Square Plaza. The deep bedrock zone consists of interbedded, fine, silty, micaceous sandstone and shale that varies from a very hard, light gray fossiliferous mudstone (marl) to dark gray or black, organic-rich shales that exhibit well developed fissility and pyrite crystallization. Bedding structures alternate from interbedded sandstones demonstrating laminar, herring bone, and composite cross-bedding. The deep bedrock zone contains some vertical and subvertical fracturing; however, the fracturing observed in the deep bedrock zone is not as apparent as that observed in the intermediate bedrock zone. Monitoring wells MW-1D through MW-4D were completed within the deep bedrock zone. MW-1D and MW-2D were installed up-gradient of the former dry cleaning location. MW-3D and MW-4D were completed down-gradient of the former dry cleaning location (Ref. 8a, p. 19).

Ground Water Flow

Hydraulic conductivities based on withdrawal and insertion slug tests performed at the Copley Square Plaza indicate geometric mean values of 1.12×10^{-3} , 7.03×10^{-4} , and 6.84×10^{-4} centimeters per second (cm/s) for the unconsolidated deposits, intermediate bedrock zone, and deep bedrock zone, respectively (Ref. 8a, p. 26). A comparison of water level data for each unit indicates that a hydraulic connection exists between the upper and lower units (Ref. 8a, pp. 23 and 24); therefore, for Hazard Ranking System (HRS) purposes, the aquifer system is evaluated as a single hydrologic unit. The ground water in the unconsolidated, intermediate, and deep portions of the aquifer exhibits interconnectivity. This is demonstrated by:

- The overall consistent decrease in ground water elevations in all three portions of the aquifer from high precipitation periods (i.e., April) to low precipitation periods (i.e., September). While there are some short-term anomalies to this trend (i.e., observation of artesian conditions in several monitoring wells), this is expected of an aquifer comprised of heterogeneous materials in different aquifer units (Ref. 3, p. 9; and Ref. 8a, Figures 27 through 30).
- The close agreement between flow direction and hydraulic gradient of ground water in the unconsolidated aquifer and intermediate bedrock aquifer over three seasons (Ref. 8a, pp. 20 and 21) indicates interconnectivity between these units.
- The consistent detection of VOCs in each of the three portions of the aquifer indicates interconnectivity and mixing of ground water between the three portions of the aquifer.

Depth to ground water in the vicinity of Copley Square Plaza ranges from approximately 4 to 12 feet bgs in the shallow aquifer (Ref. 8a, Table 9). Comparison of water level data recorded from the shallow, intermediate, and deep water zones indicates that a downward vertical gradient occurs in the vicinity of Copley Square Plaza except at well cluster MW-4. Water level data plotted for MW-4S and MW-4I indicate an upward gradient between the intermediate and shallow zones during the spring when precipitation is greater; however, water level data recorded during the drier months between late May through late September 1994 indicate a downward vertical gradient similar to that observed at the remaining well clusters. The area's ground water flow direction appears to be east to southeast (Ref. 8a, pp. 21 and 22). During both the May 2002 site inspection and August 2003 ESI sampling events, artesian conditions were observed in all monitoring wells (Ref. 3, p. 9).

SUMMARY OF AQUIFER(S) BEING EVALUATED

Aquifer No.	Aquifer Name	Is Aquifer Interconnected with Upper Aquifer within 2 miles? (Y/N/NA)	Is Aquifer Continuous within 4-mile TDL? (Y/N)	Is Aquifer Karst? (Y/N)
1	Surficial Unconsolidated Deposits (Mogadore Till)	NA	Y	N
2	Intermediate Bedrock (Cuyahoga Formation)	Y	Y	N
3	Deep Bedrock (Cuyahoga Formation)	Y	Y	N

3.1 LIKELIHOOD OF RELEASE

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: Surficial Unconsolidated Deposits and Intermediate and Deep Bedrock

An ESI conducted by OEPA in August 2003 provides documentation of an observed release attributable to the waste tanks (pits) located in the Copley Square Plaza. Ground water samples collected from residential and monitoring wells located downgradient (east and southeast) of Copley Square Plaza contained tetrachloroethene; trichloroethene; cis-1,2-dichloroethene; and vinyl chloride at concentrations exceeding EPA maximum contaminant limits and were also significantly higher than background residential or monitoring well concentrations collected upgradient (northwest/southwest) of the Copley Square Plaza (Ref. 3, pp. 13, 14, 15, 16, 33, 34, 43, 45, 47, 78, 80, 82, 84, and 86; and 7, pp. 3 and 7). The samples were analyzed for volatile organic compounds (VOC) by the EPA Contract Laboratory Program (CLP) laboratories (Ref. 3, pp. 12 and 16). Tetrachloroethene; trichloroethene; cis-1,2-dichloroethene; vinyl chloride; chloroform; ethylbenzene; trans-1,2-dichloroethene; and xylene can be attributed to the waste tanks (pits) based on source samples collected from the waste tanks (pits) (see Section 2.2 for specific source sample information).

Chemical Analysis

Residential and monitoring well samples were used to establish background concentrations. To establish an observed release, samples collected from residential wells were compared to samples collected from the designated background residential wells RW-20 and RW-21. Similarly, samples collected from monitoring wells were compared to samples collected from the designated background monitoring well locations, monitoring well clusters MW-1 and MW-2. As described in Section 3.0 on page 22 of this HRS Documentation Record, the ground water in the vicinity, and to the depth encompassed by the monitoring and residential wells sampled during the ESI, is considered to be part of a single aquifer.

Residential wells RW-20 and RW-21 are located approximately 950 and 1,100 feet northeast of the waste pits, respectively (Ref. 3, Figure 4). Monitoring well cluster MW-1 is located approximately 276 feet west of the building on the southwest corner of the Copley Square Plaza property near Copley Road (Ref. 3, p. 12). Monitoring well cluster MW-2 is located approximately 253 feet from the building and on the northwest corner of Copley Square Plaza next to the Play On Soccer property (Ref. 3, p. 12). Because the area's ground water flow direction appears to be east to southeast (Ref. 3, p. 9; and Ref. 8a, pp.21 and 22), these residential and monitoring wells are upgradient of Copley Square Plaza. Figure 3 shows the residential and monitoring well locations.

As shown in the tables below, the background and release samples from the ESI are similar and their contaminant concentrations can be compared because they were collected during the same sampling event using the same sampling and analysis procedures and from a similar range of depths. While some depths of the release wells are not specifically known, since all wells with known screened intervals within 1 mile are screened between a 17 and 120 foot depth, EPA considers it reasonable to assume that all wells are screened in this interval and in the 3 interconnected aquifers (Ref. 3 pp.126 to 129 and 171 to 187). In addition, the depths are presented relative to ground surface (bgs). While there is a surface elevation difference across the target distance limit for the site, it is unlikely to be sufficient to result in the wells being screened outside of the three interconnected aquifers being evaluated as a single aquifer system (Ref. 3, Figure 1, p. 26).

- Background Concentrations:

As shown below, all background samples had contaminant levels below detection. Therefore the background levels for the contaminants in the release are considered to be the detection limits of the substances in the background samples. For drinking water supply samples analyzed using EPA's Low Concentration Organic Analytical Service, the background is considered to be the method detection limit (MDL) of 0.5 for the VOCs in the release (Ref. 17). For the monitoring well samples analyzed using the Multi-media, multi-concentration, organic analytical service, the method detection limit and CRQL is 10 (unless otherwise stated below (Ref. 18)).

Sampling Location	Screened Interval (feet bgs)	Date	Reference
RW-20-ESI	105	8/6/03	3, pp. 16, 30, 34, and 126; and 25
RW-20	35	5/14/02	23, p. 2; and 24, pp. 2 and 3; 25; and 26
RW-21-ESI	120	8/6/03	3, pp. 16, 30, 34, and 127; 25; and 26
MW-1S	9.3 to 16.3	8/5/03	3, pp. 12, 33, and 130
MW-1I	22.4 to 32.4	8/4/03	3, pp. 12, 33, and 131
MW-1D	48.8 to 68.8	8/5/03	3, pp. 12, 33, 132, 133, and 134
MW-2S	11.2 to 21.2	8/4/03	3, pp. 13, 33, and 135
MW-2D	42 to 62	8/4/03	3, pp. 13, 33, 136, and 137

Sample Location (Sample No.)	Hazardous Substance	Concentration (µg/L)	Sample* Quantitation Limit (µg/L)	Ref.
RW-20-ESI (E0781)	No VOCs detected	ND	0.5	3, pp. 17, 34, 62, and 63; 10d, pp. 5, 6, 10, 11, 28, 29, and 30; 16; 17; 18; and 26
RW-20	No VOCs detected	ND	0.5	16; 20; 22; 24, pp. 2 and 3; and 26
RW-21-ESI (E0782)	No VOCs detected	ND	0.5	3, pp. 17, 34, 62, and 63; 10d, pp. 10, 11, 35, 36, and 37; 16; 17; and 18
MW-1S (E0725)	1,1,1-trichloroethane tetrachloroethene	9 J ^a 3 J ^a	10 10	3, pp. 12, 33, 104 and 105; 10a, pp. 7, 17, 49, and 50; 16 and 18

Sample Location (Sample No.)	Hazardous Substance	Concentration (µg/L)	Sample* Quantitation Limit (µg/L)	Ref.
MW-1I (E0724)	No VOCs detected	ND	10	3, pp. 12, 33, 76, and 77; 10b, pp. 11, 12, 45, and 46; 16 and 18
MW-1D (E0723)	No VOCs detected	ND	10	3, pp. 12, 33, 76, and 77; 10b, pp. 11, 12, 42, and 43; 16 and 18
MW-2S (E0727)	No VOCs detected	ND	10	3, pp. 13, 33, 76, and 77; 10b, pp. 11, 12, 51, and 52; 16 and 18
MW-2D (E0726)	No VOCs detected	ND	10	3, pp. 13, 33, 76, and 76; 10b, pp. 11, 12, 48, and 49; 16 and 18

Notes:

* CRQL for CLP samples, MDL for others.

µg/L = Microgram per liter

bgs = Below ground surface

ND = Not detected

VOC = Volatile organic compound

^a These sample contaminant concentrations are qualified because they are below the laboratory's CRQL or MDL.

- Contaminated Samples:

Seventeen monitoring wells and 23 residential wells were sampled during the ESI (Ref. 3, pp. 18). Eight monitoring well samples contained VOCs at concentrations exceeding three times the VOC concentrations of upgradient background samples. In addition, two residential well samples contained VOCs at concentrations exceeding the MCLs for drinking water. These exceedances can be attributed to Source 1.

Sampling Location	Screened Interval (feet bgs)	Date	Reference
RW-03-ESI	58	8/6/03	3, pp. 16, 34, and 128; and 25
RW-04-ESI	Well log not found ^b	8/6/03	3, pp. 16 and 34
RW-05	60	8/6/03	19, pp. 7; 20; 25
RW-06-ESI	Well log not found ^b	8/6/03	3, pp. 16 and 34
RW-08	N/A	8/6/03	19, pp. 6; and 20
RW-09/28	N/A	8/6/03	19, pp. 4; and 20
RW-11-ESI	52	8/6/03	3, pp. 16 and 34; and 25
MW-3S	13.4 to 18.1	8/5/03	3, pp. 13, 33, and 138
MW-3D	41 to 61	8/5/03	3, pp. 13, 33, 141, and 142
MW-4S/MW-11 ^c	6.3 to 14.3	8/6/03	3, pp. 14, 33, and 143
MW-4I	17.4 to 24.4	8/6/03	3, pp. 14, 33, and 144
MW-4D	34.3 to 54.3	8/6/03	3, pp. 14, 33, 145, and 146
USEPA MW-5S	6 to 13	8/6/03	3, pp. 147 and 148
USEPA MW-7D	37 to 64 ^a	8/6/03	3, pp. 160 and 161
MW-12	Well log not found ^b	8/6/03	3, pp. 16 and 34

Notes:

N/A = Not available

bgs = Below ground surface

^a The screened interval for this well was not specified in the well log, however, the screened interval shown extends from the casing length to the total well depth.

^b While some depths of the release wells are not specifically known, since all wells with known screened intervals within 1 mile are screened between a 13.4 and 64 foot depth, EPA considers it reasonable to assume that all wells are screened in this interval and in the 3 interconnected aquifers. (Ref. 3 pp. 126 to 129 and 171 to 187).

^c Sample MW-11 is a duplicate sample collected from MW-4S (Ref. 3, p. 33).

Sample Location (Sample No.)	Hazardous Substance	Concentration (µg/L)	Sample* Quantitation Limit (µg/L)	Reference
RW-03-ESI (E0764 and E0764DL)	vinyl chloride cis-1,2-dichloroethene	8.1 130 J ^a (13 adjusted)	0.50 5.0	3, pp. 16, 34, and 43; 10c, pp. 5, 12, 13, 14, 15, 47, 50, 51, and 52; 16; 17; and 18
RW-04-ESI (E0765 and E0765DL)	vinyl chloride cis-1,2-dichloroethene	4.5 61	0.50 2.5	3, pp. 16, 34, and 45; 10c, pp. 14, 15, 53, and 58; 16; 17; and 18
RW-05	cis-1,2 dichloroethene trans-1,2 dichloroethene vinyl chloride	54 1.1 4.4	0.50 0.50 0.50	17; 19, pp. 7, 43 thru 47, and 66 thru 74; 20
RW-06-ESI (E0767)	vinyl chloride cis-1,2-dichloroethene	0.87 4.4	0.50 0.50	3, pp. 16, 34 and 45; 10c, pp. 14, 15, 63, and 64; 16; 17; and 18
RW-08	cis-1,2 dichloroethene	8.4	0.50	17; 19, pp. 6, 26, and 66 thru 74; 20
RW-09/28	1,1-dichloroethene cis-1,2 dichloroethene trans-1,2 dichloroethene tetrachloroethene trichloroethene vinyl chloride	0.8 200 4.7 15 13 4.8	0.50 0.50 0.50 0.50 0.50 0.50	17; 19, pp. 4, 8 thru 10 and 66 thru 74; 20
RW-11-ESI (E0772)	cis-1,2-dichloroethene	2	0.50	3, pp. 16, 34 and 47; 10c, pp. 16, 17, 75, and 76; 16; 17; and 18
MW-3S (E0730 and E0730DL)	cis-1,2-dichloroethene tetrachloroethene trichloroethene	190 260 130	50 50 10	3, pp. 13, 33, 78, and 80; and 10b, pp. 13, 14, 15, 67, 68, 70, and 71; 16 and 18
MW-3D (E0728 and E0728DL)	vinyl chloride cis-1,2-dichloroethene trichloroethene tetrachloroethene	17 390 470 1,900	10 250 250 250	3, pp. 13, 33, and 78; 10b, pp. 13, 14, 58, 59, 61, and 62; 16 and 18
MW-4S/MW-11 ^b (E0733/E0722 and E0722DL)	vinyl chloride cis-1,2-dichloroethene trichloroethene tetrachloroethene	27 170 120 1,900	10 10 10 250	3, pp. 14, 33, 80, and 104; 10a, pp. 5, 6, 7, 17, 43, 44, and 47; 10b, pp. 15, 16, 79, and 80; 16 and 18
MW-4I (E0732)	vinyl chloride cis-1,2-dichloroethene tetrachloroethene	15 42 92	10 10 10	3, pp. 14, 33, and 80; 10b, pp. 15, 16, 76, and 77; 16 and 18

Sample Location (Sample No.)	Hazardous Substance	Concentration (µg/L)	Sample* Quantitation Limit (µg/L)	Reference
MW-4D (E0731)	cis-1,2-dichloroethene	72	10	3, pp. 14, 33, and 80; 10b, pp. 15, 16, 73, and 74; 16 and 18
USEPA MW-5S (E0735 and E0735DL)	cis-1,2-dichloroethene trichloroethene tetrachloroethene	160 150 290	10 10 200	3, pp. 15, 33, and 82; 10b, pp. 17, 18, 85, 86, and 89; and 16
USEPA MW-7D (E0736)	cis-1,2-dichloroethene	30	10	3, pp. 15, 33, and 82; 10b, pp. 17, 18, 91, and 92; 16 and 18
MW-12 (E0760 and E0760DL)	cis-1,2-dichloroethene tetrachloroethene	2,100 33,000	1,000 2,000	3, pp. 15, 33, and 84; 10b, pp. 19, 20, 21, 22, 113, 114, 115, and 116; 16 and 18

Notes:

* CRQL for CLP samples, MDL for others.
µg/L = Microgram per liter

- ^a This sample concentration is qualified because during analysis of this sample, continuing calibration did not meet the laboratory's quality control criteria. The sample concentration presented is for Sample No. E0764DL because the sample concentration for Sample No. E0764 (150 µg/L) exceeded the calibration limit of the laboratory's equipment (Ref. 10b, pp. 5, 12, 13, 14, 15, 47, 50, 51, and 52). This represents a situation where the bias of this result is unknown and may be biased high. The EPA Fact sheet, titled "Using Qualified Data to Document an Observed Release and Observed Contamination" explains that since this contaminant is not listed in the fact sheet, the default adjustment factor is 10. Additionally, the Fact Sheet also directs for biased high data to divide the value by the adjustment factor and then determine if the adjusted value meets the observed release criteria. In this case the adjusted value become 13 and this is above the background level of 10 thus meeting the Observed Release significance criteria (Ref. 16, p. 7).
- ^b Sample MW-11 is a duplicate sample collected from MW-4S (Ref. 3, p. 33). Results for vinyl chloride, cis-1,2-dichloroethene, and trichloroethene presented above are from Sample No. E0722. Results for tetrachloroethene presented above are from Sample No. E0727DL.

Level I Samples

Level I concentrations are established for samples from drinking water wells in which the concentration of a hazardous substance that meets the criteria for an observed release is at or above its specific health-based benchmark. Benchmarks for ground water include MCLs, nonzero maximum containment level goals (MCLG), and screening concentrations for cancer and chronic noncancer effects (Ref. 1, p. 51603, Section 3.3.2.4). As shown in the table below, Level I concentrations were detected in samples collected from two residential wells.

Sample Location (Sample No.)	Hazardous Substance	Hazardous Substance Concentration (µg/L)	Benchmark Concentration (µg/L)	Benchmark	Reference for Benchmark
RW-03-ESI (E0764)	vinyl chloride	8.1	2	MCL	2, p. BII-12; 3, pp. 16, 34, and 43; 7, p. 7; 10c, pp. 5, 12, and 47; 16 and 18
RW-04-ESI (E0765)	vinyl chloride	4.5	2	MCL	2, p. BII-12; 3, pp. 16, 34, and 45; 7, p. 7; 10c, pp. 14, 15, 53, and 58; 16 and 18
RW-05	vinyl chloride	4.4	2	MCL	2, p. BII-12; 16; 18; and 19, p. 7
RW-09	cis-1,2 dichloroethene tetrachloroethene vinyl chloride	200 15 4.8	70 5 2	MCL	2, pp. BII-5, and BII-12 ; 16; 18; and 19, p. 4

Notes:

µg/L = Microgram per liter

MCL = Maximum contaminant level

SDG = Sample delivery group

Attribution

Dry cleaning operations were conducted at Copley Square Plaza from 1963 to 1994 (Ref. 6, p. 5). In 1994, OEPA inspected eight concrete block tanks (pits) located inside the dry cleaning facility and conducted dye tests to determine the discharge points of wastewater from the dry cleaning facility (Ref. 6, p. 6). The dyetest showed dye leaked directly into the soil and ground water surrounding the Danton Dry Cleaners building where the tanks were located (Ref. 6 pp.7, 9, and 10). In 1994, OEPA tentatively identified two possible sources of the VOC contamination in the ground water in this area: the dry cleaning facility and three adjacent properties on the south side of Copley Road (Ref. 9, p. 2).

Sampling conducted in Summer 1994 indicated that the area of ground water contamination was situated around the intersection of Copley and South Plainview Roads. Source samples collected from the waste tanks (pits) indicate the presence of vinyl chloride; cis-1,2-dichloroethene; trichloroethene; and tetrachloroethene. Of these four contaminants, only tetrachloroethene was detected at low concentrations in an upgradient monitoring well (MW-1S). The remaining three contaminants were not detected in monitoring and residential samples collected upgradient of the waste tanks (pits). Analytical results for ground water samples collected downgradient of the waste tanks (pits) indicate elevated concentrations of vinyl chloride (up to 27 microgram per liter [$\mu\text{g/L}$]); cis-1,2-dichloroethene (up to 2,100 $\mu\text{g/L}$); trichloroethene (up to 470 $\mu\text{g/L}$); and tetrachloroethene (up to 33,000 $\mu\text{g/L}$) (see table on pages 27 and 28). Based on these results and because ground water flows east and southeast, ground water contamination is attributable to the waste tanks (pits) at the Copley Square Plaza. In addition, other possible upgradient sources of VOC ground water contamination are located upgradient of the background sampling locations and are therefore not considered.

Furthermore, the contamination east, southeast of Copley Square Plaza could not all be coming from the three properties south of Copley Road considered in 1994 as possible sources because these properties are downgradient of the Danton Dry Clears location and downgradient of contaminated monitoring wells 3 and 12.

Hazardous Substances Released

Vinyl chloride
cis-1,2-Dichloroethene
Trichloroethene
Tetrachloroethene

Ground water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 TOXICITY/MOBILITY

Hazardous Substance	Source No. (and/or Observed Release)	Toxicity Factor Value	Mobility Factor Value ^{a,b}	Does Haz. Substance Meet Observed Release by chemical analysis? (Y/N)	Toxicity/Mobility (Ref. 1, Table 3-9)	Reference
Vinyl chloride	1 and observed release	10,000	1	Y	10,000	2, p. BI-12
cis-1,2-Dichloroethene	1 and observed release	100	1	Y	100	2, p. BI-5
Trichloroethene	1 and observed release	10,000	1	Y	10,000	1, p. 51589, Section 2.4.1.1; and 13, pp. 1, 2, 3, and 4
Tetrachloroethene	1 and observed release	100	1	Y	100	2, p. BI-10
Chloroform	1	100	1	N	100	2, p. BI-3
Ethylbenzene	1	10	1	N	10	2, p. BI-6
Trans-1,2-Dichloroethene	1	100	1	N	100	2, p. BI-5
Xylene, total	1	100	0.01	N	1	2, p. BI-12

Notes:

- ^a Pursuant to Section 3.2.1.2, a mobility factor of 1 was assigned for all hazardous substances that met the criteria for an observed release by chemical analysis to at least one aquifer underlying the source (Ref. 1, p. 51601).
- ^b Ground water mobility values for non-karst aquifers were included in the table above because no karst aquifers exist within the target distance limit (see Section 3.0 for a description of aquifers within the target distance limit).

Toxicity/Mobility Factor Value: 10,000
(Ref. 1, Table 3-9)

3.2.2 HAZARDOUS WASTE QUANTITY

Source No.	Source Type	Source Hazardous Waste Quantity
1	Tanks and containers other than drums	12.8

Sum of Values: 12.8

Because residents have been subjected to Level I contamination, a hazardous waste quantity factor value of 100 was assigned (Ref. 1, Table 2-6 and p. 51592, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Table 2-6 and p. 51592, Section 2.4.2.2)

3.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

Toxicity/Mobility Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100

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

Waste Characteristics Factor Category Value: 32
(Ref. 1, Table 2-7)

3.3 TARGETS

Targets were evaluated within a 4-mile target distance limit. Figure 4 shows the 4-mile target distance limit for the Copley Square Plaza.

3.3.1 NEAREST WELL

Level I contamination at residential well RW-03 has been established (Ref. 3, pp. 16, 34, and 43; and 10c, pp. 5, 12, 13, 14, 15, 47, 50, 51, and 52); therefore, a nearest well factor value of 50 was assigned.

Well ID: RW-03-ESI

Level of Contamination (I, II, or potential): I

If potential contamination, distance from source in miles: Not applicable

Nearest Well Factor Value: 50
(Ref. 1, Table 3-11)

3.3.2 POPULATION

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

Level I Well	Aquifer No.	Population	Reference
RW-03-ESI	1	3	19; and 20
RW-04-ESI	1	4	19; and 20
RW-05-ESI	1	2	19; and 20
RW-09-ESI	1	4	19; and 20

Sum of Population Served by Level I Wells: 13

Sum of Population Served by Level I Wells x 10: 130

Level I Concentrations Factor Value: 130
(Ref. 1, p. 51603, Section 3.3.2.2)

A copy of the *Figure 4* is available at the EPA Headquarters Superfund Docket:

Public Reading Room, Room B102
EPA West Building
1301 Constitution Avenue, NW
Washington, DC 20004

Telephone: (202) 566-1744
E-Mail: superfund.docket@epa.gov

3.3.2.3 Level II Concentrations

Level II Well	Aquifer No.	Population	Reference
RW-06-ESI	1	2	19; and 20
RW-08	1	4	19; and 20
RW-11-ESI	1	3	19; and 20

Sum of Population Served by Level II Wells: 9

Level II Concentrations Factor Value: 9
(Ref. 1, p. 51603, Section 3.3.2.3)

3.3.2.4 Potential Contamination

The table below illustrates the potential target population within the 0.25-, 0.50-, 1.0-, 2.0-, 3.0-, and 4.0-mile radius rings around the source (Source 1) at the Copley Square Plaza as described below.

Between 0 and 0.25 mile:

Insufficient documentation exists to quantify the water supply wells between 0 and .025 mile from the source, therefore a potential target population value of 0 has been assigned. The distance-weighted population value for 0 to 0.25 miles is zero.

Between 0.25 and 0.50 mile:

Between 0.25 and 0.50 mile from the source are two water supply wells with well ID numbers 2 and 3, that supply water to Lorantffy Care Center and Copley Square Water Co., respectively (Ref. 3; pp. 18 and 19). Potential targets associated with wells 2 and 3 were calculated according to the populations served at each of the above facilities. The distance-weighted population value for 0.25 to 0.50 miles is 324 (Ref. 1, section 3.3.2.4 *Potential Contamination*, Table 3-12).

Between 0.50 and 1.0 mile:

Between 0.50 and 1.0 mile from the source are two water supply wells 5 and 7 that supply water to Summit Co-Copley Meadows and Spring Garden Waldorf School, respectively (Ref. 3; pp. 18 and 19). Potential targets associated with wells 5 and 7 were calculated according to the populations served at each of the above facilities. The distance-weighted population value for 0.50 to 1.0 miles is 167 (Ref. 1, section 3.3.2.4 *Potential Contamination*, Table 3-12).

Between 1.0 and 2.0 mile:

Between 1.0 and 2.0 mile from the source are five water supply wells 13, 18, 20, 21, and 27 that supply water to Arrowhead Elementary School (13), Copley Fairlawn Middle School (18 and 20), First Benefits Water System (21) and Ghent Academy for Boys (27) (Ref. 3; pp. 18 and 19; 20, p. 1). Potential targets associated with wells 13, 18, 20, 21, and 27 were calculated according to the populations served at each of the above facilities. The distance-weighted population value for 1.0 to 2.0 miles is 294 (Ref. 1, section 3.3.2.4 *Potential Contamination*, Table 3-12).

Between 2.0 and 3.0 mile:

Between 2.0 and 3.0 mile from the source are both one water supply well, 33, that supplies water to Granger Lake Condominium (Ref. 3; pp. 18 and 19) and Barberton City Water Treatment Plant where three ground water wells are used to supplement the surface water Barberton Reservoir. The three wells provide 55% of the supply water when in operation; the system serves a total population of 29,000 (Ref. 1, section 3.3.2.4 *Potential Contamination*; 20, p. 1). Potential targets associated with well 33 were calculated according to the population served at Granger Lake Condominium. Potential targets associated with the three ground water wells at the Barberton City Water Treatment Plant were calculated based on the percentage of the total population served (29,000 x .55)* (Ref. 1, section 3.3.2.4 *Potential Contamination*). The distance-weighted population value for 2.0 to 3.0 miles is 2,122 (Ref. 1, Table 3-12).

Between 3.0 and 4.0 mile:

Between 3.0 and 4.0 mile from the source are two water supply wells 48 and 54 that supply water to Norton Middle School and Nicolard’s Day Care, respectively (Ref. 3; pp. 18 and 20; 20, p. 1). Potential targets associated with wells 48 and 54 were calculated according to the populations served at each of the above facilities. The distance-weighted population value for 3.0 to 4.0 miles is 42 (Ref. 1, section 3.3.2.4 *Potential Contamination*, Table 3-12).

Distance Category (miles)	Well ID #	Well Distance from Source (miles)	Total Population	Reference	Distance-Weighted Population Value (Ref. 1, Table 3-12)
0 to 1/4	-	-	0	-	0
Greater than 1/4 to 1/2	2	.2634	101	3; pp. 18 and 19	324
	3	.388	<u>709</u> 810^T	3; pp. 18 and 19	
Greater than 1/2 to 1	5	.6347	392	3; pp. 18 and 19	167
	7	.6605	<u>216</u> 608^T	3; pp. 18 and 19	
Greater than 1 to 2	13	1.3	429	20; p. 1	294
	18	1.49	606	20; p. 1	
	20	1.52	606	20; p. 1	
	21	1.53	72	3; pp. 18 and 19	
	27	1.77	<u>62</u> 1,775^T	3; pp. 18 and 19	
Greater than 2 to 3	33	2.12	72	3; pp. 18 and 19	2,122
	(see above text)*	1.5	<u>15,950</u> 16,022^T	20; p. 1	
Greater than 3 to 4	48	3.62	815	20; p. 1	42
	54	3.83	<u>55</u> 870^T	3; pp. 18 and 19	

Distance Category (miles)	Well ID #	Well Distance from Source (miles)	Total Population	Reference	Distance-Weighted Population Value (Ref. 1, Table 3-12)
Sum of Distance-Weighted Population Value					2,949

Notes:

* See table and above text associated with the 2.0 to 3.0 mile distance ring.

^T Sum total of population within specific distance ring

Calculations:

$$0 + 324 + 167 + 294 + 2,122 + 42 = 8,243$$

Sum of Distance-Weighted Population Values: 2,949

Sum of Distance-Weighted Population Values/10: 294.9

Potential Contamination Factor Value: 294.9

(Ref. 1, p. 51604, Section 3.3.2.4)

3.3.3 RESOURCES

Resources have been established as water is being drawn from a target well for the aquifer being evaluated for irrigation purposes for a 40-acre area (Ref. 20). As stated in the HRS Rule Section 3.3.3 *Resources*, a resources factor value of 5 is to be assigned if water drawn from any target well for the aquifer being evaluated is used for irrigation of 5 or more acres; therefore, a resources factor value of 5 was assigned.

Resources Factor Value: 5

(Ref. 1, p. 51604, Section 3.3.3)

3.3.4 WELLHEAD PROTECTION AREA

The Copley Square Plaza is not located in a wellhead protection area; however, a wellhead protection area exists within a 4-mile target distance limit from the Copley Square Plaza (Ref. 3, p. 118; and Ref. 15).

Wellhead Protection Area Factor Value: 5

(Ref. 1, p. 51604, Section 3.3.4)