HRS DOCUMENTATION RECORD -- REVIEW COVER SHEET

Site Name: Old Wilmington Road Groundwater Contamination
EPA ID No: PAD981938939

Contact Persons

Site Contact: Drew Lausch, U.S. Environmental Protection Agency (EPA)
Region 3
(215) 814-3359

Documentation Record: Kevin Wood, EPA, Region 3
(215) 814-3303

Pathways, Components, or Threats Not Scored

The soil exposure, surface water, and air pathways were not scored in this Hazard Ranking System (HRS) evaluation because they do not pose significant risk. There is insufficient data to score the groundwater to surface water pathway.

HRS DOCUMENTATION RECORD

Date Completed: July 9, 1999

Site Name: Old Wilmington Road Groundwater Contamination

EPA Region: 3

Street Address of Site: Old Wilmington Road, Sadsburyville

County and State: Chester County, Pennsylvania

General Location in the State: Southeast Pennsylvania (Figure 1)

Topographic Maps: Parkesburg Quadrangle, 7.5 Minute Series, Photorevised 1992; Honey Brook Quadrangle, 7.5 Minute Series, Photorevised 1983

Latitude: 39°59′45″N **Longitude:** 75°54′30″W
(Measured from the approximate center of the groundwater plume)

Pathway Scores

Groundwater	100
Surface Water	NS
Soil Exposure	NS
Air	NS

HRS SITE SCORE 50

TABLE 3-1
GROUND WATER MIGRATION PATHWAY SCORESHEET

	Factor Categories and Factors	Maximum Value	Value Assigned
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release		
	2a. Containment	10	NS
	2b. Net Precipitation	10	NS
	2c. Depth to Aquifer	5	NS
	2d. Travel Time	35	NS
	2e. Potential to Release [lines 2a(2b+2c+2d)]	500	NS
3.	Likelihood of Release	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)	626
	8b. Level II Concentrations	(b)	8.46
	8c. Potential Contamination	(b)	0
	8d. Population (lines 8a+8b+8c)	(b)	634.46
9.	Resources	5	0
10.	Wellhead Protection Area	20	0
11.	Targets (lines 7+8d+9+10)	(b)	634.46
	Ground Water Migration Score for an Aquifer:		
12.	Aquifer Score [(ines 3 x 6 x 11)/82,500]	100	100
	Ground Water Migration Pathway Score:		
13.	Pathway Score (Sg_W), (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.

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Groundwater Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	100	10,000
2a.	Surface water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	
2b.	Groundwater to Surface-water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	NS	
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
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 four and take the square root		50

REFERENCES

Reference Number	Description of the Reference
1.	U.S. Environmental Protection Agency (U.S. EPA). Hazard Ranking System, Final Rule, Appendix A of the National Contingency Plan, 55 Federal Register 51583, 40 Code of Federal Regulations Part 300. U.S. Government Printing Office. Washington, D.C. December 14, 1990. Not Included - Publicly Available Document.
2.	U.S. EPA. Superfund Chemical Data Matrix (SCDM). June 1996. Not Included - Publicly Available Document.
3.	NUS Corporation. Site Inspection of Perry Phillips Landfill. May 3, 1989. (320 pages).
4.	Towle, Michael, On-Scene Coordinator, U.S. EPA. Facsimile regarding names and addresses of residential wells to Samuel Baughman, Geologist, Weston. January 8, 1998. (1 page).
5.	Thermo Analytical. Old Wilmington Road Site QA Data Report. June 23, 1995. (45 pages).
6.	GP Environmental Services, Inc. Sample Analysis Report, Perry Phillips Site. October 4, 1996. (57 pages).
7.	U.S. EPA. Organic Data Validation Report for the Perry Phillips Landfill Site. February 1, 1999. (80 pages).
8.	Reference Deleted.
9.	U.S. EPA. Water Management Division. Memorandum from Mary Brewster, Enforcement and Program Support Section and Bill Foster, Drinking Water Section, Regarding Perry Phillips Mobile Home Park Drinking Water Well. February 24, 1993. (2 pages).
10.	PA Department of Environmental Resources (DER). Special Analyses Reports. March 27, 1990; July 18, 1990; January 1, 1991 through March 31, 1991; July 1, 1991 through September 30, 1991; October 1, 1991 through December 31, 1991; January 1, 1992 through March 31, 1992; April 1, 1992 through June 30, 1992; July 1, 1992 through September 30 1992; October 1, 1992 through December 31, 1992. (11 pages).
11.	U.S. EPA. Memorandum Regarding Perry Phillips Mobile Home Park Drinking Water Well from Bill Foster, Drinking Water Section and Mary Brewster, Enforcement and Program Support Section to File. November 9, 1992. (3 pages).

REFERENCES (continued)

Reference Number	Description of the Reference
12.	U.S EPA. Memorandum Regarding Perry Phillips Landfill Request For Reassessment of HRS Scoring from Bill Foster, Superfund Technical Coordinator, Drinking Water Section to Lorie Baker, Site Assessment Section. February 1, 1993. (20 pages).
13.	U.S. EPA. ERNS Incident Notification Report. January 21, 1993 (2 page).
14.	U.S. EPA. Removal Site Assessment. March 19, 1993. (3 pages).
15.	U.S. EPA. Special Bulletin A, Perry Phillips Landfill Site, from Michael Towle, On-Scene Coordinator, Eastern Response Section to the Regional Response Center, U.S. EPA Region III. December 21, 1993. (8 pages).
16.	U.S. EPA. Polreps, Perry Phillips Landfill. March 2, 1993 to July 5, 1994 (19 pages).
17.	U.S. EPA. Facsimile Regarding Monitoring Well Profiles, Perry Phillips Landfill. January 8, 1998. (4 pages).
18.	Weston. Sample Location Map, Old Wilmington Road Site. January 24, 1995. (1 page).
19.	U.S. EPA. Potential Hazardous Waste Site Identification, Old Wilmington Road Site. March 30, 1994. (1 page).
20.	U.S. EPA. ERNS Incident Notification Report. April 20, 1994. (2 pages).
21.	U.S. EPA. Federal On-Scene Coordinator's Report for Old Wilmington Road Site. March 22, 1995. (32 pages)
22.	Weston. Hydrogeology Report Perry Phillips Landfill Site. June 1, 1998. (50 pages).
23.	PADER. Preliminary Assessment for Perry Phillips Landfill, PA #2122. December 19, 1986. (32 pages).
24.	NUS Corporation. Non-Sampling Site Reconnaissance Summary Report. April 5, 1988. (27 pages).
25.	NUS Corporation. Logbook for Perry Phillips Landfill, 8711-23. FIT 609. November 31, 1987. (18 pages).
26.	PA Bureau of Litigation Enforcement, Eastern Region. Letter from Keith Welks, Assistant Attorney General to Honorable Earl Smith Regarding Perry Phillips Landfill. April 18, 1978. (3 pages).

REFERENCES (continued)

Reference Number	Description of the Reference
27.	U.S. EPA. Federal On-Scene Coordinator's Report for Perry Phillips Landfill Site. March 1, 1995, (36 pages).
28.	U.S. EPA. Memorandum from Lawrence H. Richardson, Civil Investigator, Removal Enforcement Section to File Regarding Removal Enforcement PRP Search Close-out for Old Wilmington Road Site. September 8, 1994. (2 pages).
29.	Weston. Trip Report for Perry Phillips Landfill. March 11, 1999. (23 pages).
30.	Bell Atlantic. Yellow Pages (with White Pages) for Coatesville, Downingtown, Exton, Page 57. June 1998 - May 1999. (2 pages).
31.	Poth, C. Hydrology of the Metamorphic and Igneous Rocks of Chester County, Pennsylvania. Water Resources Report 25. Pennsylvania Geological Survey. 1968, Reprinted 1973. (7 pages).
32.	Princeton Testing Laboratory, Inc. Analytical Report. January 12, 1994. (20 pages).
33.	Reference Deleted.
34.	Tetra Tech. I or J Index Calculation for Perry Phillips Landfill/Old Wilmington Road Groundwater Plume HRS Package. April 16, 1999. (2 pages).
35.	Tetra Tech. Record of Telephone Conversation Regarding Chester County Population per Household Between Donna Davies, Environmental Scientist, and Karen Jones, Research Assistant, U.S. Bureau of Census. (1 page).
36.	Frost Associates. Centracts Report for Perry Phillips Landfill. March 5, 1999 (9 pages).
37.	Chester County Health Department. Letter from James Morgan, Sanitary Technician to Terry Fabian, PADER, Regarding Perry Phillips Site. December 12, 1972. (5 pages).
38.	PADER. Memorandum from Bruce D. Beitler, Environmental Protection Specialist to Dennis Coyne, Environmental Strike Force, Regarding Perry Phillips Landfill. May 16, 1973. (1 page).
39.	PADER. Memorandum from George Buchanan EPS-II to Mark Rosenburg, EPS-I Regarding Status of Four Chester County Sites. May 10, 1976. (2 pages).
40.	PADER. Memorandum from Mark Rosenberg, Environmental Protection Specialist to Wayne Lynn, Region Solid Waste Director, Region I Regarding Perry Phillips Landfill. April 2, 1976. (1 page).

REFERENCES (continued)

Reference Number	Description of the Reference
41.	PADER. Memorandum from Bruce Beitler, Solid Waste Specialist to File Regarding Perry E. and Jeanne E. Phillips Property. February 28, 1978. (2 pages).
42.	Richards, Layton, & Finger. Letter from Stephen E. Herrmann, Attorney to Wayne Lynn, Regional Solid Waste Director, PADER Regarding NVF Company, Yorklyn, Delaware. March 22, 1978, (2 pages).
43.	PADER. Memorandum from Bruce Beitler, Solid Waste Specialist to File Regarding Perry E. and Jeanne E. Phillips Property. March 29, 1978. (1 page).
44.	PADER. Memorandum from Bruce Beitler, Solid Waste Specialist to File Regarding Perry E. and Jeanne E. Phillips Property. April 20, 1978. (1 page).
45.	PADER. Memorandum from Frank Holmes, Solid Waste Specialist (SWS) to File Regarding Perry Phillips Dump Inspection. October 7, 1981. (3 pages).
46.	PADER. Consent Order and Agreement for Commonwealth vs. Perry E. and Jeanne E. Phillips. Docket No. S-364-S-369-86. October 30, 1986. (17 pages).
47.	Reference Deleted.
48.	PADER. Memorandum from Wayne Lynn, Solid Waste Coordinator to James Snyder, Chief Solid Waste Enforcement Unit, Division of Solid Waste Management Regarding Perry Phillips Landfill. January 21, 1972. (3 pages).
49.	Chester County Health Department. Letter from Carole Rubley, Solid Waste Coordinator to Frank Holmes, PADER, Regarding Perry Phillips Landfill. June 3, 1987. (11 pages).
50.	Tetra Tech. Record of Telephone Conversation Regarding Residential Well Sampling Between Donna Davies, Environmental Scientist and Craig Zeidman, Hydrogeologist, Weston. March 11, 1999. (1 page).
51.	Tetra Tech. Record of Telephone Conversation Regarding Well Depths in Vicinity of Perry Phillips Landfill Between Donna Davies, Environmental Scientist and John Senmelhaack, Chester County Health Department. March 8, 1999. (1 page).
52.	U.S. Geological Survey. Parkesburg Quandrangle, 7.5 Minute Series, Photorevised 1992; combined with the Honey Brook (Photorevised 1983), Coatesville (Photorevised 1992) and Wagontown (Photorevised 1983) 7.5 Minute Quandrangles.
53.	Recra LabNet. Analytical Report TDD #9805-L10. June 11, 1998. (117 pages).

REFERENCES (continued)

Reference Number	Description of the Reference
54.	Tetra Tech. Record of Telephone Conversation Regarding Water Supply in West Caln Township Between Donna Davies, Environmental Scientist and Jan Bower, Environmental Planner, Chester County Planning Commission. February 24, 1999. (1 page).
55.	Chester County Planning Commission. Chester County Water Systems Inventory. December 1984. (1 page).
56.	Geology and Well Locations in the Coatesville and Parkesburg Quadrangles, Pennsylvania, Plate 2. 1968, (Reprinted 1973).

ACRONYMS AND ABBREVIATIONS

EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ft	Feet
HRS	Hazard Ranking System
HWQ	Hazardous Waste Quantity
MCL	Maximum Contaminant Level
mg/kg	Milligram per kilogram
NA	Not applicable
ND	Not detected
NS	Not scored
NL	Not listed
PA	Preliminary Assessment
PADEP	Pennsylvania Department of Environmental Protection
PCE	Tetrachloroethene
SCDM	Superfund Chemical Data Matrix
SI	Site inspection
SVOC	Semi-volatile organic compound
µg/kg	Microgram per kilogram
VOC	Volatile organic compound

SITE SUMMARY

The Old Wilmington Road Ground Water Contamination Site consists of a plume of groundwater contaminated with various volatile organic compounds (VOCs) located in the vicinity of Old Wilmington Road in Sadsburyville, West Caln Township, Chester County, Pennsylvania (Figures 1 and 2). The groundwater plume was discovered during a U.S. Environmental Protection Agency (EPA) site inspection (SI) completed for the Perry Phillips Landfill site located along Old Wilmington Road in Sadsburyville (Ref. 3). During the SI eleven residential wells were sampled. Laboratory analytical results indicated that the residential well located on the site (Perry Phillips home well) as well as several other wells in the vicinity were contaminated with VOCs and manganese at levels above background (Ref. 3, pp. 7-1a and 7-5a).

The well that provided water to the 60 residents of a mobile home park owned by Perry Phillips was found to be contaminated with levels of trichloroethene (TCE) above the EPA maximum contaminant level (MCL) for that compound. (Ref. 3, p. 7-1a and Ref. 9, p.1).

Subsequent sampling conducted by the Pennsylvania Department of Environmental Protection (PADEP) (formerly Department of Environmental Resources) confirmed the VOC contamination in the Perry Phillips residential and mobile home park wells (Ref. 10). On November 9, 1992 EPA representatives from the Drinking Water Section, the Enforcement and Program Support Section, and the Region III Central Regional Laboratory in Annapolis met with PADEP and Chester County Health Department personnel to conduct a sampling and inspection of the public water supply system that provided water for the Perry Phillips mobile home park (Ref. 11, p. 1). Three groundwater samples were collected from three separate wells. Two of the wells provided water to the mobile home park and the third well was the Perry Phillips residential well (Ref. 11, p. 2). Laboratory analytical results indicated that two of the three wells (one of the mobile home park wells and the Perry Phillips well) had VOC contamination above corresponding maximum contaminant levels (MCLs) and the level of tetrachloroethylene (PCE) in the Phillips private well exceeded EPA's Removal Action Level (Ref. 12, pp. 1, 2). Based on these results an ERNS incident notification report was filed by EPA's Drinking Water Section on January 21, 1993 (Ref. 13). EPA's Hazardous Waste Management Division's Eastern Removal Response Section was informed of the situation and initiated a removal site assessment on February 26, 1993 (Ref. 9, p. 2 and Ref. 14). Samples of groundwater were collected from private wells in the vicinity of the Perry Phillips Landfill site and analyzed for VOCs on four occasions in 1993 (Ref. 15, p. 2). The analytical results indicated that the Perry Phillips residential well and nearby private wells were contaminated with PCE and TCE above the removal action level (Ref. 15, p. 2).

Based on the results of the removal site assessment EPA determined that there was an immediate and significant threat to human health due to the presence of elevated concentrations of hazardous substances in the drinking water supplies of residents living in the vicinity of the Perry Phillips Landfill site (Ref. 15, p. 1). Emergency CERCLA funding was obligated to mitigate the threat to public health, welfare, and the environment at the Perry Phillips Landfill site on December 21, 1993 (Ref. 15, p. 1).

A copy of Figure one is available at the Headquarters Superfund Docket:

U.S. CERCLA Docket Office
Crystal Gateway #1, 1st Floor
1235 Jefferson Davis Highway
Arlington, VA 22202

Telephone: (703) 603-8917
E-Mail: superfund.docket@epa.gov

A copy of Figure two is available at the Headquarters Superfund Docket:

U.S. CERCLA Docket Office
Crystal Gateway #1, 1st Floor
1235 Jefferson Davis Highway
Arlington, VA 22202

Telephone: (703) 603-8917
E-Mail: superfund.docket@epa.gov

Initially, the EPA Response Action focused on providing bottled water, and later carbon filtration units to the affected residences. The response action also set out to investigate and mitigate the source of the contamination (Ref. 16, pp. 5 and 6). Three areas of high concentration of VOCs were identified during a soil gas survey completed by EPA in 1994 (Ref. 16, pp. 8 and 9). Two of these areas were on the Perry Phillips Landfill property and one was on an adjacent property owned by Leon Butler (Ref. 16, p. 12). Test pits excavated in the three areas indicated municipal waste the Perry Phillips Landfill property and two stone-filled trenches in an area of alleged liquid disposal on the Leon Butler property (Ref. 16, p. 12). Six monitoring wells were installed by EPA from March 16 - 23, 1994 in the area of the groundwater plume (Ref. 17 and 18).

The soil gas, soil, and groundwater laboratory analytical results indicated that an additional source of the VOC contamination existed adjacent to the Perry Phillips Landfill property on the Leon Butler property, therefore EPA filed a potential hazardous waste site identification on March 11, 1994 and an ERNS incident notification report on April 20, 1994, identifying the Old Wilmington Road site (Ref. 19 and Ref. 20). On May 4, 1994 EPA obligated funds to be used for a Removal Action at the Old Wilmington Road site (Ref. 21, p. 3). The removal action investigations conducted at the Old Wilmington Road site could not definitely establish that a source of the VOC groundwater contamination was located on the Old Wilmington Road site (Ref. 21, p. 8).

A hydrogeology analysis was completed in 1998 in an attempt to determine the source of VOC contamination in the area of the plume. Groundwater contaminant contour maps were generated from three rounds of sampling analytical data (Ref. 22, pp. 1 and 5). The groundwater contaminant contour maps indicated that, based on the types and concentrations of contaminants, there were three possible sources in the area. One source appears to have been the Perry Phillips property, another possible source was identified on Leon Butler's property and a third possible source was identified on a third property located along Old Wilmington Road, the Roger Phillips property (Ref. 22, pp. 6 and 7). Although the studies conducted in the area of the groundwater plume have indicated several potential sources of the VOC contamination the exact locations of the original source or sources cannot be documented with the existing analytical data.

2.2 Source Characterization

2.2.1 Source 1 Description/Characterization

Number of the Source: 1

Name and Description of the Source: Other: Groundwater plume

Sampling of residential and monitoring wells by the U.S. Geological Survey (U.S.G.S), Chester County Department of Health, PADEP, and EPA have confirmed a groundwater contamination plume in the area of Old Wilmington Road in Sadsburyville, West Caln Township, Pennsylvania (Ref. 10, Ref. 11, Ref. 12, and Ref. 49, pp. 1, 4, and 9). Several sources of the groundwater plume have been implied thru the investigative studies completed in the area, however sampling data linking the original sources to the groundwater contamination is not available. One of the original sources implicated is the Perry Phillips Landfill property. The Perry Phillips Landfill property is a 34.6 acre located off Old Wilmington Road approximately 1.25 miles north of Sadsburyville (Ref. 3, pp. 2-1 and 2-2). This potential source consists of two areas. Area No. 1 is a 7.6-acre parcel where municipal/residual waste was dumped on the unlined ground and was then sorted to remove the metals. The unsalvageable waste was hauled off-site for disposal (Ref. 23, p. 3). Area 2 is a 27-acre area that consists of a mobile home park, landfill, junkyard, and a backfilled sewage disposal pit (Ref. 23, p. 3).

According to PADEP file information, the Perry Phillips Landfill was in violation of PADEP solid waste regulations since the early 1970s when the Department began investigating the site. In 1972 a sanitary technician with DEP compiled information over a six month period documenting the dumping of "liquid industrial wastes" at the Perry Phillips Landfill. In one location where the waste was being dumped it reportedly had flowed downhill and contaminated a spring which was used as a water source by several residents in the area (Ref. 37, pp. 1-3). Leachate was observed discharging from the dump as early as 1973 (Ref. 38, p. 1).

During a February 23, 1978 investigation of the site a PADEP inspector found large volumes of residential, commercial, and industrial wastes deposited at several places on the property. Piles of trash and garbage covered several hundred square yards of the site. It was also observed during this inspection that several hundred drums of liquids and sludges, many of which were ruptured and leaking, were found at three locations on the site. In addition, evidence indicated recent dumping of liquids from tank trucks with evidence of at least three different waste liquids (milky, tan, and green) found frozen on the property (Ref. 41, p. 1). Shipping labels on the drums indicated the wastes were generated from at least four sources: the NVF Company of Yorklyn, Delaware; Wyeth Labs Inc. of West Chester; Wilmington Chemical Company of Wilmington, Delaware; and the Wilmington Analytical Corporation (Ref. 41, p. 1). PADEP file information indicated that the waste from the NVF Company was "solid and semi-solid zinc-containing waste materials". The response from the NVF company indicated that they contracted the disposal of this waste to a contractor named the National Liquid Waste Co. The National Liquid Waste Co. vice president and general manager was Mr. Joseph Phillips (Ref. 42, p. 1). No information concerning the wastes from the remaining three sources was located in the existing file information. Joseph Phillips was to submit a letter describing the proposed removal of these drums but failed to do so (Ref. 26, p. 2).

On March 27, 1978 a PADEP inspection of the property was conducted to investigate reports that liquid waste deposited on the Phillips property were running off the property and into a tributary to Buck Run. The stream was traced onto the Phillips property. For the entire distance downstream of the Phillips property the stream bottom was covered with deposits of white and red waste material. The stream water was cloudy and foaming was noted in areas of turbulent flow. The source of the contamination was found to be runoff from the Phillips property originating in the vicinity of the former septic tank waste disposal area. Upstream of this discharge the tributary was clear and no foaming was noted. In addition no change was observed in the status of the open dump and the 55-gallon drums on the property (Ref. 43). The drums were also observed on the site during a April 18, 1978 inspection as well as several areas of leachate and a large pond of leachate near the toe of the dump (Ref. 44).

PADEP inspections of the Perry Phillips property continued throughout the 1980s with several notices of violations being given to Perry Phillips for the unpermitted activities conducted on the property (Ref. 23, pp. 27, 29, and 31; Ref. 46, pp. 4-5, and 8-11).

In 1986 the U.S.G.S. conducted groundwater sampling throughout Chester County. A residential well (well no. 2403) located in the area of Old Wilmington Road was found to be contaminated with 1,1-dichloroethane, 1,1,1-trichloroethane, and phenols (Ref. 49, pp. 1, 4, and 9).

PADEP completed a Preliminary Assessment (PA) for the Perry Phillips Landfill in 1986. During the November 6, 1986 site reconnaissance sewage sludge, septic tank pumpings, and holding tank pumpings were observed to be spread on the ground surface and dumped into pits in area 1. PADEP also observed piles of demolition waste and several roll-off containers (Ref. 23, p. 3). According to the PA, Mr. Phillips began accepting waste in this area after he purchased the property on June 23, 1970 (Ref. 23, p. 3). Also observed during the November 6, 1986 site visit at area 2 were large piles of class 3 demolition waste, automotive waste, and a landfill that was not adequately closed, covered, or vegetated (Ref. 23, pp. 3-4).

During an EPA site reconnaissance completed on February 1, 1988 waste was observed behind the Phillip's residence and across the access road that runs through area 1 (Ref. 24, p. 1). These wastes included demolition waste, piles of automotive batteries, automobile transmissions, exposed municipal waste, and brown cloth filters (Ref. 24, pp. 1, 3, and 10-11). In addition twelve drums were observed west of the Perry Phillips' residence. Some of these drums were full of liquid and contained oil paint cans and debris (Ref. 24, pp. 3, 10, and Ref. 25, p. 5). Numerous labeled and unlabeled drums were also observed at three areas of area 2 (Ref. 24, pp. 4 and 5).

The EPA Field Investigation Team (FIT) contractor completed a SI at the Perry Phillips Landfill on August 3, 1988. The FIT collected one surface water, 12 soil samples, and six samples from residential wells (Ref. 3, pp. 5-4 through 5-6). Laboratory analytical results indicated various semi-volatile organic compounds (SVOCs), pesticides, PCBs, and manganese in on-site soil samples, benzene, ethylbenzene, and xylenes in the on-site surface water sample, and VOCs and manganese in the Perry Phillips residential well and the mobile home park well (Ref. 3, pp. 7-1a through 7-5a).

In an attempt to determine the source or sources of the VOC contamination detected in residential wells in the area of Old Wilmington Road, EPA completed a soil gas survey. Three areas of high concentrations of VOCs were detected in soils (Ref. 16, pp. 8 and 9). Two of the areas were on the Perry Phillips Landfill and one was on an adjacent property currently owned by Leon Butler (Ref. 16, p. 12).

To further investigate these three areas test pit excavations were completed by EPA. Two stone-filled trenches were discovered on the Leon Butler property in an area of alleged liquid waste disposal (Ref. 16, p. 12). During an interview it was revealed that the former owner of the property, Joseph Phillips operated a waste transportation company called Eastern Environmental Services at this property. While in business he reportedly transported wastewater from a treatment plant in Delaware to a facility in New Jersey. Joseph Phillips stated that he only used the site as a truck depot, however area residents allege that in the early 1980s Joseph Phillips used to dispose of trash debris and 55-gallon drums filled with chemicals into trenches on the property (Ref. 28, pp. 1 and 2). These allegations were supported when the two stone-filled trenches were discovered on this property during EPA removal investigations (Ref. 16, p. 12). Joseph Phillips was also the transporter (under the name of the National Liquid Waste Co.) of the 200 drums of unknown liquid waste discovered at the Perry Phillips site by PADEP in 1978 (Ref. 26, p. 2 and Ref. 42, p. 1). Leon Butler purchased this property in 1985 from Joseph Phillips (Ref. 28, p. 2).

In addition to the Perry Phillips and Leon Butler properties, a hydrogeology analysis completed in 1998 identified the Roger Phillips property as another possible source of the VOC contamination (Ref. 22, pp. 6 and 7). There is no further information available concerning the Roger Phillips property.

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

The groundwater plume is located in an area approximately 1.25 miles north of the intersection of Business Route 30 and Old Wilmington Road, West Caln Township, Chester County, Pennsylvania (Figures 1, 2, and 3) (Ref. 52).

Containment:

Release to groundwater:

A release to groundwater is established based on the existence of contaminated residential and monitoring wells as documented in Section 3.1.1 of this documentation record.

Release via overland migration and/or flood: The surface water migration pathway was not scored.

Gas Release to Air: The air migration pathway was not scored.

Particulate Release to Air: The air migration pathway was not scored.

A copy of Figure three is available at the Headquarters Superfund Docket:

U.S. CERCLA Docket Office
Crystal Gateway #1, 1st Floor
1235 Jefferson Davis Highway
Arlington, VA 22202

Telephone: (703) 603-8917
E-Mail: superfund.docket@epa.gov

2.4 Waste Characteristics

2.4.1 Hazardous Substances

Monitoring and residential groundwater well samples document the following hazardous substances in the groundwater plume. The evidence provided below has been gathered during five separate sampling events. The first groundwater sampling event was conducted in 1988 during the completion of the SI of the Perry Phillips Landfill site, the remaining four sampling events were conducted by EPA in 1995, 1996, and two in 1998. The residential well samples were given various designations depending on the sampling event. Provided below is the designation given during the 1988 SI followed by the corresponding name and address of the resident (Ref. 3, pp. 5-3 and 5-4; Ref. 4).

1988 SI	Name	Address
HW-1	Perry Phillips	Old Wilmington Road
HW-5	Eberhart	19 Karen Circle
HW-7	Dailey	11 Karen Circle
HW-11	Perry Phillips Mobile Home	Parkesburg Road

The following additional residential wells were sampled after 1988 and have been included as evidence:

Roger Phillips
544 Old Wilmington Road

Joseph Walters, Jr.
491 Ash Road

Leon Butler
545 Old Wilmington Road

Steven Knipmeyer
471 Ash Road

The residential wells sampled in 1998 are designated by address only. The wells are designated by their addresses. The addresses have been condensed to identify the sample. The designation AR indicates Ash Road, KC indicates Karen Circle, and DD indicates Debbie Drive. A "B" following the address indicates that the sample was collected before the carbon filtration system (Ref. 50).

Hazardous Substance	Evidence	Reference
1988 SI		
Chloroethane	HW-1 and HW-11	3, p. 7-1a
1,1-Dichloroethane	HW-1, HW-5, HW-7, and HW-11	3, p. 7-1a
1,1-Dichloroethene	HW-1 and HW-11	3, p. 7-1a
1,1,1-Trichloroethane	HW-1, HW-5, HW-7, and HW-11	3, p. 7-1a
Trichloroethene	HW-11	3, p. 7-1a
Tetrachloroethene	HW-1	3, p. 7-1a
Manganese	HW-1, HW-7, and HW-11	3, p. 7-5a

SD-Hazardous Waste Quantity Value
Source No.: 1

Hazardous Substance	Evidence	Reference
1995		
Chloroethane	R. Phillips, Butler, Knipmeyer, MW-5 and MW-6	5, pp. 8, 12, 18, 25, and 26
Trichlorofluoromethane	R. Phillips, Butler, Knipmeyer, MW-1, MW-3	5, pp. 8, 12, 18, 22, and 23
Chloroform	R. Phillips, Butler, MW-1	5, p. 8, 12, and 22
1-1-Dichloroethane	R. Phillips, Walters, Jr., Butler, Knipmeyer, MW-1, MW-3, MW-4, MW-5 and MW-6	5, pp. 8, 11, 12, 18, 22, 23, 24, 25, and 26
1,2-Dichloroethane	MW-5	5, p. 25
cis-1,2-Dichloroethene	MW-5	5, p. 25
1,1-Dichloroethene	R. Phillips, Butler, Knipmeyer, MW-1, MW-3, MW-5, and MW-6	5, pp. 8, 12, 18, 22, 23, 25, and 26
Tetrachloroethene	R. Phillips, Butler, Walters, Jr. Knipmeyer, MW-1, MW-5, and MW-6	5, pp. 8, 11, 12, 18, 22, 25, and 26
1,1,1-Trichloroethane	R. Phillips, Butler, Knipmeyer, MW-1, MW-3, MW-4, MW-5 and MW-6	5, pp. 8, 12, 18, 22, 23, 24, 25, and 26
1,1,2-Trichloroethane	MW-5	5, p. 25
Trichloroethene	R. Phillips, Butler, Knipmeyer, MW-3, MW-5, and MW-6	5, pp.8, 12, 18, 23, 25, and 26
1996		
Chloroethane	Knipmeyer, R. Phillips, MW-3, and MW-5	6, pp. 31, 45, 51, and 27
Chloroform	Butler and MW-1	6, pp. 39 and 21
1,1-Dichloroethane	P. Phillips, Walters, MW-1, MW-6, MW-5, Knipmeyer, Butler, R. Phillips, and MW-3	6, pp. 10, 14, 20, 22, 26, 30, 36, 38, 46, and 50
1,1-Dichloroethene	MW-6 and MW-5	6, pp. 22, and 26
cis-1,2-Dichloroethene	MW-5	6, p. 27
1,1,1,-Trichloroethane	P. Phillips, Walters, MW-1, MW-6, MW-4, MW-5, Knipmeyer, Butler, MW-3, and R. Phillips	6, pp. 10, 14, 20, 22, 24, 26, 30, 36, 38, 46, and 50
Trichloroethene	Walters, MW-6, MW-5, Knipmeyer, Butler, MW-3	6, pp. 15, 23, 27, 31, 37, 39, and 51
Tetrachloroethene	Walters, MW-1, MW-6, MW-5, Knipmeyer, MW-3	6, pp. 15, 21, 23, 27, 31, 37, and 51
Trichlorofluoromethane	P. Phillips, Knipmeyer, Butler, MW-3	6, pp. 11, 31, 37, 39, and 51
5/21/98		
Tetrachloroethene	508ARB, 500AR, 450AR, 511AR	29, pp. 1, 5, 9, 10, 13, and 15

Hazardous Substance	Evidence	Reference
12/28/98		
Trichloroethene	500AR, 509AR	7, p. 8
1,1,1-Trichloroethane	500AR, 509AR	7, p. 7
Tetrachloroethene	504AR, 511AR, 500AR, 509AR	7, pp. 6, and 8
1,1-Dichloroethane	500 AR, 108KC, 509AR	7, p. 7

The compounds in the above table were found in wells located within the groundwater plume at concentrations meeting observed release criteria (see Section 3.1.1 of this documentation record).

2.4.2 Hazardous Waste Quantity

The hazardous waste quantity cannot be calculated because the data necessary to document the original source of the VOCs and manganese currently detected in the groundwater plume is not available at this time, however, as shown in Section 3.1.1 of this documentation record, because a release of VOCs and manganese are documented in groundwater the hazardous waste quantity is considered greater than zero (Refs. 3, 5, 6, 7, and 29).

2.4.2.1.1 Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity (pounds)	Reference

Information available is not sufficient to adequately evaluate the hazardous constituent quantity for Source 1.

Sum (pounds): Unknown

Hazardous Constituent Quantity Value (C): NA

2.4.2.1.2 Hazardous Waste Stream Quantity

Hazardous Waste Stream	Quantity (pounds)	Reference

Information available is not sufficient to adequately evaluate the hazardous waste stream quantity for Source 1.

Sum (pounds): Unknown

Hazardous Waste Stream Quantity Value: NA

2.4.2.1.3 Volume

Information available is not sufficient to adequately quantify the volume of Source 1.

Dimension of source (yd^3 or gallons): Unknown

Volume Assigned Value: NA

2.4.2.1.4 Area

Information available is not sufficient to adequately quantify the area of Source 1.

Area of source (ft^2): Unknown

Area Assigned Value: NA

2.4.2.1.5 Source Hazardous Waste Quantity Value

Although a release to groundwater of VOCs and manganese has been documented the data to document the original source is not available therefore, the hazardous waste quantity value for Source 1 is considered greater than zero (Refs. 3, 5, 6, 7, and 29).

Source Hazardous Waste Quantity Value: > 0

SUMMARY OF SOURCES EVALUATED

Source No.	Source Name	Source Hazardous Waste Quantity Value	Source Containment Values			
			Ground Water	Surface Water	Air Gas	Air Particulate
1	Groundwater Plume	>0	10	NS	NS	NS

NS = Not scored

Sum of HWQ Values: >0

HWQ Factor Value: 100* (Ref. 1, Section 2.4.2.2)

*Because Level 1 targets have been documented the site hazardous waste quantity factor is assigned a value of 100 (Ref. 1, Section 2.4.2.2 and Section 3.1.1 of this documentation record).

3.0 GROUNDWATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Aquifer/Stratum 1 (shallowest)

Shallow Aquifers/Stratum Names: Baltimore Gneiss and Chickies Quartize

Description: The areal extent of the groundwater plume is located within the Baltimore Gneiss and Chickies Quartizite formations (Ref. 56). These formations are located in the Piedmont Province in the Piedmont Upland Section of southeastern Pennsylvania. The bedrock in the area consists mostly of metamorphic rocks that have been intensively faulted and folded (Ref. 22, p. 4). The Precambrian age Baltimore Gneiss is widely exposed in the cores of anticlinal structures in the area and constitutes one of the major rock types in the area (Ref. 31, pp. 9 and 47). The formation is characterized by contorted, banded gneiss, in part graphitic, injected by gabbro, and serpentine (Ref. 31, p. 9). The thickness of this unit is unknown (Ref. 31, p. 49). Published data of 89 wells in the Baltimore Gneiss indicate that the wells ranged from 15 to 300 feet deep with a median depth of 84 feet (Ref. 31, p. 49).

The stratigraphically younger, Cambrian age Chickies Quartzite is a vitreous to granular quartzite that contains interbedded quartzose schist and ranges from massive to thin-bedded (Ref. 31, pp. 9 and 61). The thickness of the Chickies is estimated to be about 500 feet (Ref. 31, p. 61). Published data on depths of 11 wells in the Chickies ranged from 42 to 222 feet, the median depth was 112 feet (Ref. 31, p. 62).

A thrust fault is mapped within the area of the groundwater plume (Ref. 56). This fault places the Precambrian Baltimore Gneiss in contact with the Cambrian age Chickies Formation (Ref. 56). It is likely that the aquifers underlying the plume are hydraulically interconnected with other rock units in the four-mile radius study area via fracture networks, joint openings, and, in the limestones and dolomites, solution channels (Ref. 3, p. 3-6).

The topography of the region consists of maturely dissected hills that slope gently southeastwardly. The drainage pattern in this area is entirely dendritic (Ref. 3, p. 3-3; and Ref. 22, p. 4).

The east-northeast-trending Chester Valley is located approximately 1.8 miles south of the plume. It is underlain by Cambrian and Ordovician age limestones and dolomites and Cambrian age quartzite and schist (Ref. 3, p. 3-3).

Scattered throughout the four-mile radius are Precambrian age pegmatite, metagabbro, and serpentine intrusive igneous rocks that form sills and dikes throughout the study area. The pegmatite is white to brown in color and has a variable grain size from one millimeter to several inches. It is composed of quartz, orthoclase, microcline, albite, and biotite, and muscovite. The metagabbro is fine to medium grained and ranges from an altered gabbro to hornblende gneiss. The serpentine is a magnesium-rich rock derived from pyroxenite and periodotite. It is usually green in color and can be fibrous. The thickness of individual dikes and sills can vary from a few inches to tens of feet (Ref. 3, p. 3-5).

A small section of the Conestoga Valley Section consisting of Cambrian and Ordivician age carbonates, is present 1.9 miles northwest of the groundwater plume.

Cropping out 2.8 miles south of the groundwater plume is the Precambrian-Lower Paleozoic age (actual age is uncertain) Wissahickon Formation. The Wissahickon Formation exhibits the widest range of metamorphism of any formation in the Piedmont Providence because it ranges from phyllite through schist to gneiss. The facies that underlies the plume is a phyllite (an argillaceous rock intermediate in metamorphic grade between a shale and schist) that contains quartz, feldspar, chlorite, albite, and muscovite. This phyllite, however, is also commonly referred to as an albite-chlorite schist to simplify classification and complexity on geologic maps. Because of the intense folding and lack of recognizable recurrent beds, the thickness of the Wissahickon is not known (the estimated thickness ranges from 8,000 to 10,000 (Ref. 3, p. 3-5).

Stratigraphically younger than the Chickies Formation and Baltimore Gneiss and cropping out 1.4 miles northwest and 2.1 miles south of the plume are the Cambrian age Antietam and Harpers Formations (undivided). Since the Antietam has a very narrow areal extent, both formations are mapped as one unit. The Harpers Formation consists of a dark greenish-gray, coarse-grained phyllite and albite-mica schist. It grades upward into the Antietam Formation, which is a light gray, buff-weathering, fine-grained quartzitic sandstone and quartz schist. The thickness of these units in the study area is estimated to be about 1,500 feet (Ref. 3, p. 3-5).

Stratigraphically younger than the Antietam/Harpers Formations and cropping out 1.9 miles northwest of the plume is the Cambrian age Vintage Formation. The Vintage is a micaceous limestone containing interbedded calcareous mica schist. The formation is approximately 150 feet thick (Ref. 3, p. 3-5).

Stratigraphically younger than the Kinzers Formation and cropping out 2.4 miles northwest of the plumes is the Cambrian age Ledger Formation. The Ledger Formation is a pure, light gray to white, crystalline dolomite that is so massive and homogeneous that no bedding planes are evident. The thickness of the formation is estimated to be 600 feet (Ref. 3, p. 3-6).

Stratigraphically younger than the Ledger Formation and cropping 2.2 miles south of the plume is the Cambrian-Ordovician age Conestoga Formation. The Conestoga Formation is a blue to gray, impure, granular, thin-bedded, micaceous limestone. The base of the formation is usually marked by beds of conglomerate containing carbonate clasts and large masses of marble in a limestone matrix. The Conestoga is estimated to be at least 500 feet thick in the study area (Ref. 3, p. 3-6).

The overburden unit consists of soils belonging to the Edgemont Series. These moderately deep, well-drained, channery loams (with three to eight percent slopes) were formed from weathered quartizite and quartz schist. A representative profile consists of a top four inches of dark grayish-brown channery loam, five inches of a yellowish silt loam, and nine inches of a strong brown sandy loam. These soils have moderately rapid to rapid permeability in a low moisture capacity, and a pH range of 5.0 to 6.0 (Ref. 3, p. 3-6).

Groundwater within the four-mile radius of the groundwater plume is used for domestic purposes. Domestic wells installed in the Baltimore Gneiss are cased at depths of 20 to 75 feet and yield 3 to 80 gallons per minute. Domestic wells installed in the Chickies Formation are cased between 20 to 115 feet and yield 2 to 25 gpm (Ref. 3, p. 3-2). Approximately 12,305 people living in a four-mile radius of the plume rely on groundwater sources for their potable water supply. There are approximately 258 private wells within a 0.5 mile radius of the groundwater plume (Ref. 36 and Ref. 52).

Aquifer Discontinuities:

No aquifer discontinuities have been identified in the immediate vicinity of the groundwater plume (Ref. 56).

3.1 Likelihood of Release

3.1.1 Observed Release

Aquifer Being Evaluated: Baltimore Gneiss and Chickies Quartzite

As shown in the contaminated samples section of this documentation record, the substances detected in the contaminated groundwater are non-naturally occurring substances. Although the depths of the background wells are unknown they are provided here to assist in estimating the areal extent of the groundwater plume.

Chemical Analysis:

- **Background Samples**

Sample ID	Depth (Feet)	Date Sampled	Reference
HW-10 (Ash Road)	Unknown*	8/3/88	3, pp. 5-1, 5-4, and 5-7
R. Diguardi 1327 Airport Rd.	Unknown*	12/29/93	32, p. 9; 30, p. 157
108 DD	Unknown*	12/28/98	7, p. 5
107 DDB	Unknown*	12/29/98	7, p. 5

*The Chester County Health Department estimates that the residential wells in this area are between 100 to 200 feet deep (Ref 51).

- **Background Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
HW-10	Chloroethane	ND	10	3, p. 7-1a
	Chloroform	ND	5	3, p. 7-1a
	1,1-Dichloroethane	ND	5	3, p. 7-1a
	1,1-Dichloroethene	ND	5	3, p. 7-1a
	1,2-Dichloroethene	ND	5	3, Appendix B, p. 8
	1,1,1-Trichloroethane	ND	5	3, p. 7-1a
	1,1,2-Trichloroethane	ND	5	3, Appendix B, p. 8
	Trichloroethene	ND	5	3, p. 7-1a
	Tetrachloroethene	ND	5	3, p. 7-1a
	Manganese	13.4	5	3, p. 7-5a
R. Diguardi 1327 Airport Rd.	Chloroethane	ND	10	32, p. 9
	Chloroform	ND	5	32, p. 9
	1,1-Dichloroethane	ND	5	32, p. 9
	1,1-Dichloroethene	ND	5	32, p. 9
	1,2-Dichloroethene	ND	5	32, p. 9
	Trichlorofluoromethane	ND	5	32, p. 9
	1,1,1-Trichloroethane	ND	5	32, p. 9
	1,1,2-Trichloroethane	ND	5	32, p. 9
	Trichloroethene	ND	5	32, p. 9
	Tetrachloroethene	ND	5	32, p. 9
108-DD	Chloroethane	ND	1	7, p. 5
	Chloroform	ND	1	7, p. 5
	1,1-Dichloroethane	ND	1	7, p. 5
	1,1-Dichloroethene	ND	1	7, p. 5
	cis-1,2-Dichloroethene	ND	1	7, p. 5
	1,1,1-Trichloroethane	ND	1	7, p. 5
	1,1,2-Trichloroethane	ND	1	7, p. 6
	Trichloroethene	ND	1	7, p. 6
	Tetrachloroethene	ND	1	7, p. 6

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
107-DDB	Chloroethane	ND	1	7, p. 5
	Chloroform	ND	1	7, p. 5
	1,1-Dichloroethane	ND	1	7, p. 5
	1,1-Dichloroethene	ND	1	7, p. 5
	cis-1,2-Dichloroethene	ND	1	7, p. 5
	1,1,1-Trichloroethane	ND	1	7, p. 5
	1,1,2-Trichloroethane	ND	1	7, p. 6
	Trichloroethene	ND	1	7, p. 6
	Tetrachloroethene	ND	1	7, p. 6

ND = Not detected

- **Contaminated Samples**

Sample ID	Depth (Feet)	Date Sampled	Reference
HW-1 (Perry Phillips)	Unknown*	8/3/88	3, pp. 5-1, 5-4, and 5-7
HW-7 (11 Karen Circle)	Unknown*	8/3/88	3, pp. 5-1, 5-4, and 5-7
HW-11 (Phillips Mobile Home)	Unknown*	8/3/88	3, pp. 5-1, 5-4, and 5-7
R. Phillips (544 Old Wilmington Road)	Unknown*	6/21/95	5, pp. 5 and 8; 4
L. Butler (545 Old Wilmington Road)	Unknown*	6/21/95	5, pp. 5 and 12; 4
Knipmeyer (471 Ash Road)	Unknown*	6/21/95	5, pp. 5 and 18; 4
MW-5	80	6/21/95	5, pp. 5 and 25; 17
MW-6	205	6/21/95	5, pp. 5 and 26; 17
Walters, Jr. (509 Ash Road)	Unknown*	6/21/95	5, pp. 5 and 11; 4
MW-1	103	6/21/95	5, pp. 5 and 22; 17
MW-3	100	6/21/95	5, pp. 5 and 23; 17
MW-4	110	6/21/95	5, pp. 5 and 24; 17
450 AR (Duplicate of 511AR)	Unknown*	3/21/98	29, pp. 3, 4, 5, and 9
500 AR	Unknown*	3/21/98	29, pp. 3, 4, 5, and 10
508ARB	Unknown*	3/21/98	29, pp. 3, 4, 5 and 13
509AR	Unknown*	12/28/98	7, p. 8
108 KC	Unknown*	12/28/98	7, p. 7

*The Chester County Health Department estimates that the residential wells in this area are between 100 to 200 feet deep (Ref. 51).

- **Contaminated Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
1988				
HW-1	1,1-Dichloroethane	36	5	3, p. 7-1a
	1,1-Dichloroethene	5	5	3, p. 7-1a
	1,1,1-Trichloroethane	94	5	3, p. 7-1a
	Manganese	172	5	3, p. 7-5a
HW-11	1,1-Dichloroethane	17	5	3, p. 7-1a
	1,1,1-Trichloroethane	37	5	3, p. 7-1a
	Trichloroethene	9	5	3, p. 7-1a
	Manganese	586	5	3, p. 7-5a
HW-7	Manganese	288	5	3, p. 7-5a
1995				
R. Phillips	Chloroethane	1.1	.5	5, p. 8
	Trichlorofluoromethane	6.0	.5	5, p. 8
	Chloroform	0.6	.5	5, p. 8
	1,1-Dichloroethane	5.2	.5	5, p. 8
	1,1-Dichloroethene	3.3	.5	5, p. 8
	Tetrachloroethene	0.8	.5	5, p. 8
	1,1,1-Trichloroethane	60.9	.5	5, p. 8
	Trichloroethene	43.9	.5	5, p. 8

- **Contaminated Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
Butler	Chloroethane	0.9	.5	5, p. 12
	Trichlorofluoromethane	10.5	.5	5, p. 12
	1,1-Dichloroethane	4.4	.5	5, p. 12
	1,1-Dichloroethene	4.0	.5	5, p. 12
	Chloroform	1.1	.5	5, p. 12
	1,1,1-Trichloroethane	90.4	.5	5, p. 12
	Trichloroethene	54.9	.5	5, p. 12
	Tetrachloroethene	1.3	.5	5, p. 12
Knipmeyer	Chloroethane	1.7	.5	5, p. 18
	Trichlorofluoromethane	2.9	.5	5, p. 18
	1,1-Dichloroethane	8.9	.5	5, p. 18
	1,1-Dichloroethene	3.1	.5	5, p. 18
	Tetrachloroethene	1.2	.5	5, p. 18
	1,1,1-Trichloroethane	45	.5	5, p. 18
	Trichloroethene	36.3	.5	5, p. 18
MW-5	Chloroethane	2.1	.5	5, p. 25
	1,1-Dichloroethene	6.1	.5	5, p. 25
	1,1-Dichloroethane	85.5	.5	5, p. 25
	cis-1,2-Dichloroethene	1.8	.5	5, p. 25
	Tetrachloroethene	270	.5	5, p. 25
	1,1,1-Trichloroethane	85.5	.5	5, p. 25
	1,1,2-Trichloroethane	1.2	.5	5, p. 25
	Trichloroethene	3.1	.5	5, p. 25
	1,2-Dichloroethane	.9	.5	5, p. 25
MW-6	Chloroethane	1.0	.5	5, p. 26
	1,1-Dichloroethane	18.8	.5	5, p. 26
	1,1-Dichloroethene	3.2	.5	5, p. 26
	Tetrachloroethene	310	.5	5, p. 26
	1,1,1-Trichloroethane	22.2	.5	5, p. 26
	Trichloroethene	3.1	.5	5, p. 26

- **Contaminated Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
MW-1	Chloroform	.7	.5	5, p. 22
	1,1-Dichloroethane	5.1	.5	5, p. 22
	1,1-Dichloroethene	.6	.5	5, p. 22
	Tetrachloroethene	4.0	.5	5, p. 22
	1,1,1-Trichloroethane	12.2	.5	5, p. 22
	Trichlorofluoromethane	.8	.5	5, p. 22
MW-3	1,1-Dichloroethane	4.0	.5	5, p. 23
	1,1-Dichloroethene	10.7	.5	5, p. 23
	1,1,1-Trichloroethane	210.0	.5	5, p. 23
	Trichloroethene	200.0	.5	5, p. 23
	Trichlorofluoromethane	7.4	.5	5, p. 23
MW-4	1,1-Dichloroethane	.7	.5	5, p. 24
	1,1,1-Trichloroethane	2.2	.5	5, p. 24
Walters, Jr.	1,1-Dichloroethane	1.7	.5	5, p. 11
	Tetrachloroethene	12.1	.5	5, p. 11
1996				
Knipmeyer	Chloroethane	1.17	0.18	6, p. 31
	1,1-Dichloroethane	6.15	0.22	6, p. 30
	1,1,1-Trichloroethane	31.7	0.03	6, p. 30
	Trichloroethene	33	0.36	6, p. 31
	Tetrachloroethene	1.29	0.20	6, p. 31
	Trichlorofluoromethane	2.26	0.12	6, p. 31
R. Phillips	Chloroethane	2.5	0.18	6, p. 45
	1,1-Dichloroethane	10.2	0.22	6, p. 46
	1,1,1-Trichloroethane	18.2	0.03	6, p. 46
MW-3	Chloroethane	1.92	0.18	6, p. 51
	1,1-Dichloroethane	5.71	0.22	6, p. 50
	1,1,1-Trichloroethane	95.1	0.03	6, p. 50
	Trichloroethene	127	0.36	6, p. 51
	Tetrachloroethene	1.46	0.20	6, p. 51
	Trichlorofluoromethane	10.2	0.12	6, p. 51

- **Contaminated Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
MW-5	Chloroethane	1.23	0.18	6, p. 27
	1,1-Dichloroethane	24.1	0.22	6, p. 26
	1,1-Dichloroethene	4.50	0.10	6, p. 26
	Trichloroethene	1.60	0.36	6, p. 27
	Tetrachloroethene	848	0.2	6, p. 27
	cis-1,2-Dichloroethene	1.6	0.25	6, p. 27
	1,1,1-Trichloroethane	24.3	0.03	6, p. 26
MW-1	Chloroform	1.66	0.18	6, p. 21
	1,1,1-Trichloroethane	6.65	0.03	6, p. 20
	Tetrachloroethene	2.88	0.2	6, p. 21
	1,1-Dichloroethane	1.59	0.22	6, p. 20
MW-4	1,1,1-Trichloroethane	1.69	0.03	6, p. 24
Walters	1,1-Dichloroethane	4.71	0.22	6, p. 14
	1,1,1-Trichloroethane	4.24	0.03	6, p. 14
	Trichloroethene	1.73	0.36	6, p. 15
	Tetrachloroethene	87.2	0.2	6, p. 15
MW-6	1,1-Dichloroethane	18.7	0.22	6, p. 22
	1,1-Dichloroethene	4.34	0.10	6, p. 22
	1,1,1-Trichloroethane	15.0	0.03	6, p. 22
	Trichloroethene	1.5	0.36	6, p. 23
	Tetrachloroethene	420	0.2	6, p. 23
Butler	1,1-Dichloroethane	1.80	0.22	6, p. 38
	1,1,1-Trichloroethane	36.3	0.03	6, p. 38
	Trichlorofluoromethane	6.63	0.12	6, p. 39
	Chloroform	1.66	0.18	6, p. 39
	Trichloroethene	30.3	0.36	6, p. 39
P. Phillips	1,1-Dichloroethane	5.36	0.22	6, p. 10
	1,1,1-Trichloroethane	6.41	0.03	6, p. 10
	Trichlorofluoromethane	1.86	0.12	6, p. 11

- **Contaminated Samples (con't)**

Sample ID	Hazardous Substance	Concentration (µg/l)	Sample Quantitation Limit (µg/l)	Reference
5/21/98				
450AR	Tetrachloroethene	5	1	29, p. 9; 53, pp. 47 and 85
500AR	Tetrachloroethene	5	1	29, p. 10; 53, pp. 37 and 85
508ARB	Tetrachloroethene	1	1	29, p. 13; 53, pp. 32 and 85
12/28/98				
500AR	1,1-Dichloroethane	2	1	7, p. 7
	Tetrachloroethene	29	1	7, p. 8
509AR	1,1-Dichloroethane	2	1	7, p. 7
	1,1,1-Trichloroethane	1	1	7, p. 7
	Tetrachloroethene	22	1	7, p. 8
108KC	1,1-Dichloroethane	1	1	7, p. 7
511AR	Tetrachloroethene	8	1	7, p. 6

- Level I Samples

The following residential wells are located within the Old Wilmington Road Contaminated Groundwater site and have concentrations of hazardous substances above media-specific benchmark values (Ref. 1, Section 2.5.2, p. 51593, Table 3-10, and Section 3.3.2, p. 51603).

Sample ID	Sample Date	Hazardous Substance	Sample Concentration (mg/L)	MCL (mg/L)	I or J Index	Reference
HW-1	8/3/88	1,1-Dichloroethene	.005	.007	35.7	2, p. B-49; 34
		Tetrachloroethene	0.2	.005	125	2, p. B-60; 34
HW-11	8/3/88	Trichloroethene	.009	.005	1.17	2, p. B-61; 34
R. Phillips	6/21/95	1,1-Dichloroethene	.0033	.007	23.57	2, p. B-49; 34
		Tetrachloroethene	.0008	.005	5	2, p. B-60; 34
		Trichloroethene	.0439	.005	5.7	2, p. B-61; 34
Butler	6/21/95	1,1-Dichloroethene	.004	.007	28.57	2, p. B-49; 34
		Trichloroethene	.0549	.005	7.13	2, p. B-61; 34
Knipmeyer	6/21/95	1,1-Dichloroethene	.0031	.007	22.14	2, p. B-49; 34
450AR	3/21/98	Tetrachloroethene	.005	.005	3.13	2, p. B-60; 34
500AR	3/21/98	Tetrachloroethene	.005	.005	3.13	2, p. B-60; 34
509AR	12/28/98	Tetrachloroethene	.022	.005	13.75	2, p. B-60; 34
511AR	12/28/98	Tetrachloroethene	.008	.005	5	2, p. B-60; 34

Attribution:

The contaminated groundwater in the vicinity of Old Wilmington Road was initially identified during a groundwater sampling event conducted in Chester County by the U.S.G.S. The U.S.G.S. sampling revealed a well (no. 2403) located in the area of Old Wilmington Road that was contaminated with 1,1-dichloroethane, 1,1,1-trichloroethane, and phenols (Ref. 49, pp. 1, 4, and 9). Subsequent sampling by the Chester County Health Department, PADEP, and EPA confirmed the groundwater plume located in this area (Ref. 10, Ref. 11, and Ref. 12).

Three possible sources of the Old Wilmington Road groundwater plume have been identified to date: the Perry Phillips Landfill; the Leon Butler property along Old Wilmington Road; and the Roger Phillips property (Ref. 22, pp. 6 and 7). The most extensively investigated possible source is the Perry Phillips Landfill property. Perry Phillips operated an unpermitted dump at this location from the early 1970s until at least 1988. During this time the exact nature of the wastes he accepted is unknown however several specific incidents of drummed industrial wastes located on the property were observed. During PADEP inspections unknown drummed industrial wastes were observed in 1972, 1978, and 1988 (Ref. 37, pp. 1-3; Ref. 41, p. 1 and Ref. 24, pp. 3, 4, 5, and 10). During EPA's response action at the site 15 severely weathered drums were discovered in the western portion of the landfill (Ref. 16, p. 16).

An SI was completed by EPA in 1988 at the Perry Phillips Landfill. Hazardous substance detected in soils collected from the Perry Phillips Landfill property include: bis(2-ethylhexyl phthalate; benzo(b)fluoranthene; benzo(k)fluoranthene; 2-methyl naphthalene; acenaphthene; dibenzofuran; fluorene; phenanthrene; anthracene; di-n-butyl phthalate; fluoranthene; pyrene; butylbenzyl phthalate; benzo(a)anthracene; chrysene; di-n-octyl phthlate; benzo(a)pyrene; indeno(1,2,3-cd)pyrene; dibenz(a,h)anthracene; benzo(g,h,i)perylene; gamma-BHC lindane; 4,4'-DDE, 4,4-DDD, and 4,4-DDT (Ref. 3, pp. 5-5, 7-2a through 7-4a). Manganese was also detected at three times the background level in on-site soils (Ref. 3, pp. 5-5, 5-6 and 7-7a). Detection of these hazardous substances indicate that hazardous materials were dumped at the Perry Phillips Landfill. No soil samples were collected below the surface during the SI making the detection of VOCs (as those detected in the groundwater plume) highly unlikely, however, a soil gas survey completed during the EPA removal investigation did detect two areas of elevated VOCs in soils on the Perry Phillips property (Ref. 16, pp. 8, 9, and 12). Analytical results of soil samples collected in these areas indicated tetrachloroethene (PCE) (Ref. 16, p. 16). PCE is also a contaminant detected in most of the residential wells located in the groundwater plume (see section 3.1.1 of this documentation record).

A second potential VOC source area is a property located off of Old Wilmington Road currently owned by Leon Butler. Leon Butler purchased this property in 1985 from Joseph Phillips (Ref. 28, p. 2). Since 1970 Joseph Phillips owned and operated a waste transportation company named the National Liquid Waste Co. (transporter of the 200 drums of liquid waste discovered at the Perry Phillips Landfill in 1978) and later named Eastern Environmental Services (Ref. 26, p. 2; Ref. 28, pp. 1 and 2; Ref. 42, p. 1). Area residents allege that in the early 1980s Joseph Phillips disposed of 55-gallon drums filled with chemicals into trenches on the property (Ref. 28, pp. 1 and 2). These allegations were supported when two stone-filled trenches were discovered on this property during EPA removal investigations. Soil gas results indicated elevated VOCs in the area of the trenches (Ref. 16, p. 12).

A hydrogeology analysis completed in 1998 identified a third property owned by Roger Phillips as a potential source of the VOC contamination (Ref. 22, pp. 6 and 7). This identification was based on groundwater contour maps, there is no sampling or historical data available concerning this property.

Hazardous Substances Released:

Chloroethane	Chloroform
1,1-Dichloroethane	Trichloroethene
1,1-Dichloroethene	Manganese
1,1,1-Trichloroethane	cis-1,2-Dichloroethene
Tetrachloroethene	1,1,2-Trichloroethane
Trichlorofluoromethane	

3.2 Waste Characteristics

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value	Toxicity/ Mobility	Reference
Chloroethane	1	NL	1	NA	NA
Chloroform	1	100	1	100	2, p. B-5
1,1-Dichloroethane	1	10	1	10	2, p. B-7
1,1-Dichloroethene	1	100	1	100	2, p. B-7
1,2-Dichloroethene	1	100	1	100	2, p. B-8
Manganese	1	10,000	1	10,000	2, p. B-13
Tetrachloroethene	1	100	1	100	2, p. B-18
1,1,1-Trichloroethane	1	1	1	1	2, p. B-19
1,1,2-Trichloroethane	1	1,000	1	1,000	2, p. B-19
Trichloroethene	1	10	1	10	2, p. B-19
Trichlorofluoromethane	1	10	1	10	2, p. B-19

*All substances listed meet the criteria for an observed release by chemical analysis to an aquifer, therefore, each substance is assigned a mobility factor of 1 (Ref. 1, Section 3.2.1.2).

NL = Not listed in the Superfund Chemical Data Matrix.

NA = Not applicable.

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

3.2.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is Source Hazardous Constituent Quantity Data Complete? (Yes/No)
1	Unknown but >0	No

Sum of Values: >0

Hazardous Waste Quantity Factor Value: 100*

*Because Level I targets have been established for the groundwater pathway (see Section 3.1.1 of this documentation record) a default hazardous waste quantity factor value of 100 has been assigned, as directed under Section 2.4.2.2 of the Final Rule.

3.2.3 Waste Characteristics Factor Category Value

10,000 x 100 = 1,000,000

Toxicity/Mobility Factor Value x Hazardous Waste Quantity Factor Value: 1,000,000

==========

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

3.3 TARGETS

According to the Chester County Planning Commission there are two public water systems located within the four-mile radius of the site, the City of Coatesville Authority and the Octoraro Water Company. Both of these public water suppliers rely on surface water as their source for potable water. The remaining population not provided public water rely on private domestic wells for their potable water (Ref. 54 and Ref. 55).

3.3.1. Nearest Well

As documented in Section 3.3.2.2, there are nine residential wells subject to Level I contamination, therefore the nearest well factor value is 50.

Nearest Well Factor Value: 50
[Ref. No. 1 (Table 3-11)]

3.3.2. Population

3.3.2.2 Level I Contamination

Level I Wells	Population*	Reference
HW-1 (Perry Phillips)	2.82	35
HW-11 (Perry Phillips Mobile Home Park)	40	3, p. 3-1
R. Phillips	2.82	35
Butler	2.82	35
Knipmeyer	2.82	35
450AR	2.82	35
500AR	2.82	35
509AR	2.82	35
511AR	2.82	35
	62.56 Total Level I Population	

*This value is the average number of persons per residence of Chester County, Pennsylvania (Ref. 35).

Population Served by Level I Wells: 62.56 x 10 = 625.6 (rounded to 626)

Level I Concentrations Factor Value: 626

3.3.2.3 Level II Concentrations

Level II Wells	Population*	Reference
HW-7 (Dailey)	2.82	35
508ARB	2.82	35
108KC	2.82	35
	8.46 Total Level II Population	

*This value is the average number of persons per residence of Chester County, Pennsylvania (Ref. 35).

Population Served by Level II Wells: 8.46

Level II Concentrations Factor Value: 8.46

3.3.2.4 Potential Contamination

Although it is likely that the aquifers located within a four-mile radius of the groundwater plume are interconnected, the documentation necessary to support this is not available at this time, therefore, the potential targets have not been scored.

Sum of Distance - Weighed Population Values = 0

3.3.3 Resources

Well	Aquifer	Resource Use	Reference

No resource uses have been identified in the study area.

==========

Resource Factor Value: 0
(Ref. 1, Section 3.3.3)

3.3.4 Wellhead Protection Area

Area	Use	Reference	Value

No wellhead protection areas have been designated in the study area.

==========

Wellhead Protection Area Factor Value: 0
(Ref. 1, Section 3.3.4)