R5 ✓
\# 557006
D1
MF

Report No.: 8003-144
Work Assignment No.: 019-2JZZ
Contract No.: 68-W9-0051
February 26, 1993
Volume 1 of 3

Ms. Sandra Foose
Pre - Remedial Assistant WAM
Environmental Services Division
U.S. Environmental Protection Agency
Region II
Edison, NJ 08837

RE: Warrensburg Board & Paper Company Site Inspection Prioritization Evaluation

Dear Ms. Foose:

The following is a summary of the Site Inspection Prioritization evaluation of the Warrensburg Board & Paper Company site (CERCLIS ID No. NYD013348438) (Ref. No. 1).

General Description and Site History

The Warrensburg Board & Paper (WB&P) site is located 1.8 miles west of the Village of Warrensburg on Route 418 in Warrensburg, Warren County, New York. The site is bordered to the north by Route 418, to the south and west by a wooded area, to the northwest by an abandoned railroad spur, and to the east by a small residential development. The Schroon River is located approximately 170 feet north of the site. The inactive, twelve-acre site is bisected by an abandoned section of the Delaware and Hudson Railroad, which runs east to west across the site. During its years of operation, the site was used by the Warrensburg Board & Paper Company for the disposal of solid waste generated at the company's mill facility, located adjacent to the site on the north side of Route 418. Notable on-site features include an old building foundation and barn to the north, a pump house to the northeast, and several large piles of debris. A small, depressed, "wetland area" (the hollow) is located to the north of the railroad in the western portion of the site. A dirt road that runs from north to south along the center of the site provides access to the southern portion of the property (Ref. Nos. 17; 22, pp. 14-16, 23).

Two landfills are located on the site property, one in the northern area (between Route 418 and the railroad line) and the second to the south of the railroad. The northern landfill is situated between the barn/building foundation area and the hollow. Landfilling in this area apparently began first, with the filling in of a previously existing pond. The south landfill encompasses the entire portion of the site south of the abandoned railroad tracks (Ref. Nos. 17; 22, pp. 14-17, 23). Figure 1-1 and 2-1 of the Remedial Investigation report completed in July, 1989 by Ecology and Environment, Inc. (E&E) provide a Site Location Map and Site Map, respectively (Ref. No. 22, pp. 15, 23).

The site, which is currently owned by The Warrensburg Board & Paper Co., operated until January 1978, when the mill became heavily damaged by fire (Ref. Nos. 5; 22, pp. 16, 17). Prior to 1978, the landfill areas were used for disposal of the solid waste generated from mill operations. Solid waste refuse included bailing wire, paper, wood, plastic shreddings, and metal drums which reportedly contained solid waste (Ref. No. 22, pp. 16, 17). Available site information does not indicate when site operations began.

In May 1979, a local resident reported to the New York State Department of Environmental Conservation (NYSDEC) that a tank truck was dumping black liquid on-site during the late evening hours. This dumping was observed by the resident over a period of approximately eight months. A quantity of approximately 288,000 gallons of liquid is estimated to have been deposited at the landfill during this time period (Ref. No. 22, p. 17). Additionally, a former mill employee has reported that unknown quantities of xylene, toluene and formaldehyde were deposited in the landfill (Ref. No. 22, p. 17). An initial site inspection was conducted by

the NYSDEC on May 16, 1979, as a result of the dumping that allegedly took place on-site. During this inspection, evidence of dumping and black-stained soils were observed. On July 3, 1989, NYSDEC returned to the site to collect two surface water and two surface soil samples. Analysis of these samples indicated the presence of trace levels of PCB's. The Quality Assurance/ Quality Control for these samples is unknown (Ref. No. 22, pp. 17, 18). From September 21, 1987 to April 26, 1988, a Remedial Investigation was conducted to identify the sources of on-site contamination and the potential contaminant migration pathways at the WP&G site. This investigation included the collection of surface/subsurface soils, groundwater, surface water, and sediment samples (Ref. No. 22, pp. 14, 18, 19).

Evaluation of Existing Information

Information included in the site file, Phase I site investigation, and the 1989 Remedial Investigation report were used to conduct the site evaluation. These reports indicate the routes of concern for contamination migration are via the groundwater and surface water pathways.

During the Remedial Investigation, eight monitoring wells were installed and developed for the collection and analysis of groundwater samples. Additionally, groundwater samples were collected from four nearby private potable water supply wells located west of the site. Additional environmental samples included eleven surface/subsurface soil samples, two surface waters and one sediment sample from an intermittent stream in the hollow, and two surface water/sediment samples from the Schroon River. Samples were also collected from other potential contaminant sources including an ash sample, and a sample of a tar-like substance. An additional characterization sample was collected from the mill fuel tank which is located off-site (Ref. No. 22, pp. 24, 25, 26, 27, 67). All samples collected were analyzed for Target Compound List (TCL) organic and Target Analyte List (TAL) inorganic parameters by a NYSDEC Contract Laboratory Protocols (CLP) certified laboratory (Ref. Nos. 4; 22, p. 29). Data summary tables of samples and analyses are presented in Tables 4-1 through 4-3 (Ref. No. 22, pp. 59, 67, 70). Sample Location Maps are provided in Figures 4-1 and 4-2 (Ref. No. 22, pp. 125, 126).

The analytical data for these samples indicate a limited release of contaminants from the site property. Analysis of soil samples collected from the area of the tar-like substance indicated the presence of organic compounds. Additionally, organic and inorganic constituents were detected in subsurface soils (AUGER 1, CATAUG 2 through 4). Analysis of groundwater samples collected from downgradient monitoring well #6 indicated a release of organic contaminants when compared to the background monitoring well #8. These compounds are similar to those found in site soils. A release of organic and inorganic contaminants has not been observed in the analysis of groundwater samples collected from the other on-site monitoring wells and off-site private potable water supply wells (Ref. No. 22, pp. 67, 70, 125, 126). Sediment samples collected from the intermittent stream indicate significantly elevated inorganic constituents similar to those found in on-site soils. However, surface water and sediment samples collected from the Schroon River do not indicate elevated levels of contaminants (Ref. No. 22, pp. 59, 67, 125, 126).

Hazard Assessment

Updated and additional information and data collected to further evaluate the site included groundwater and population data, sensitive environments and four-mile vicinity populations.

Groundwater Pathway - The Warrensburg Board & Paper site is situated above a preglacial valley and valley side on an outwash deposit composed of pleistocene and recent alluvium deposits that were derived from the surrounding Adirondack Precambrian granulite-gneiss terrain. These deposits consist of layers of sand, gravel, and boulders with occasional silt layers which vary rapidly both vertically and laterally. These unconsolidated deposits range in thickness from approximately 30 feet at the southwest corner of the site to approximately 100 feet at the northern portion of the site. These soils have an approximate hydraulic conductivity of 10^{-6} cm/sec (Ref. No. 9). The outwash deposits rest upon bedrock which is composed of high grade metamorphic rock and consists of various minerals that include ilmenite and magnetite (Ref. No. 22, pp. 35, 36). The bedrock has an approximate hydraulic conductivity of 10^{-8} cm/sec (Ref. No. 9).

The site is situated over three aquifers that are contained within the outwash deposits. There is a perched water table located under the south landfill that appears to discharge north into the hollow, and a second limited perched water table located under the northern portion of the site in the former pond area. These perched water tables are approximately 10 feet below the ground surface and are approximately 10 feet thick. The principal unconfined aquifer lies approximately 20 feet beneath these perched water tables. The aquifer, which varies in thickness, follows the bedrock contours. The direction of groundwater flow is generally to the north/northwest towards the Schroon River and follows the bedrock contours (Ref. No. 22, p. 48).

Analytical results from the Remedial Investigation groundwater sampling of on-site monitoring well MW #6 indicate a release of contaminants from the site when compared to the background monitoring well (MW #8). Chromium (209 ppb) and nickel (259 ppb) were detected in MW #6 at levels significantly higher than those found in MW #8 (chromium, 46 ppb; nickel, 44 ppb). However, these contaminants have not been detected in other on-site monitoring wells or off-site private potable supply wells in significant concentrations (Ref. No. 22, pp. 67, 70, 126).

Groundwater usage within the four-mile site vicinity consists of both private potable water wells and public water supplies. The nearest well used to provide potable water is a private well that is located approximately 825 feet west (side-gradient) of the site (Ref. Nos. 17; 22, p. F-5). There are four municipal drinking water supply wells located approximately 1 - 2.5 miles northeast of the site. Drinking water wells serve an aggregate population of approximately 3,810 persons (0 - 0.25 mile, 10; 0.25 - 0.5 mile, 0; 0.5 - 1 mile, 0; 1 - 2 miles, 1,900; 2 - 3 miles, 1,900; 3 - 4 miles, 0) (Ref. Nos. 7; 17). The WB&P site is located within a wellhead protection area for the unconsolidated aquifers of upstate New York (Ref. No. 8).

<u>Surface Water Pathway</u> - At the WB&P site, surface water runoff follows the site's topography and is not controlled by storm sewers or extensive drainage culverts. Surface drainage on the south landfill is generally to the north into the hollow, by means of a culvert that extends through the bed of the main railroad line. Drainage in the southeast corner and along the west boundary is toward several on-site depressions (Ref. No. 22, pp. 31, 32, 34, 35).

In the north landfill, surface drainage from the south and central areas is towards the hollow to the south. During periods of heavy precipitation, flow occurs in the hollow in a westerly direction along an ill-defined intermittent stream. This "stream" only occurs in the extension of the hollow, and sinks back into the ground beside the abandoned railroad spur which bounds a portion of the northwest corner of the site. A second low-lying area, located east of the access road in the north landfill area, intercepts only localized surface drainage. The remaining parts of the north landfill drain north-northwest along the south grade of Route 418 (Ref. No. 22, pp. 34, 35).

There are no perennial streams or surface waters located on the site, with the exception of a spring that creates a small pool and several small areas of standing water in the hollow (Ref. No. 22, pp. 34, 35). Due to the presence of the low-lying area (the hollow), lack of a discernable surface water runoff pathway, and the highly permeable on-site soils (hydraulic conductivity estimated to be 10^{-2} cm/sec), the majority of site runoff is likely to infiltrate into the ground and discharge as groundwater to the Schroon River located 170 feet north of the site (Ref Nos. 9; 22, pp. 34, 35, 38-52). The Schroon River travels approximately 0.8 miles west to its confluence with the Hudson River. The flow of the Schroon River is estimated to be between 1,000 and 2,919 ft^3/sec. The average flow of the Hudson River is 2,919 ft^3/sec (Ref. Nos. 10; 18).

Analysis of surface water samples collected from the pooled water in the hollow indicated the presence of copper (697 ppb in Area C West), lead (584 ppb in Area C West), nickel (152 ppb in Area C West), and zinc (1,820 ppb in Area C West). Analysis of sediment samples collected from the intermittent stream bed also indicated the presence of copper (110,000 ppb) lead (836,000 ppb), nickel (152 ppb), and zinc (636,000 ppb). These contaminants are similar to those contaminants found in on-site soils. Samples collected from the Schroon River did not detect these constituents in downstream surface water or sediment samples at levels significantly above those detected in upstream samples (Ref. No. 22, p. 67).

There are approximately 0.8 miles of wetlands along the fifteen-mile surface water pathway 10-12 miles downstream of the site (Ref. No. 18). No other sensitive environments associated with the pathway have been identified (Ref. Nos. 14; 15; 18). There are no surface water intakes that supply drinking water along the surface water pathway (Ref. Nos. 6; 18). The Schroon River and Hudson River have been identified as freshwater fisheries (Ref. No. 13). The site is situated outside of the 500-year floodplain boundary (Ref. No. 20).

Soil Exposure Pathway - As the majority of the soil samples collected during the Remedial Investigation were composite samples collected from depths ranging from 0-8.5 feet, it is difficult to attribute contamination in these samples to the surficial soils (0-2 feet). Additionally, as the background soil sample was collected from a depth of 0-6 inches, it may not be representative of subsurface conditions. Several inorganic and organic compounds were detected in the composite soil samples including chromium (12,800 ppb in AUG1), copper (203,000 ppb in CATAUG2), nickel (28,500 in AUG1), and Aroclor-1254 (360 ppb in AUG4) (Ref No. 22, pp. 59, 126). Analytical results for a surface soil sample collected from the south landfill area by NYSDEC on July 3, 1989 also indicated low levels of PCB's. The Quality Assurance/Quality Control for this sample, however, is unknown (Ref No. 22, pp. 17, 18). The site currently has no workers present; however, public access to the site is unrestricted (Ref No. 22, p. 16). There are no schools, residences, or day care facilities located within 200 feet of areas of soil contamination (Ref. No. 5). There are also no terrestrial sensitive environments located on areas of documented soil contamination (Ref. No. 14).

Air Pathway - There is no analytical data available to determine whether or not a release of organic or inorganic compounds has occurred to the air. However, ambient air analysis collected during the Remedial Investigation with an HNu did not indicated readings above background (Ref. No. 22, p. 21). There are approximately 875 acres of wetlands located within the four mile site vicinity (0-0.25 mile, 0; 0.25-0.5 mile, 0; 0.5-1 mile, 0; 1-2 miles, 150 acres; 2-3 miles, 425 acres; 3-4 miles, 300 acres) (Ref. No. 17; 19). An aggregate population of approximately 4,451 people reside within four-miles of the site (0 - 0.25 mile, 36; 0.25 - 0.5 mile, 18; 0.5 - 1 mile, 209; 1 - 2 miles, 1,911; 2 - 3 miles, 2,006; 3 - 4 miles, 271) (Ref. No. 16). There are no known sensitive environments located within a four-mile radius of the WB&P site (Ref No. 14).

Summary

Based upon information contained in the Remedial Investigation report and additional information collected, the groundwater and surface water routes are the primary pathways of concern. Analysis of groundwater samples collected from one on-site monitoring well indicates an observed release of inorganic contaminants. However, analysis of groundwater samples collected from other on-site monitoring wells and off-site downgradient drinking water wells do not indicate a release of contaminants from the site property. The nearest well is a private drinking water well located approximately 825 feet downgradient of the site. There are approximately 3,810 people receiving potable water from groundwater wells located within a four-mile radius of the site. Although analysis of sediment samples collected from the on-site intermittent stream indicate the presence of inorganic contaminants, sediment and surface water samples collected from the Schroon River do not indicate a release to the river. There are 0.8 miles of wetlands located along the 15-mile surface water pathway; however, no sensitive environments have been identified within the target distance limit. The Schroon and Hudson Rivers are designated freshwater fisheries.

Very truly yours,

RICKEY T. KAMPFER
SITE MANAGER

JOHN D. RIECKHOFF
PROJECT TASK LEADER

DENNIS STAINKEN, Ph.D.
WORK ASSIGNMENT MANAGER

j:\8003144\WB&P.sip

ATTACHMENT 1

REFERENCES

1. U. S. Environmental Protection Agency (EPA) Superfund Program, Comprehensive Environmental Response Compensation Liability Information System (CERCLIS) Site/Event Listing, p. 520, December 2, 1992.

2. New York State Department of Environmental Conservation (NYSDEC) Inactive Hazardous Waste Disposal Report for the Warrensburg Board & Paper Co., Thurman Road, Warrensburg, Warren County, NY. Site Code 557006, EPA ID No. NYD013348438.

3. Superfund Chemical Data Matrix Sources (SCDM), October 6, 1992.

4. Telecon Note: Conversation between Dan Steenberg, Site Manager, NYSDEC, and Rickey T. Kampfer, Malcolm Pirnie, Inc. (MPI), December 21, 1992.

5. Telecon Note: Conversation between Cindy Converse, Tax Assessor, Town of Warrensburg, and Rickey T. Kampfer, MPI, October 28, 1992.

6. Project Note: To Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Surface Water Intakes, January 15, 1992.

7. Project Note with Attachment: To Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Potable Water Well Supplies, December 21, 1992.

8. Telecon Note with Attachment: Conversation between Kevin Roberts, Division of Water/Groundwater, NYSDEC and Lisa Szegedi, MPI, June 18, 1992.

9. Hazard Ranking System, Final Rule, 40 Code of Federal Regulations Part 300. Federal Register, Volume 55, No 241, p. 56601., December 14, 1990.

10. Project Note with Attachments: To Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: River Flow Values, January 15, 1993.

11. Telecon Note: Conversation between E. Sinsabaugh, National Weather Service, and Rickey T. Kampfer, MPI, December 29, 1992.

12. Project Note with Attachment: To Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Drainage Area, December 29,1992

13. Telecon Note: Conversation between Bill Miller, Bureau of Fisheries, NYSDEC, and Rickey T. Kampfer, MPI, November 16, 1992.

14. Project Note with Attachment: To Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Endangered Species, December 21, 1992.

15. Telecon Note: Conversation between J. Haubert, Division of Protected Environments, National Park Service, and Rickey T. Kampfer, MPI, December 31, 1992.

16. Project Note: To The Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Population Calculations, January 15, 1993.

17. Four-Mile Vicinity Map for The Warrensburg Board & Paper Co. Site based on USGS Topographic Maps, 7.5 minute series, Quadrangles of "Warrensburg, NY, 1966," "Stony Creek, NY, 1968," "Lake George, NY, 1966," and "Lake Luzerne, NY, 1968."

18. Fifteen-Mile Surface Water Pathway Map for The Warrensburg Board & Paper Co. Site based upon USGS Topographic Maps, 7.5 minute series, "Warrensburg, NY, 1966," "Lake Luzerne, NY, 1968," and "Conkunville, NY, 1966."

19. Project Note: To The Warrensburg Board & Paper Co. file, From Rickey T. Kampfer, MPI, Subject: Wetlands, December 21, 1992.

20. Telecon Note with Attachment: Conversation between F. Dunlap, Surface Water Quality, NYSDEC and Rickey T. Kampfer , MPI, January 2, 1993.

21. Preliminary Investigation of the Warrensburg Board & Paper Co. site, Ecological Analysts, Inc., September 1984.

22. Remedial Investigation, The Warrensburg Board & Paper site, Volume 1 and 2, Ecology and Environment, Inc., July 1989.

REFERENCE NO. 1

SELECTION:
SEQUENCE: REGION, STATE, SITE NAME

EVENTS: ALL

EPA ID NO.	SITE NAME / STREET / CITY / COUNTY CODE AND NAME	STATE ZIP / CONG DIST.	OPRBLE UNIT	EVENT TYPE	EVENT QUAL	ACTUAL START DATE	ACTUAL COMPL DATE	CURRENT EVENT LEAD
NYD980535496	WALLKILL LF							
(CONTINUED)			(01)	RD1		04/02/90		RESP. PARTY
NYD000514463	WALMORE ROAD DUMP		00	DS1			04/01/80	EPA (FUND)
	WALMORE RD			PA1	LOWER PRIORITY		09/30/86	STATE(FUND)
	WHEATFIELD	NY 14150		PA2	NO FURTHER REMDL ACT PLND		01/22/90	STATE(FUND)
	063 NIAGARA	NY-36		SI1	NO FURTHER REMDL ACT PLND	09/22/87	09/22/87	EPA (FUND)
NYD980509392	WAPPINGER FALLS LF		00	DS1			04/29/80	EPA (FUND)
	FRANKLINDALE & CLAPP AVENUES			PA1	LOWER PRIORITY		05/01/83	EPA (FUND)
	WAPPINGER FALLS	NY 12590		PA2	LOWER PRIORITY	06/24/88	06/29/88	STATE(FUND)
	027 DUTCHESS	NY-25		HR1			04/01/83	EPA (FUND)
				SI1		04/01/83	04/01/83	EPA (FUND)
NYD013348436	WARRENSBURG BOARD & PAPER CO		00	DS1			08/01/80	EPA (FUND)
	THURMAN RD			PA1	LOWER PRIORITY		08/01/83	EPA (FUND)
	WARRENSBURG	NY 12885		SI1	HIGHER PRIORITY	07/01/83	08/01/83	STATE(FUND)
	113 WARREN	NY-29						
NYD980762538	WARWICK FOUR CORNERS RD		00	DS1			05/01/83	EPA (FUND)
	FOUR CORNERS RD			PA1	LOWER PRIORITY		05/01/83	EPA (FUND)
	WARWICK	NY 10990		HR1			05/01/83	OTHER
	071 ORANGE	NY-26		SI1	LOWER PRIORITY	05/01/83	05/01/83	EPA (FUND)
NYD980506679	WARWICK LANDFILL		00	RS1		04/16/90	09/07/90	EPA (FUND)
	PENALUNA RD/OLD TUXEDO/DUTCH H			RS2		07/03/91	08/29/91	EPA (FUND)
	WARWICK	NY 10990		DS1			10/01/79	EPA (FUND)
	071 ORANGE	NY-22		PA1	LOWER PRIORITY	08/01/84	09/01/84	STATE(FUND)
				NP1			09/18/85	EPA (FUND)
				NF1			03/31/89	EPA (FUND)
				SI1	HIGHER PRIORITY	08/01/84	09/01/84	STATE(FUND)
			01	AR1		05/30/91		EPA (FUND)
				WP1		01/01/89	05/01/89	EPA (FUND)
				CO1		04/19/88	06/27/91	EPA (FUND)

REFERENCE NO. 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION
INACTIVE HAZARDOUS WASTE DISPOSAL REPORT

CLASSIFICATION CODE: 2 REGION: 5 SITE CODE: 557006
EPA ID: NYD0133484

NAME OF SITE : Warrensburg Board and Paper
STREET ADDRESS: Thurman Road
TOWN/CITY: Warrensburg
COUNTY: Warren
ZIP: 12885

SITE TYPE: Open Dump- Structure- Lagoon- Landfill-X Treatment Pond-
ESTIMATED SIZE: 12 Acres

SITE OWNER/OPERATOR INFORMATION:
CURRENT OWNER NAME....: Warrensburg Board and Paper Corp.
CURRENT OWNER ADDRESS.: 645 West 1st Ave., Rosellek, NJ
OWNER(S) DURING USE...: Warrensburg Board and Paper
OPERATOR DURING USE...: Warrensburg Board & Paper
OPERATOR ADDRESS......: Thurman Road, Warrensburg, NY
PERIOD ASSOCIATED WITH HAZARDOUS WASTE: From To 1978

SITE DESCRIPTION:
This inactive landfill was used for the disposal of waste paper, wood and metal from the operation of the Warrensburg Board and Paper mill. The landfill also received municipal waste. A local resident reported midnight dumping took place at the site during Fall 1978 and Spring 1979. The material dumped was reported to have been a thin black liquid of unknown composition. A Phase I study was carried out and a State Superfund Remedial Investigation has been completed. The investigation did not detect evidence of any hazardous waste at the site.

This site was rejected for inclusion on the National Priorities List (NPL).

HAZARDOUS WASTE DISPOSED: Confirmed-X Suspected-

TYPE	QUANTITY (units)

SITE CODE: 557006

ANALYTICAL DATA AVAILABLE:
Air- Surface Water-X Groundwater-X Soil-X Sediment-X

CONTRAVENTION OF STANDARDS:
Groundwater- Drinking Water- Surface Water- Air-

LEGAL ACTION:

TYPE..: State- Federal-
STATUS: Negotiation in Progress- Order Signed-

REMEDIAL ACTION:

Proposed- Under design- In Progress- Completed-X
NATURE OF ACTION: RI-FS

GEOTECHNICAL INFORMATION:
SOIL TYPE: Sand, boulders
GROUNDWATER DEPTH: 0-20 feet

ASSESSMENT OF ENVIRONMENTAL PROBLEMS:

The only sample taken during the Remedial Investigation which showed any contaminant of any concern was a sediment sample from an intermittent stream on site which showed 385 ppm of lead.

ASSESSMENT OF HEALTH PROBLEMS:

There are a number of homes with private wells nearby. These have been sampled by the Department of Health and show no contamination. The Schroon River is close by (about 500ft), however, no site related contaminants were found in the river. There is extensive use of the site by local residents using off-road vehicles, however, only low levels of contaminants are found in the surface soils. Any type of proper closure would prevent any threat to the public health.

REFERENCE NO. 3

SUPERFUND CHEMICAL DATA MATRIX

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(385 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Ammonium sulfamate	001773-06-0	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Aniline	000062-53-3	10000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	10	NA	NA	No	Yes
Anthracene	000120-12-7	10	1.0E+00	1.0E-04	2.0E-03	2.0E-07	0.4000	0.4000	5000.0	5000.0	5000.0	5000.0	10000	10000	6	0.0020	Yes	Yes
Antimony	007440-36-0	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	500.0	0.5	500.0	...	...	NA	NA	No	Yes
Arsenic	007440-38-2	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	50.0	500.0	10	100	NA	NA	No	Yes
Asbestos	001332-21-4	10000	1.0E+00	1.0E-04	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Atrazine	001912-24-9	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	6	0.0020	Yes	Yes
Azinphos- ethyl	002642-71-9	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Azinphos- methyl	000086-50-0	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Aziridine	000151-56-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Barium	007440-39-3	10*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Barium cyanide	000542-62-1	10	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Benz(a)anthracene	000056-55-3	1000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0002	Yes	Yes
Benzene	000071-43-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	5000.0	5000.0	500.0	50000.0	10000	10000	17	1.0000	Yes	No
Benzene carbonyl chloride	000098-88-4	...	1.0E+00	1.0E+00	...	...	0.4000	1.0000	0.5	0.5	0.5	0.5	10	1	11	1.0000	Yes	No
Benzidine	000092-87-5	10000	1.0E+00	1.0E-04	1.0E+00	1.0E-04	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0002	Yes	Yes
Benzo(a)pyrene	000050-32-8	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	500.0	50000.0	500.0	10000	1000	6	0.0002	Yes	Yes
Benzo(j,k)fluorene	000206-44-0	100	1.0E+00	...	...	...	1.0000	0.4000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Benzo(k)fluoranthene	000207-08-9	...	1.0E+00	...	2.0E-05	...	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0002	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility				Persistence		Bioaccumulation				Ecotoxicity					
			Liquid		Non-Liquid				Food Chain		Environmental							
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Chlorpyrifos	002921-88-2	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chromium	007440-47-3	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	5.0	500.0	10000	10	NA	NA	No	Yes
Chromium(III)	016065-83-1	1*	1.0E+00*	1.0E-07*	... *	... *	1.0000	1.0000	500.0	500.0	500.0	500.0	10	10	NA	NA	No	Yes
Chromium(VI)	018540-29-9	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	5.0	500.0	5.0	500.0	100	100	NA	NA	No	Yes
Chrysene	000218-01-9	...	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0002	Yes	Yes
Cobalt	007440-48-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	NA	NA	No	Yes
Copper	007440-50-8	...*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	100	1000	NA	NA	No	Yes
Copper cyanide	000544-92-3	100	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Coumaphos	000056-72-4	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.4000	500.0	500.0	500.0	500.0	10000	1000	NA	NA	No	Yes
Creosote	008001-58-9	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Cresol, m-	000108-39-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	100	100	11	1.0000	Yes	No
Cresol, p-	000106-44-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	5000.0	5000.0	100	100	11	1.0000	Yes	No
Cumene	000098-82-8	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	100	1	17	1.0000	Yes	No
Cyanazine	021725-46-2	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0020	Yes	Yes
Cyanide	000057-12-5	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyanogen	000460-19-5	100	1.0E+00	...	1.0E+00	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Cyanogen bromide	000506-68-3	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyclohexane	000110-82-7	1	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	10	100	17	1.0000	Yes	No
Cyclohexanone	000108-94-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Hexachlorocyclohexane, alpha-	000319-84-6	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	5000.0	500.0	1000	1000	11	0.0200	Yes	Yes
Hexachlorocyclohexane, beta-	000319-85-7	100	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	500.0	500.0	5000.0	5000.0	...	...	6	0.0020	Yes	Yes
Hexachlorocyclohexane, delta-	000319-86-8	1*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5.0	500.0	5000.0	500.0	...	...	6	0.0200	Yes	Yes
Hexachlorocyclopentadiene	000077-47-4	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	50.0	50.0	10000	10000	17	0.2000	Yes	Yes
Hexachloroethane	000067-72-1	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	1000	17	1.0000	Yes	No
Hexachlorophene	000070-30-4	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Hexane	000110-54-3	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	...	...	17	1.0000	Yes	No
Hydrazine	000302-01-2	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	10000	100	17	1.0000	Yes	No
Hydrochloric acid	007647-01-0	1000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Hydrogen cyanide	000074-90-8	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0700	0.0700	0.5	0.5	0.5	0.5	10000	10000	17*	1.0000	Yes	No
Hydrogen sulfide	007783-06-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	17	1.0000	Yes	No
Ioxynil	001689-83-4	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Iron	015438-31-0	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	NA	NA	No	Yes
Isobutanol	000078-83-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	10	1	17	1.0000	Yes	No
Isophorone	000078-59-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Kepone	000143-50-0	10000	1.0E+00	...	2.0E-01	...	0.4000	0.0700	50000.0	50000.0	50000.0	50000.0	...	...	0	0.0020	Yes	Yes
Lead	007439-92-1	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	1000	1000	NA	NA	No	Yes
Lindane	000058-89-9	10000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.0200	Yes	Yes
Malathion	000121-75-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	0	0.0020	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Maleic anhydride	000108-31-6	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Maleic hydrazide	000123-33-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Manganese	007439-96-5	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50000.0	5000.0	50000.0	50000.0	...	...	NA	NA	No	Yes
Mercury	007439-97-6	10000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	11	0.2000	Yes	Yes
Methacrylonitrile	000126-98-7	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Methanol	000067-56-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Methomyl	016752-77-5	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Methoxychlor	000072-43-5	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	5000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
Methyl chlorocarbonate	000079-22-1	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Methyl ethyl ketone	000078-93-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Methyl isobutyl ketone	000108-10-1	10*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methyl methacrylate	000080-62-6	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0002	Yes	Yes
Methylene chloride	000075-09-2	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	10000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	0	0.0020	Yes	Yes
Metribuzin	021087-64-9	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Mirex	002385-85-5	10000	1.0E+00	...	...	...	0.4000	0.0700	5000.0	50000.0	50000.0	50000.0	10000	10000	NA	NA	No	Yes
Naphthalene	000091-20-3	100*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.4000	500.0	5.0	500.0	5000.0	1000	1000	11	0.2000	Yes	Yes
Nickel	007440-02-0	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	0.5	500.0	500.0	500.0	10	1000	NA	NA	No	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Nitric acid	007697-37-2	...	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitric oxide	010102-43-9	10	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitroaniline, p-	000100-01-6	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitrobenzene	000098-95-3	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No
Nitrogen dioxide	010102-44-0	1*	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Nitroglycerine	000055-63-0	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50.0	50.0	100	100	6	0.0200	Yes	Yes
Nitrophenol, 4-	000100-02-7	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	500.0	500.0	100	100	6	0.0200	Yes	Yes
Nitroso-di-n-butylamine, N-	000924-16-3	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	11	0.2000	Yes	Yes
Nitroso-di-n-methylurethane, N	000615-53-2	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Nitrosodiethanolamine, N-	001116-54-7	1000	1.0E+00	1.0E+00	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	0.0200	Yes	Yes
Nitrosodiethylamine, N-	000055-18-5	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Nitrosodimethylamine, N-	000062-75-9	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Nitrosodiphenylamine, N-	000086-30-6	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	100	100	6	0.0200	Yes	Yes
Nitrosopyrrolidine, N-	000930-55-2	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.2000	Yes	Yes
Nitrotoluene, 4-	000099-99-0	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	11	0.2000	Yes	Yes
Parathion, ethyl-	000056-38-2	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	6	0.0020	Yes	Yes
Parathion, methyl-	000298-00-0	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	0.4000	0.5	0.5	0.5	0.5	10000	10000	6	0.0200	Yes	Yes
PCBs	001336-36-3	10000	1.0E+00	1.0E-04	...	...	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	NA	NA	No	Yes
Pentachlorobenzene	000608-93-5	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation								
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity		Air Gas	Air Gas		
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Migration	Mobility	Gas	Part
Tetraethyldithiopyrophosphate	003689-24-5	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	NA	NA	No	Yes
Tetrahydrofuran	000109-99-9	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Thallium	007440-28-0	1000*	1.0E+00*	1.0E-04*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Thiourea	000062-56-6	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Thiram	000137-26-8	100	1.0E+00	...	2.0E-01	...	0.4000	0.0700	5000.0	5000.0	5000.0	5000.0	...	...	NA	NA	No	Yes
Toluene	000108-88-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Toluene diisocyanate	000584-84-9	1000	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	11	0.2000	Yes	Yes
Toxaphene	008001-35-2	1000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
TP, 2,4,5-	000093-72-1	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	1000	1000	0	0.0020	Yes	Yes
Tribromomethane	000075-25-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	50.0	50.0	50.0	50.0	10	10	11	1.0000	Yes	No
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorobenzene, 1,2,4-	000120-82-1	100*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	100	17	1.0000	Yes	No
Trichloroethane, 1,1,1-	000071-55-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Trichloroethane, 1,1,2-	000079-00-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichloroethylene	000079-01-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichlorofluoromethane	000075-69-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorophenol, 2,3,5-	000933-78-8	...	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,3,6-	000933-75-5	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,4,5-	000095-95-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

			Ground Water Mobility						Bioaccumulation									
			Liquid		Non-Liquid		Persistence		Food Chain		Environmental		Ecotoxicity					
Substance Name	CAS Number	Toxicity	Karst	Non-Karst	Karst	Non-Karst	River	Lake	Fresh	Salt	Fresh	Salt	Fresh	Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Trichlorophenol, 2,4,6-	000088-06-2	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	500.0	500.0	500.0	500.0	1000	100	11	0.2000	Yes	Yes
Trichlorophenol, 3,4,5-	000609-19-8	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.0200	Yes	Yes
Trichlorophenoxyacetic acid, 2,4,5-	000093-76-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	500.0	500.0	10000	10000	0	0.0020	Yes	Yes
Trichloropropane, 1,2,3-	000096-18-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	11	1.0000	Yes	No
Triethanolamine	000102-71-6	1	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	0	0.0020	Yes	Yes
Trifluralin	001582-09-8	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	50000.0	50000.0	10000	1000	11	0.0200	Yes	Yes
Trinitrobenzene, 1,3,5-	000099-35-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	100	100	6	0.0200	Yes	Yes
Trinitrotoluene	000118-96-7	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	...	...	6	0.0200	Yes	Yes
Tris (2,3-dibromopropyl) phosphate	000126-72-7	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5.0	5.0	...	...	11	0.0200	Yes	Yes
Vanadium pentoxide	001314-62-1	100	1.0E+00	...	...	...	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Vinyl acetate	000108-05-4	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	10	100	17	1.0000	Yes	No
Vinyl chloride	000075-01-4	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.0007	0.0700	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Warfarin	000081-81-2	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	10	10	0	0.0020	Yes	Yes
Xylene, m-	000108-38-3	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	500.0	500.0	500.0	500.0	100	100	17	1.0000	Yes	No
Xylene, o-	000095-47-6	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Xylene, p-	000106-42-3	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Zinc	007440-66-6	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	50000.0	500.0	50000.0	10	100	NA	NA	No	Yes
Zinc cyanide	000557-21-1	10	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes
Zinc phosphide	001314-84-7	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	0.5*	0.5*	0.5*	0.5*	...	...	NA	NA	No	Yes

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

REFERENCE NO. 4

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: December 21, 1992 Time: 9:50 AM [X] PM [ ]

Outgoing Call

To: Dan Steenberg (518) 891-1370
Telephone No.

Affiliation: NYSDEC, Site Manager - Warrensburg Board & Paper

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. **The New York State Department of Environmental Conservation (NYSDEC) has reviewed the information contained in DEC files for the Warrensburg Board & Paper Co. and has removed the site from the NYS Inactive Hazardous Waste Site Listing.**

2. **Ecology & Environment Inc. (E&E) is an NYSDEC Contract Laboratory Protocol certified laboratory in addition to being a U.S. Environmental Protection Agency (EPA) contract Laboratory Program laboratory.**

3. **A Quality Assurance/ Quality Control (QA/QC) review of the data was conducted by NYSDEC Bureau of QA/QC . The data is adequate for site assessment and conforms to NYSDEC CLP data guidelines which are equivalent to EPA CLP guidelines.**

REFERENCE NO. 5

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: October 28, 1992 Time: 3:45 AM [ ] PM [X]

Outgoing Call

To: Cindy Converse (518) 623-3300
Telephone No.

Affiliation: Warrensburg Tax Assessor

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. **Ms. Converse verified the current listing for the Warrensburg Board and Paper Co., Thurman Road (NYS Route 418), Warrensburg, Warren County, New York, as listed in the tax rolls as property Block 55-1, Lot 22-1 and being approximately 13.15 acres in size.**

2. **The current owner is listed as: Warrensburg Board and Paper, 547 West Twenty-Seventh Street, New York, New York.**

3. **A check of the local properties located within 0.25 miles of the site indicated that there are no schools, daycare facilities or nurseries.**

REFERENCE NO. 6

MALCOLM PIRNIE, INC.	PROJECT NOTES
To: File	Date: January 15, 1993
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Surface Water Intakes	Site Name: Warrensburg Board & Paper

1. Based upon information gathered from water companies operating within four miles of the WP&B site and along the fifteen-mile surface water pathway, it was determined that there are no surface water intakes used for drinking water purposes along the surface water pathway for the site.

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: October 30, 1992 Time: 2:00 AM [ ] PM [X]

Outgoing Call

To: Julius Frasaer (518) 668-4420
Telephone No.

Affiliation: Plant Worker, Lake George Water Co.

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1) **Mr. Frasaer located two surface water intakes which supply water to approximately 50,000 in the Lake George area.**

   A. **Bolton Road: Located at the termination of Bolton Road and drawing from Lake George.**

   B. **Beach Road: Located at the termination of Beach Road and drawing from Lake George.**

2) **These intakes draw approximately 1000 gallons per minute (GPM)**

3) **Lake George is not situated along the fifteen-mile surface water pathway for the Warrensburg site. As a result, they will not be evaluated as part of this report.**

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: October 30, 1992 Time: 9:40 AM [X] PM [ ]

Outgoing Call

To: Timmy Rosell (518) 696-3071
Telephone No.

Affiliation: Foreman, Lake Luzerne Water Dept.

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. **Mr. Rosell located one surface water intake behind the Lake Luzerne Town Garage on NYS Route 9N. The intake draws from Lake Luzerne at an approximate rate of 1000 gallons per minute and supplies approximately 20,000 persons in the Township of Lake Luzerne.**

2. **Lake Luzerne is not located along the projected fifteen-mile surface water pathway, therefore this intake will not be evaluated.**

REFERENCE NO. 7

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: December 21 ,1992
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Potable Water Well Supplies	Site Name: Warrensburg Board & Paper

1. Private potable water supply wells have been identified in the Remedial Investigation report in Appendix F, pp 4-5. A total of 4 wells are located approximately 825 - 1,125 feet from the site. Based upon a county, person/per household average of 2.58 persons per residence, approximately 10 persons are located within 0.25 miles of the site.

2. The Warrensburg Water Co. currently operates 4 public water supply wells located within the four-mile site vicinity (see attatched).

3. No other public supply wells have been located within the four-mile site vicinity.

4. Four-Mile Population Summary

POP. RING	POPULATION
0.0 - 0.25	10 persons (4 private Wells / Ref. No. 25, Appendix F pp. 4-5)
0.25 - 0.50	0 persons
0.50- 1.0	0 persons
1.0 - 2.0	1900 persons (see attatched)
2.0 - 3.0	1900 persons (see attatched)
3.0 - 4.0	0 persons

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: October 29, 1992 Time: 1:00 AM [ ] PM [X]

Outgoing Call

To: Richard Galusha (516) 623-2743
Telephone No.

Affiliation: Superintendent, Warrensburg Water Co.

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. Mr. Galusha located the following wells :

1	**Library Road Well**	**70 Feet Deep (Aquifer Unknown)**	**2000 Gallons per Day (GPD)**
2	**Horigon Avenue**	**70 Feet Deep (" ")**	**9000 GPD**
		70 Feet Deep (" ")	**2200 GPD**
3	**Swan Street**	**70 Feet Deep (" ")**	**9000 GPD**
4	**Alden Avenue**	**Big Brook (Surface Water intake) - This intake is being removed from service.**	

2. Warrensburg Water Dept. currently supplies 3,800 persons on the four wells.

3. 3,800 people/ 4.0 wells = 950 persons per well

RADIUS RING	**#WELLS - POPULATION**
0.0 - 1.0 miles:	**no wells**
1.0 - 2.0 miles:	**2 wells - 1900 persons**
2.0 - 3.0 miles:	**2 wells - 1900 persons**
3.0 - 4.0 miles:	**no wells**

4. These wells are part of a blended well system.

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Householder living alone: Total	Householder living alone, 65 years and over: Total	Householder living alone, 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
The State	**17 445 190**	**6 639 322**	**4 489 312**	**3 315 845**	**919 266**	**2 150 010**	**1 806 263**	**700 016**	**544 755**	**2.63**	**3.22**	**545 265**	**267 122**	**278 143**
COUNTY														
Albany County	278 399	115 824	71 455	54 534	13 355	44 369	35 050	13 559	10 777	2.40	3.04	14 195	4 286	9 909
Allegany County	45 639	17 011	12 318	10 231	1 466	4 693	3 943	1 927	1 478	2.68	3.15	4 831	398	4 433
Bronx County	1 163 368	424 112	288 609	146 234	118 610	135 503	119 218	46 431	35 780	2.74	3.35	40 421	28 534	11 887
Broome County	204 344	81 843	54 819	44 163	8 183	27 024	22 037	9 065	7 203	2.50	3.05	7 816	3 420	4 396
Cattaraugus County	80 833	30 456	21 657	17 395	3 228	8 799	7 543	3 651	2 789	2.65	3.18	3 401	1 035	2 366
Cayuga County	77 968	29 075	20 927	16 660	3 127	8 148	6 874	3 418	2 680	2.68	3.19	4 345	3 955	390
Chautauqua County	136 558	53 696	37 203	29 942	5 506	16 493	14 035	6 849	5 459	2.54	3.07	5 337	2 557	2 780
Chemung County	90 460	35 275	24 808	19 646	4 058	10 467	8 992	4 387	3 505	2.56	3.08	4 735	3 788	947
Chenango County	50 896	19 141	13 821	11 438	1 670	5 320	4 451	2 085	1 602	2.66	3.14	872	840	32
Clinton County	77 971	29 123	20 839	17 279	2 594	8 284	6 429	2 626	2 111	2.68	3.14	7 998	4 282	3 716
Columbia County	60 884	23 696	16 882	13 658	2 339	6 814	5 689	2 759	2 078	2.57	3.04	2 098	1 825	273
Cortland County	45 664	17 247	11 799	9 461	1 681	5 448	4 070	1 860	1 513	2.65	3.13	3 299	510	2 789
Delaware County	45 233	17 646	12 374	10 224	1 552	5 272	4 458	2 308	1 746	2.56	3.07	1 992	660	1 332
Dutchess County	240 984	89 567	64 757	53 635	8 353	24 810	19 884	7 705	6 051	2.69	3.18	18 478	11 475	7 003
Erie County	944 115	376 994	254 472	192 646	49 968	122 522	105 083	45 370	35 665	2.50	3.09	24 417	13 138	11 279
Essex County	34 824	13 721	9 498	7 805	1 204	4 223	3 520	1 682	1 280	2.54	3.07	2 328	2 223	105
Franklin County	42 549	16 284	11 265	8 976	1 677	5 019	4 197	2 064	1 612	2.61	3.16	3 991	3 012	979
Fulton County	53 276	20 995	14 602	11 601	2 242	6 393	5 412	2 894	2 281	2.54	3.05	915	700	215
Genesee County	58 858	21 614	16 050	13 269	2 054	5 564	4 671	2 312	1 840	2.72	3.19	1 202	800	402
Greene County	42 080	16 596	11 642	9 465	1 612	4 954	4 245	2 033	1 488	2.54	3.05	2 659	2 474	185
Hamilton County	5 197	2 153	1 508	1 266	170	645	550	241	172	2.41	2.89	82	82	-
Herkimer County	64 636	24 936	17 576	14 347	2 369	7 360	6 246	3 402	2 594	2.59	3.11	1 161	840	321
Jefferson County	103 614	37 851	28 163	23 155	3 680	9 688	8 005	3 772	2 996	2.74	3.19	7 329	2 589	4 740
Kings County	2 266 401	828 199	555 284	335 295	177 871	272 915	236 977	92 972	71 504	2.74	3.40	34 263	16 651	17 612
Lewis County	26 475	9 253	7 056	5 985	744	2 197	1 889	964	728	2.86	3.32	321	317	4
Livingston County	56 777	21 197	15 178	12 558	1 896	6 019	4 643	2 043	1 610	2.68	3.14	5 595	2 212	3 383
Madison County	64 006	23 567	17 162	14 137	2 176	6 405	5 050	2 326	1 808	2.72	3.17	5 114	776	4 338
Monroe County	691 387	271 944	182 813	140 622	34 008	89 131	71 166	25 702	20 400	2.54	3.11	22 581	8 405	14 176
Montgomery County	50 956	20 185	14 028	11 058	2 202	6 157	5 432	3 081	2 408	2.52	3.06	1 025	960	65
Nassau County	1 266 740	431 515	344 502	286 638	43 950	87 013	73 804	35 544	28 221	2.94	3.30	20 608	9 799	10 809
New York County	1 428 973	716 422	301 041	187 016	92 055	415 381	348 134	87 139	64 439	1.99	2.99	58 563	13 988	44 575
Niagara County	216 912	84 809	59 732	47 221	9 822	25 077	22 119	10 080	7 797	2.56	3.10	3 844	2 358	1 486
Oneida County	236 328	92 562	63 735	50 430	10 385	28 827	24 950	11 640	9 110	2.55	3.12	14 508	9 522	4 986
Onondaga County	453 012	177 898	118 575	91 978	21 081	59 323	47 047	18 082	14 374	2.55	3.12	15 961	5 859	10 102
Ontario County	92 094	34 929	25 143	20 792	3 210	9 786	7 716	3 414	2 675	2.64	3.10	3 007	1 497	1 510
Orange County	293 491	101 506	77 111	63 207	10 401	24 395	19 975	8 404	6 611	2.89	3.35	14 156	6 211	7 945
Orleans County	39 588	14 428	10 685	8 608	1 484	3 743	3 119	1 482	1 146	2.74	3.20	2 258	2 053	205
Oswego County	116 928	42 434	30 905	25 013	4 231	11 529	9 150	4 027	3 158	2.76	3.22	4 843	899	3 944
Otsego County	55 592	21 725	14 768	12 258	1 795	6 957	5 414	2 679	2 056	2.56	3.06	4 925	746	4 179
Putnam County	82 838	28 094	22 549	19 675	2 028	5 545	4 410	1 594	1 202	2.95	3.32	1 103	299	804
Queens County	1 924 375	720 149	490 915	351 675	102 674	229 234	196 008	82 433	65 305	2.67	3.25	27 223	18 938	8 285
Rensselaer County	148 564	57 612	39 356	30 925	6 446	18 256	14 715	6 211	4 881	2.58	3.13	5 865	1 538	4 327
Richmond County	371 574	130 519	99 059	78 198	16 249	31 460	27 314	10 516	8 305	2.85	3.33	7 403	5 222	2 181
Rockland County	257 325	84 874	66 583	55 520	8 357	18 291	15 067	6 038	4 838	3.03	3.46	8 150	4 994	3 156
St Lawrence County	101 384	37 964	26 784	21 809	3 663	11 180	8 924	4 223	3 303	2.67	3.16	10 590	3 232	7 358
Saratoga County	177 151	66 425	48 363	40 835	5 597	18 062	14 204	5 263	4 073	2.67	3.14	4 125	2 224	1 901
Schenectady County	144 981	59 181	39 702	31 284	6 556	19 479	16 611	7 649	6 063	2.45	3.01	4 304	2 201	[illegible]
Schoharie County	29 759	11 257	8 127	6 705	1 016	3 130	2 522	1 249	916	2.64	3.10	2 100	450	1 650
Schuyler County	18 176	6 818	5 025	4 140	618	1 793	1 471	753	571	2.67	3.11	486	474	[illegible]
Seneca County	32 452	12 285	8 998	7 421	1 156	3 287	2 708	1 296	981	2.64	3.09	1 231	670	[illegible]
Steuben County	97 128	37 299	26 447	21 446	3 615	10 852	9 194	4 286	3 374	2.60	3.11	1 960	1 690	[illegible]
Suffolk County	1 292 470	424 719	340 593	282 081	44 113	84 126	67 834	29 961	23 450	3.04	3.40	29 394	16 882	[illegible]
Sullivan County	63 858	24 576	17 090	13 848	2 344	7 486	6 216	2 916	2 095	2.60	3.13	5 419	2 329	[illegible]
Tioga County	51 974	18 838	14 470	12 192	1 640	4 368	3 670	1 594	1 252	2.76	3.17	363	318	[illegible]
Tompkins County	82 093	33 338	19 049	15 488	2 661	14 289	9 066	2 608	2 105	2.46	2.98	12 004	848	[illegible]
Ulster County	156 774	60 807	42 213	33 839	6 186	18 594	14 799	5 988	4 628	2.58	3.09	8 530	3 653	[illegible]
Warren County	58 122	22 559	15 788	12 740	2 254	6 771	5 519	2 591	2 070	2.58	3.09	1 087	513	[illegible]
Washington County	55 682	20 256	15 023	12 218	2 032	5 233	4 295	2 160	1 649	2.75	3.21	3 648	3 519	[illegible]
Wayne County	87 841	31 977	23 961	19 787	3 046	8 016	6 443	2 948	2 354	2.75	3.17	1 282	962	[illegible]
Westchester County	845 770	320 030	227 827	180 205	37 133	92 203	79 330	33 373	26 725	2.64	3.16	29 096	16 022	[illegible]
Wyoming County	38 731	13 897	10 528	8 857	1 175	3 369	2 847	1 391	1 088	2.79	3.23	3 776	3 709	[illegible]
Yates County	22 158	8 419	6 100	5 111	698	2 319	1 909	996	782	2.63	3.09	652	259	[illegible]
PLACE AND COUNTY SUBDIVISION														
Adams village, Jefferson County	1 742	726	469	379	78	257	231	131	112	2.40	3.04	11	11	
Adams town, Jefferson County	4 966	1 839	1 335	1 115	177	504	424	220	183	2.70	3.20	11	11	
Adams Center CDP, Jefferson County	1 675	591	455	378	64	136	102	45	36	2.83	3.22	-	-	
Addison village, Steuben County	1 842	711	505	378	94	206	171	106	87	2.59	3.05	-	-	
Addison town, Steuben County	2 645	995	730	556	127	265	215	118	97	2.66	3.08	-	-	
Afton village, Chenango County	838	337	238	207	26	99	86	52	38	2.49	3.01	-	-	
Afton town, Chenango County	2 972	1 092	814	670	98	278	219	108	81	2.72	3.13	-	-	
Airmont CDP, Rockland County	7 540	2 282	2 042	1 817	169	240	196	97	77	3.30	3.51	295	216	
Akron village, Erie County	2 895	1 185	790	621	137	395	350	224	176	2.44	3.04	11	-	
Alabama town, Genesee County	1 998	678	545	468	48	133	118	59	42	2.95	3.30	-	-	
Albany city, Albany County	91 458	42 121	20 308	12 695	6 193	21 813	16 239	5 659	4 481	2.17	2.94	9 624	2 338	[illegible]
Albertson CDP, Nassau County	5 166	1 808	1 484	1 261	153	324	291	177	150	2.86	3.21	-	-	
Albion village, Orleans County	5 710	2 317	1 504	1 061	347	813	704	350	284	2.46	3.06	153	121	
Albion town, Orleans County	6 259	2 394	1 625	1 211	316	769	659	319	249	2.61	3.19	1 919	1 887	
Albion town, Oswego County	2 028	638	528	442	54	110	81	26	12	3.18	3.45	15	15	
Alden village, Erie County	2 443	955	667	558	77	288	251	134	103	2.56	3.13	14	-	
Alden town, Erie County	8 587	2 991	2 411	2 100	226	580	491	259	200	2.87	3.25	1 785	771	
Alexander village, Genesee County	445	150	123	102	12	27	23	14	13	2.97	3.28	-	-	
Alexander town, Genesee County	2 233	742	621	543	47	121	99	41	33	3.01	3.28	-	-	
Alexandria town, Jefferson County	3 899	1 505	1 091	878	133	414	345	186	139	2.59	3.05	50	21	
Alexandria Bay village, Jefferson County	1 154	504	309	222	64	195	171	95	76	2.29	2.94	40	21	
Alfred village, Allegany County	1 055	487	191	177	12	296	197	59	52	2.17	2.81	3 504	-	[illegible]
Alfred town, Allegany County	2 287	958	517	460	36	441	308	87	76	2.39	3.02	3 504	-	[illegible]
Allegany village, Cattaraugus County	1 944	754	459	383	57	295	193	114	91	2.58	3.06	36	36	
Allegany town, Cattaraugus County	6 410	2 399	1 720	1 464	196	679	520	266	209	2.67	3.12	1 917	36	[illegible]
Allegany Reservation, Cattaraugus County	1 139	419	289	187	82	130	107	44	31	2.72	3.30	4	-	
Allen town, Allegany County	406	137	109	99	6	28	26	14	8	2.96	3.40	-	-	
Alma town, Allegany County	838	293	240	210	17	53	45	28	15	2.86	3.16	8	8	
Almond village	458	185	133	108	22	52	47	27	21	2.48	3.00	-	-	
Allegany County	442	175	128	103	22	47	43	25	20	2.53	3.04	-	-	
Steuben County	16	10	5	5	-	5	4	2	1	1.60	2.00	-	-	

REFERENCE NO. 8

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8002-062

Date: 6/18/92 Time: 9:28 [ ] AM [ ] PM

[ ] Incoming Call From: ______ Telephone No.

Affiliation: ______

[X] Outgoing Call To: Kevin Roberts (518)-457-6674 Telephone No.

Affiliation: NYSDEC Division of Water, groundwater management

Malcolm Pirnie Staff: Lisa Szegedi (609)-860-0100
(Receiving or Calling) Name Telephone No.

Summary of [X] Conversation [ ] Agreement:

The Sept 1990 NYS wellhead protection program document is a finalized document

f:\rectele.jan(1)

TABLE 3.1.
WELLHEAD PROTECTION AREA
DELINEATION SUMMARY

Geographic Region	Aquifer Area	Wellhead Protection Area Baseline Delineation
Long Island	Magothy & Lloyd Aquifers	Deep Flow Recharge Area
	Glacial Aquifer	Simplified Variable Shape: 1,500 ft. radius upgradient 500 ft. radius downgradient
Upstate	Unconsolidated Aquifers	Aquifer Boundaries (land surface)
	Bedrock Aquifers	Fixed Radius: 1,500 ft. radius

REFERENCE NO. 9

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

TABLE 3-6.—HYDRAULIC CONDUCTIVITY OF GEOLOGIC MATERIALS

Type of material	Assigned hydraulic conductivity[a] (cm/sec)
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks	10^{-8}
Silt; loesses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks	10^{-6}
Sands; sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks	10^{-4}
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-2}

[a] Do not round to nearest integer.

TABLE 3-7.—TRAVEL TIME FACTOR VALUES[a]

Hydraulic conductivity (cm/sec)	Thickness of lowest hydraulic conductivity layer(s)[b] (feet)			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5}	35	25	15	15
Less than 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

Determine travel time only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the travel time factor for any aquifer that does not have an observed release. If the necessary subsurface geologic information is available at multiple locations, evaluate the travel time factor at each location. Use the location having the highest travel time factor value to assign the factor value for the aquifer. Enter this value in Table 3–1.

3.1.2.5 *Calculation of potential to release factor value.* Sum the factor values for net precipitation, depth to aquifer, and travel time, and multiply this sum by the factor value for containment. Assign this product as the potential to release factor value for the aquifer. Enter this value in Table 3–1.

3.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for that aquifer. Otherwise, assign the potential to release factor value for that aquifer as the likelihood of release value. Enter the value assigned in Table 3–1.

3.2 *Waste characteristics.* Evaluate the waste characteristics factor category for an aquifer based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to ground water. Such hazardous substances include:

• Hazardous substances that meet the criteria for an observed release to ground water.

• All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 2.2.2, 2.2.3, and 3.1.2.1).

3.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified in the following sections. Select the toxicity/mobility factor value for the aquifer being evaluated as specified in section 3.2.1.3.

3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in Section 2.4.1.1.

3.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance for the aquifer being evaluated as follows:

• For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the sources at the site, regardless of the aquifer being evaluated, assign a mobility factor value of 1.

• For any hazardous substance that does not meet the criteria for an observed release by chemical analysis to at least one of the aquifers, assign that hazardous substance a mobility factor value from Table 3–8 for the aquifer being evaluated, based on its water solubility and distribution coefficient (K_d).

• If the hazardous substance cannot be assigned a mobility factor value because data on its water solubility or distribution coefficient are not available, use other hazardous substances for which information is available in evaluating the pathway.

TABLE 3-8.—GROUND WATER MOBILITY FACTOR VALUES[a]

Water solubility (mg/l)	Distribution coefficient (K_d) (ml/g)			
	Karst[c]	≤10	>10 to 1,000	>1,000
Present as liquid[b]	1	1	0.01	0.0001
Greater than 100	1	1	0.01	0.0001
Greater than 1 to 100	0.2	0.2	0.002	2×10^{-6}
Greater than 0.01 to 1	0.002	0.002	2×10^{-5}	2×10^{-7}
Less than or equal to 0.01	2×10^{-5}	2×10^{-5}	2×10^{-7}	2×10^{-9}

[a] Do not round to nearest integer.

[b] Use if the hazardous substance is present or deposited as a liquid.

[c] Use if the entire interval from the source to the aquifer being evaluated is karst.

REFERENCE NO. 10

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: January 15, 1993
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: River Flow Values	Site Name: Warrensburg Board & Paper

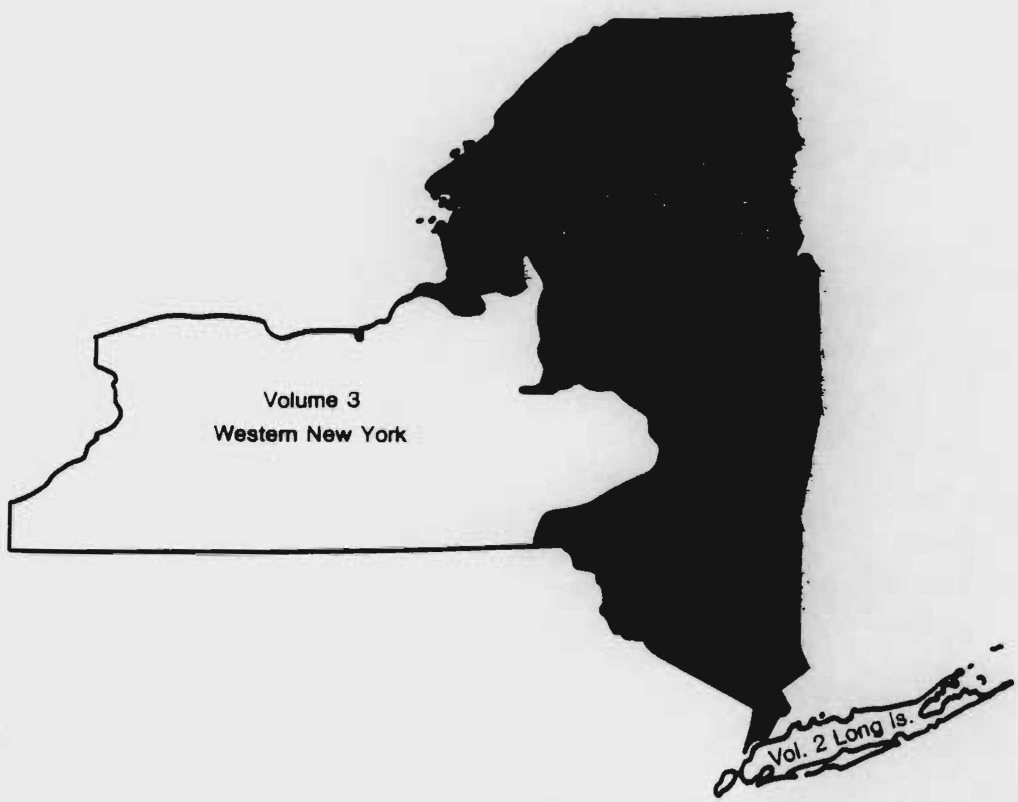
1. The average discharge for the Hudson River is 2,919 ft^3/s based upon values listed in the Water Resource Data, New York, for water year 1990.

2. Mean annual flow data is currently unavailable for the Schroon River. As a result, the average discharge for the Schroon River is estimated to be between 1000 ft^3/s and 2,919 ft^3/s. This range is based upon the size of the river, topographic contours, and the assumption that the Schroon River should have a lower flow than the river into which it flows (the Hudson River).

Water Resources Data New York Water Year 1990

Volume 1. Eastern New York excluding Long Island

by Gary D. Firda, Richard Lumia, and Patricia M. Murray



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NY-90-1
Prepared in cooperation with the State of New York
and with other agencies

01318500 HUDSON RIVER AT HADLEY, NY

LOCATION.--Lat 43°19'08", long 73°50'41", Saratoga County, Hydrologic Unit 02020001, on right bank at Hadley, 400 ft downstream from outlet of Lake Luzerne, and 0.3 mi upstream from Sacandaga River.

DRAINAGE AREA.--1,664 mi^2.

PERIOD OF RECORD.--July 1921 to current year.

REVISED RECORDS.--WSP 561: 1921-22. WSP 756: Drainage area. WSP 1432: 1931 (m).

GAGE.--Water-stage recorder. Datum of gage is 563.99 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Some diurnal fluctuation caused by powerplant on Schroon River. Flow regulated by Indian Lake (see station 01314500) and other reservoirs upstream from station. Telephone gage-height telemeter and satellite gage-height telemeter at station.

AVERAGE DISCHARGE.--69 years, 2,919 ft^3/s.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,700 ft^3/s, Jan. 1, 1949, gage height, 21.21 ft; minimum, 281 ft^3/s, Sept. 3, 1934, gage height, 0.94 ft; minimum daily, 292 ft^3/s, July 24, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Discharge for the flood of March 27, 1913, was about 49,000 ft^3/s, based on peak runoff comparison with a station 12.7 mi upstream (drainage area 1,533 mi^2).

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 15,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Mar. 16	1315	a*26,200	*14.52	May 18	0500	16,000	10.28
Mar. 18	0430	23,400	13.35	May 21	1915	16,000	10.27
Apr. 4	2245	19,100	11.59				

a Result of ice jam release.

Minimum discharge, 635 ft^3/s, Sept. 7, gage height, 1.94 ft; minimum daily, 672 ft^3/s, Sept. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2490	3770	3270	1280	2930	4230	4700	5690	4740	1480	1090	1020
2	2570	4120	2600	e1400	2790	3960	5020	5040	4490	1510	1200	1000
3	2620	3990	2380	1310	2650	3730	6610	4450	4010	1430	1160	943
4	2890	3750	2070	1290	2460	3530	16200	3880	3910	1310	1040	879
5	2840	3460	1970	1390	2340	3250	17700	4070	3890	1220	954	755
6	2610	3300	2220	1420	2320	3080	14600	5270	3750	1110	1380	888
7	2360	3300	2420	1430	2320	2890	12000	5340	3570	1010	2030	672
8	2450	3500	2120	1360	2270	2760	9930	4890	3290	980	3420	722
9	2190	4570	1930	1340	2230	2660	8770	4890	2520	969	2890	791
10	2280	6450	1850	1260	2520	2570	7730	4990	2440	938	2280	798
11	1910	6410	1950	1180	3160	2740	12200	7210	2350	898	3000	704
12	2240	5850	1950	e1100	3420	3540	13300	8100	2280	859	4830	750
13	2170	5190	1750	e1000	3400	5470	11100	7490	2170	827	4500	756
14	1930	4680	1660	e1000	3230	10100	9240	10200	2030	779	5560	724
15	2150	4310	1550	e1000	3030	15600	8420	9500	1860	757	5960	798
16	2110	4190	1540	1100	2780	20500	7860	8600	1770	816	5080	998
17	2180	6710	1590	1120	3290	21500	7430	10600	2320	864	4120	1010
18	3100	7330	1560	1220	3870	22700	7280	15500	2580	841	3320	858
19	3320	6190	e1500	1620	3780	18100	6700	13300	2440	771	2880	813
20	4350	5420	e1400	2130	3790	14000	6090	11500	2360	727	2500	788
21	12100	5750	e1300	2380	3200	12100	6090	14400	2130	701	2180	759
22	10700	5270	e1300	2350	3050	10700	6630	14700	2070	728	1960	772
23	8650	4660	1130	2170	4140	9840	6760	12300	1990	957	1760	840
24	7290	4260	1130	1990	6400	9010	6580	10600	2170	2750	1630	776
25	6260	3930	1180	1890	6560	8130	6490	8880	2160	3030	1600	747
26	5520	3740	e1100	2600	5640	7340	7090	7900	1920	2470	1540	778
27	4980	3580	e1100	3750	5150	6290	8040	6930	1700	1920	1430	771
28	4490	3330	1010	3850	4650	5850	7470	6070	1540	1570	1400	750
29	4010	3970	e1100	3600	---	5370	6870	5630	1450	1350	1360	716
30	3710	3090	1040	3000	---	4970	6240	5500	1510	1160	1220	896
31	3460	---	1080	3040	---	4770	---	5370	---	1040	1090	---
TOTAL	121930	138070	51750	56570	97370	251280	261140	248790	77410	37772	76364	24472
MEAN	3933	4602	1669	1825	3477	8106	8705	8025	2580	1218	246[illegible]	816
MAX	12100	7330	3270	3850	6560	22700	17700	15500	4740	3030	5960	1020
MIN	1910	3090	1010	1000	2230	2570	4700	3880	1450	701	954	672

CAL YR 1989 TOTAL 1062343 MEAN 2911 MAX 13200 MIN 674
WTR YR 1990 TOTAL 1442918 MEAN 3953 MAX 22700 MIN 672

e Estimated

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at partial-record stations are usually presented in two tables. The first is usually a table of discharge measurements at low-flow partial-record stations and the second is a table of annual maximum stage and discharge at crest-stage stations. Discharge measurements made at miscellaneous sites for both low flow and high flow are given in a third table. No discharge measurements were made at low-flow partial-record stations for the 1990 water year.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain, but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water year 1990

Station No.	Station name	Location	Drainage area (mi^2)	Period of record	Annual maximum: Date	Annual maximum: Gage height (feet)	Annual maximum: Discharge (ft^3/s)
		Housatonic River basin					
01199477	Stony Brook near Dover Plains, NY	Lat 41°42'38", long 73°37'18", Dutchess County, Hydrologic Unit 01100005, on town road, 100 ft upstream from mouth, and 2.9 mi southwest of Dover Plains.	1.93	1976-90	10-21-89	2.79	148
		Hudson River basin					
01317000	Schroon River at Riverbank, NY	Lat 43°36'34", long 73°44'17", Warren County, Hydrologic Unit 02020001, on right bank, 30 ft upstream from highway bridge at Riverbank, and 11.8 mi downstream from Schroon Lake.	527	1908-25, 1926-70‡, 1987-90	3-18-90	8.02	5,200
01329154	Steele Brook at Shushan, NY	Lat 43°05'35", long 73°19'38", Washington County, Hydrologic Unit 02020003, at bridge on county road, 1.1 mi upstream from mouth, and 0.8 mi east of Shushan.	2.85	1979-90	1-26-90	5.62	118
01329500	Batten Kill at Battenville, NY	Lat 43°06'05", long 73°25'55", Washington County, Hydrologic Unit 02020003, on left bank, 1.2 mi upstream from Trout Brook, and 1.0 mi southwest of Battenville.	394	1923-68‡, 1987-90	1-26-90	8.11	5,690
01330880	Saratoga Lake tributary near Bemis Heights, NY	Lat 42°59'43", long 73°43'06", Saratoga County, Hydrologic Unit 02020003, at culvert on State Highway 423, 1.4 mi upstream from mouth, and 4.6 mi northwest of Bemis Heights.	2.98	1968-90	1-26-90	15.58	226
01342800	West Canada Creek at Nobleboro, NY	Lat 43°23'47", long 74°51'35", Herkimer County, Hydrologic Unit 02020004, at bridge on State Highway 8, 2.9 mi northeast of Wilmurt, in village of Nobleboro.	193	1958-66, 1967-68‡, 1969-76, 1985, 1987-90	10-21-89 3-17-90	9.00 9.00	8,800 8,800
01348420	North Creek near Ephratah, NY	Lat 43°00'28", long 74°33'54", Fulton County, Hydrologic Unit 02020004, at culvert on town road, 0.4 mi upstream from mouth, and 1.2 mi northwest of Ephratah.	6.52	1975-90	4-11-90	5.86	223

‡ Operated as a continuous-record gaging station.

REFERENCE NO. 11

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: December 29, 1992 Time: 10:36 AM [X] PM [ ]

Outgoing Call

To: Eric Sinsabaugh (518) 869-6347
Telephone No.

Affiliation: National Weather Service

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. **Mr. Sinsabaugh related that the 1-year, 24-hour rainfall for the 1991 year was approximately 4.4 inches.**

2. **He further related the 24-hour monthly rainfalls for the 1992 year as follows:**

January	**0.65 (inches)**
February	**2.70**
March	**3.20**
April	**1.90**
May	**1.47**
June	**1.22**
July	**0.81**
August	**0.48**
September	**0.96**
October	**0.01**
November	**1.04**
December	**0.74**

3. **Taking the total readings for the 1992 year, the approximate 24-hour rainfall for 1992 was approximately 3.20 inches.**

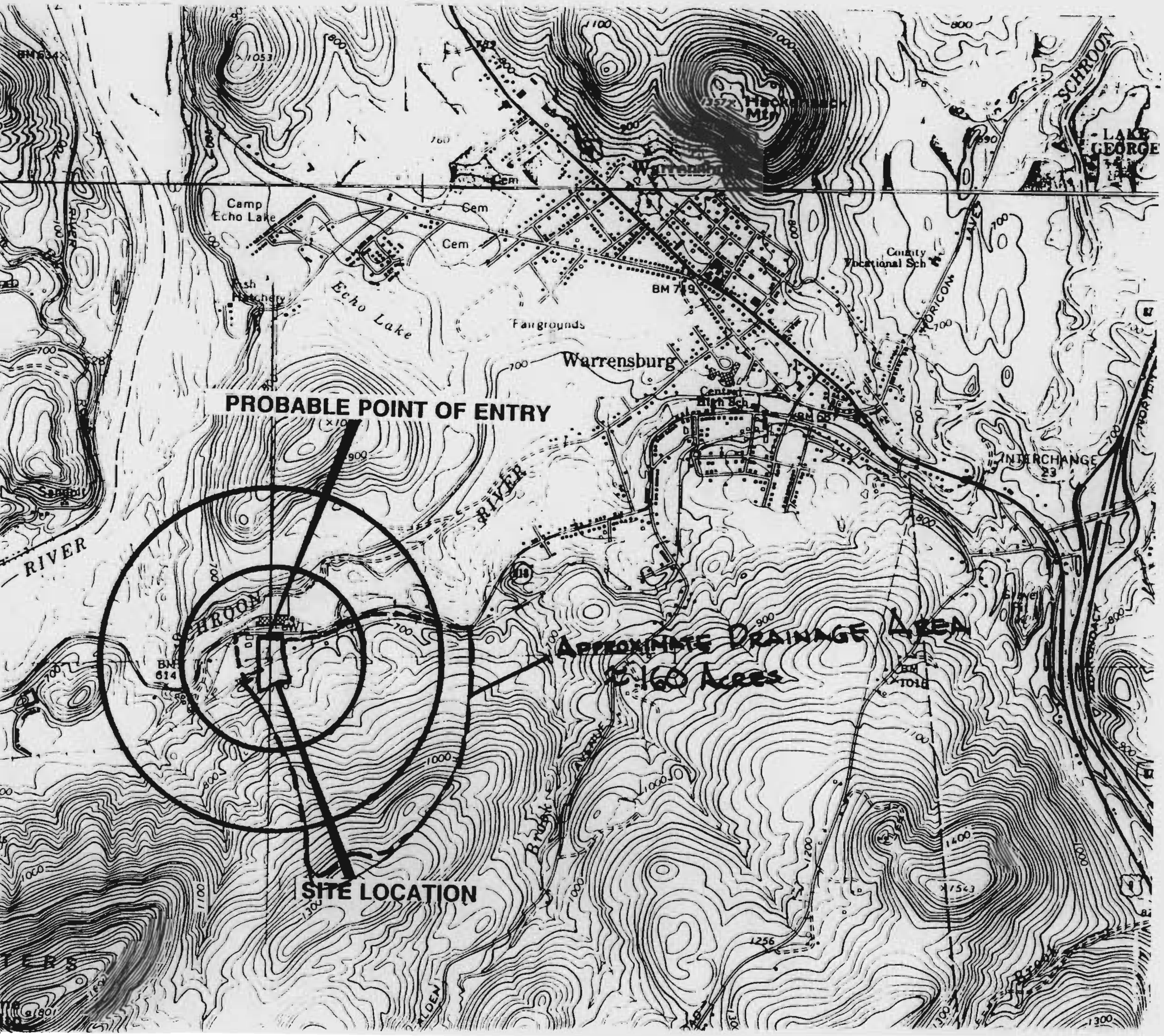
4. **As a result, the two-year 24-hour rainfall is approximately 4.4 inches.**

REFERENCE NO. 12

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: December 29, 1992
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Drainage Area	Site Name: Warrensburg Board & Paper

1. Based upon US Geological Survey topographical maps, 7.5 minute series, "Warrensbug Quadrangle, NY." , the approximate drainage area for the Warrensburg Board & Paper Co. site is 160 acres. A map of the drainage area in relation to the site location is provided in the attachment.


PROBABLE POINT OF ENTRY
SITE LOCATION
APPROXIMATE DRAINAGE AREA
±160 ACRES
Warrensburg
Fairgrounds
Echo Lake
Camp Echo Lake
Fish Hatchery
Cem
Cem
Cem
County Vocational Sch
Central High Sch
BM 719
INTERCHANGE 23
SCHROON
LAKE GEORGE
RIVER
RIVER
HORICON AVE
Brook

REFERENCE NO. 13

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: November 16, 1992 Time: 1034 AM ☑ PM ▯

Outgoing Call

To: Bill Miller (518) 623-3671
Telephone No.

Affiliation: Bureau of Fisheries, NYSDEC, Warrensburg Field Office

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

1. **Mr. Miller confirmed the direction of flow for the Schroon River as being southwest discharging into the Hudson River. The direction of flow for the Hudson River is south towards the ocean. Additionally, Mr. Miller informed me that the Schroon and Hudson Rivers are freshwater fisheries.**

2. **The Schroon River is stocked with trout, and also contains species of northern pike, salmon and bass. There are also large fishing derbies held at various times throughout the year in the town of Warrensburg.**

3. **The Hudson River contains various species of bass, and is also actively fished.**

REFERENCE NO. 14

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: December 21, 1992
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Endangered Species	Site Name: Warrensburg Board & Paper

1. The NY Natural Heritage program, New York Department of Environmental Conservation has conducted a data retrieval for the Warrensburg Board & Paper Co., Warrensburg, Warren County, New York. This data is classified and may not be included in the report (See Attachment)

2. This information has been reviewed and verified on the four-mile vicinity and fifteen-mile surface water pathway maps for the site and indicates that no sensitive environments are along the surface water pathway or within 4.0 miles of the site. The data will be kept on file in the site project file.

New York State Department of Environmental Conservation
Wildlife Resources Center
Information Services
700 Troy-Schenectady Road
Latham, New York 12110-2400

Thomas C. Jorling
Commissioner

November 20, 1992

Rickey T. Kampfer
Malcolm Pirnie, Inc.
104 Interchange Plaza
Cranbury, NJ 08512-9543

Dear Mr. Kampfer:

We have reviewed the New York Natural Heritage Program files with respect to your recent request for biological information concerning the Warrensburg Board and Paper Company site on Route 418, as indicated on your map, located in the Town of Warrensburg, Warren County.

Enclosed is a computer printout covering the area you requested to be reviewed by our staff. The information contained in this report is confidential and may not be released to the public without permission from the New York Natural Heritage Program.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office, Division of Regulatory Affairs, at the address enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State Law.

If this project is still active one year from now we recommend that you contact us again so that we may update this response.

Sincerely,

Burrell Buffington

Burrell Buffington
NY Natural Heritage Program

Encs.
cc: Reg. 5, Wildlife Mgr.
Reg. 5, Fisheries Mgr.

REFERENCE NO. 15

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: December 31, 1992 Time: 1034 AM [ ] PM []

Outgoing Call

To: John Haubert (202) 208-4290
Telephone No.

Affiliation: National Park Service, Division of Protected Env.

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

Mr. Haubert related that the Schroon River is listed on the Potential Wild, Scenic and Recreational Rivers directory. The National Park Service has adapted the following classifications in this directory.

Designated Rivers - Defined and Mandated by the US Congress or the Secretary of the Interior. These environments are protected and the NPS must grant permission for any projects occurring within the river boundaries.

Designated Study Rivers - Defined and Mandated by the US Congress. These environments are protected. Provisions similar to the Designated Rivers apply.

Potential Rivers - The environments have been identified as potential wild, scenic and recreational rivers by the National Park Service. These rivers are not protected environments, however, the NPS requests to be consulted prior to the commencement of activities which would adversely affect the river boundary.

REFERENCE NO. 16

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: January 15, 1993
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Population Calculations	Site Name: Warrensburg Board & Paper

1. Populations for the four-mile site vicinity of the Warrensburg Board & Paper Co. Site have been estimated using a combination of a physical house count from the Four-Mile Vicinity Map for the site (made from USGS topographical 7.5 minute series quadrangles), the Warren County, New York 1990 population per household average, and the Personal Computer Version of the Graphical Exposure Modeling System (PCGEMS) (see attached).

2. House count, estimated population values and PCGEMS population values are as follows:

POP. RING	# HOUSES	POP./HOUSE.	POPULATION
0-0.25 miles:	14	2.58	36
0.25-0.50 miles:	7	2.58	18
0.50-1.0 miles:	81	2.58	209
1.0-2.0 miles:	N/A	N/A	1,911 (PCGEMS)
2.0-3.0 miles:	N/A	N/A	2,006 (PCGEMS)
3.0-4.0 miles:	105	2.58	271
		TOTAL POP.	4,451

GSC-TR-32-90-008

DRAFT

PCGEMS USER'S GUIDE RELEASE 1.0

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION

Under
Contract No. 68024281
Task No. 2-28
Project Officer: Lynn Delpire
Task Manager: Patricia Harrigan

Prepared by

GENERAL SCIENCES CORPORATION
6100 Chevy Chase Drive
Laurel, Maryland 20707

April 1990

WARRENSBURG BOARD AND PAPER

LATITUDE 43:28:51 LONGITUDE 73:47:60 1980 POPULATION

KM	0-1/4 0.00- 0.4	1/4-1/2 0.4- 0.8	1/2 - 1 0.8- 1.6	1- 2 1.6- 3.2	3.2- 4.8	4.8- 6.4	SECTOR TOTALS
S 1	0	0	0	1911	2006	0	3917
RING TOTALS	0	0	0	1911	2006	0	3917

REFERENCE NO. 17

REFERENCE NO. 18

REFERENCE NO. 19

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	Date: December 21, 1992
From: Rickey T. Kampfer	Project #: 8003-14-4
Subject: Wetlands	Site Name: Warrensburg Board & Paper

1. Wetlands maps based upon USGS topographical maps were not available from CLEARS . These maps for the project site are not in print. Wetlands delineation was made using the standard symbols contained in the USGS map legend.

2. Wetlands and approximate acreages are as follows:
   0 - 0.25 mile = 0 acres
   0.25 - 0.50 mile = 0 acres
   0.50 - 1 mile = 0 acres
   1 - 2 miles = 150 acres
   2 - 3 miles = 425 acres
   3 - 4 miles = 300 acres

REFERENCE NO. 20

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8003-14-4

Date: January 4, 1993 Time: 9:35 AM [X] PM [ ]

Outgoing Call

To: Fred Dunlap (518) 891-1370
Telephone No.

Affiliation: NYSDEC, Surface Water Quality

Malcolm Pirnie Staff: Rickey T. Kampfer (609) 860-0100
Telephone No.

Summary of Conversation:

Mr. Dunlap related the following concerning the location of the Warrensburg Board & Paper Co. site location and floodplain information:

1. **The site is currently located within a zone "C" floodplain which is an area of minimal flooding situated outside of the 500-year floodplain boundary.**

2. **The above information may change depending upon the final impact of the Warrensburg Dam Project. The Adirondak Hydro-Electric Company (AHEC) has made several structural improvements to the dam that may impact the floodplain delineation as determined the Federal Emergency Management Agency (FEMA). A finalized impact study is due from the AHEC for this determination.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ROUTE 86
RAY BROOK, NY 12977

TELEX NO. 891-4520

ENVIRONMENTAL QUALITY
FAX TRANSMISSION ROUTING FORM

TO: Rickey Kampfer, Malcolm-Pirnie

TELEX NO. 609-860-0250

FROM: Fred Dunlap, NYSDEC, Ray Brook

DATE: 1/4/93

We are transmitting a total of 3 pages, including this cover page. you do not receive all the pages, please contact the switchboard operator at (518) 891-1370.

Notes/Messages/Instructions:

KEY TO MAP

500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations*

100-Year Flood Boundary

500-Year Flood Boundary

Base Flood Elevation Line With Elevation In Feet** — 513 —

Base Flood Elevation in Feet Where Uniform Within Zone** (EL 987)

Elevation Reference Mark RM7×

Zone D Boundary

River Mile •M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:

SEPTEMBER 20, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

N

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRA

FIRM

FLOOD INSURANCE RATE MAF

TOWN OF WARRENSBURG, NEW YORK WARREN COUNTY

PANEL 23 OF 45

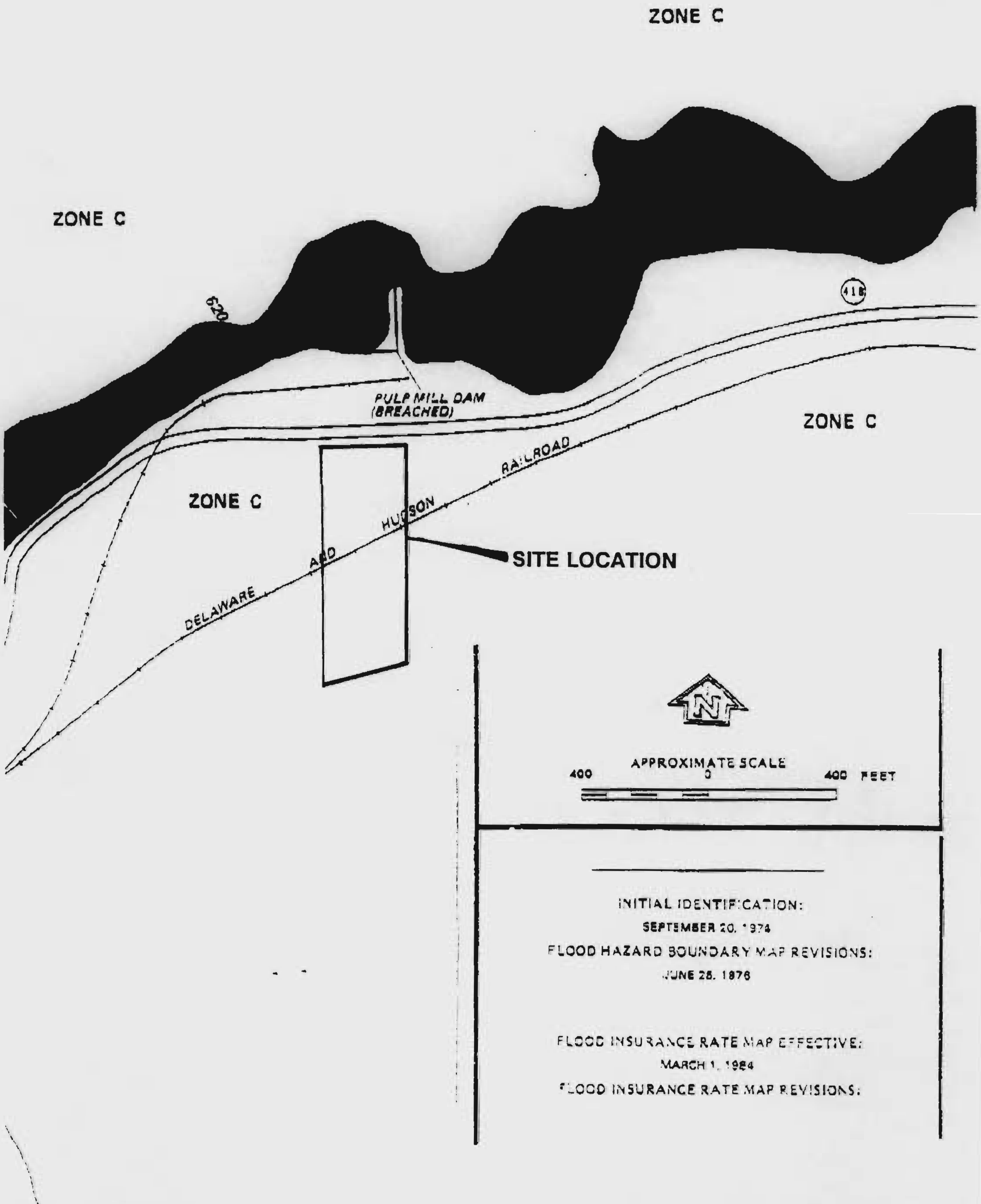
(SEE MAP INDEX FOR PANELS NOT PRINTE

COMMUNITY-PANEL NUMBE

360882 0023 E

EFFECTIVE DATI

MARCH 1, 199


ZONE C
ZONE C
620
41B
PULP MILL DAM
(BREACHED)
ZONE C
ZONE C
DELAWARE AND HUDSON RAILROAD
SITE LOCATION
N
APPROXIMATE SCALE
400 0 400 FEET
INITIAL IDENTIFICATION:
SEPTEMBER 20, 1974
FLOOD HAZARD BOUNDARY MAP REVISIONS:
JUNE 28, 1976
FLOOD INSURANCE RATE MAP EFFECTIVE:
MARCH 1, 1984
FLOOD INSURANCE RATE MAP REVISIONS:

REFERENCE NO. 21

EA Report DEC31A

PRELIMINARY INVESTIGATION OF THE WARRENSBURG BOARD AND PAPER CORPORATION SITE TOWN OF WARRENSBURG, WARREN COUNTY, NEW YORK

PHASE I. SUMMARY REPORT

Prepared for

New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Prepared by

Ecological Analysts, Inc.
R.D. 2, Goshen Turnpike
Middletown, New York 10940

September 1984

CONTENTS

EXECUTIVE SUMMARY

The Warrensburg Board and Paper Corp. Site (New York ID No. 557006, EPA ID No. NYD013348438) is an inactive landfill located opposite the dilapidated, abandoned company mill 2 miles east of Warrensburg on Rte. 418 in the town of Warrensburg, Warren County, New York. The approximately 5-acre site was used until 1978 for the disposal of the company's baling wire, paper and plastic shredding, wood, and other wastes. The property is owned by the Warrensburg Board and Paper Corp., 510 West 27th Street, New York, New York. In May of 1979, a nearby resident complained to the NYSDEC Warrensburg office that a tank truck was emptying 2,000-3,000 gallons of black liquid, 2-3 times per week at the site. Ecological Analysts Inc. (EA) contacted the complainee to establish the duration of the dumping and consequently determined that total waste quantity was 288,000 gallons. A former mill employee reported that xylene, toluene, and formaldehyde were dumped at the site. Past sampling and analyses for PCBs indicated trace concentrations in soil and standing water samples.

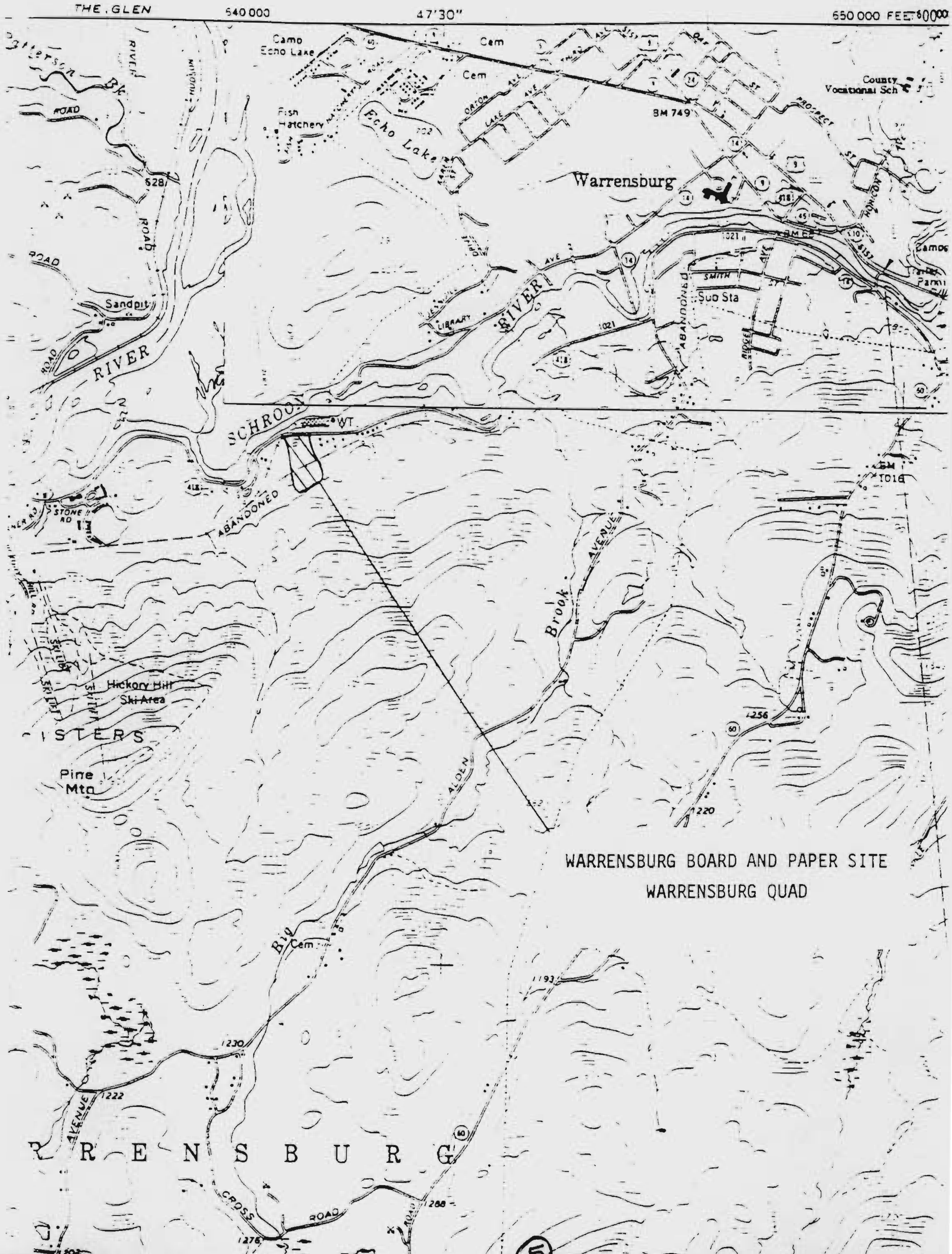
At the time of the EA inspection, the site exhibited extensive indications of leachate generation. Asphaltic-type seeps were observed in areas where the tank truck was reported to have dumped. In addition, a spring-fed pond was found to be leachate ridden. Ground water contamination is suspected due to the condition of the spring.

The preliminary HRS scores for this site are as follows: Migration Score (S_M) = 38.65; Direct Contact Score (S_{DC}) = 25.00. The available data are inadequate to prepare a final HRS. In the event that releases to surface and ground water are confirmed, the Migration Score would increase to 44.65 . The recommended Phase II work plan entails sampling a spring reported to serve a nearby residence. Additional sampling is recommended for active and asphaltic seeps, and the leachate pond. Test borings will be converted to observation wells in accordance with the findings of the geophysical and OVA surveys. The estimated cost for Phase II work is $37,000.

WARRENSBURG BOARD AND PAPER CORPORATION SITE

The Warrensburg Board and Paper Corporation Site (New York ID No. 557006, EPA ID No. NYD013348438) is an inactive landfill located opposite the abandoned Warrensburg Corp. mill, 2 miles east of the city of Warrensburg, Warren County, New York. The site is 5 acres in size and was used until 1978 for disposal of the company's baling wire, paper and plastic shredding, wood, and other wastes. Xylene, formaldehyde, and toluene are reported to have been disposed of at this site. A local resident reported that after the mill was closed following a fire in 1978, illegal dumping of black liquid at the site by tanker trucks took place regularly until May 1979. Leachate is emanating from the landfill and is suspected of contaminating groundwater.

7.5 MINU


THE GLEN
640 000
47'30"
650 000 FEET
Camp Echo Lake
Cem
Cem
County Vocational Sch
Fish Hatchery
Echo Lake
BM 749
Warrensburg
RIVER
ROAD
Sandpit
RIVER
SCHROON
WT
ABANDONED
STONE RD
Sub Sta
SMITH
LIBRARY
BM 1016
AVENUE
Brook
Hickory Hill Ski Area
SISTERS
Pine Mtn
ALDEN
1256
1220
WARRENSBURG BOARD AND PAPER SITE
WARRENSBURG QUAD
Big
Cem
1193
1230
1222
AVENUE
R E N S B U R G
CROSS
ROAD
1288
1276

federal register

Friday
July 16, 1982

Warrensburg
Board and
Paper Site
557006

Part V

Environmental Protection Agency

National Oil and Hazardous Substances Contingency Plan

6.

Facility name: WARRENSBURG BOARD & PAPER CO.

Location: WARRENSBURG WARREN COUNTY, [illegible]

EPA Region: II

Person(s) in charge of the facility:

Name of Reviewer: Ecological Analysts, Inc. Date: 8/31/83

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Site is a landfill which had been used by the paper mill for non-toxic disposal until 1972. Midnight dumping was reported since 1979

Scores: S_M = 38.65 (S_{gw} = 66.33 S_{sw} = 8.39 S_a = 0)

S_{FE} = N/A

S_{DC} = 25.00

MAY S_M = 44.65

FIGURE 1
HRS COVER SHEET

BILLING CODE 6560-50-C

Ground Water Route Work Sheet					
Rating Factor	**Assigned Value (Circle One)**	**Multiplier**	**Score**	**Max. Score**	**Ref. (Section)**
1 Observed Release	0 45	1	0	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2	6	6	
Net Precipitation	0 1 2 3	1	2	3	
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3	
Physical State	0 1 2 3	1	3	3	
	Total Route Characteristics Score		13	15	
3 Containment	0 1 2 3	1	3	3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	7	8	
	Total Waste Characteristics Score		25	26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3	9	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	30	40	
	Total Targets Score		39	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			38025	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 66.33		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

MAX = 76.5?
with release

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1	2	3	
1-yr. 24-hr. Rainfall	0 1 2 3	1	1	3	
Distance to Nearest Surface Water	0 1 2 3	2	6	6	
Physical State	0 1 2 3	1	3	3	
Total Route Characteristics Score			12	15	
3 Containment	0 1 2 3	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	7	8	
Total Waste Characteristics Score			25	26	
5 Targets					4.5
Surface Water Use	0 1 2 3	3	6	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			5400	64,350	
7 Divide line 6 by 64,350 and multiply by 100	S_{sw} = 8.39				

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

S_{sw} = 10.49
with release

Air Route Work Sheet					
Rating Factor	**Assigned Value (Circle One)**	**Multiplier**	**Score**	**Max. Score**	**Ref. (Section)**
1 Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5 If line 1 is 45, then proceed to line 2					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100		S_a =	0		

FIGURE 9
AIR ROUTE WORK SHEET

BILLING CODE 6560-50-C

four-mile radius as well as transients such as workers in factories, offices, restaurants, motels, or students. It excludes travelers passing through the area. If aerial photography is used in making the count, assume 3.8 individuals per dwelling unit. Select the highest value for this rating factor as follows:

DISTANCE TO POPULATION FROM HAZARDOUS SUBSTANCE

Population	0–4 miles	0–1 mile	0–½ mile	0–¼ mile
0	0	0	0	0
1 to 100	9	12	15	18
101 to 1,000	12	15	18	21
1,001 to 3,000	15	18	21	24
3,001 to 10,000	18	21	24	27
More than 10,000	21	24	27	30

Distance to sensitive environment is an indicator of the likelihood that a region that contains important biological resources or that is a fragile natural setting would suffer serious damage if hazardous substances were to be released from the facility. Assign a value from Table 10.

Land use indicates the nature and level of human activity in the vicinity of a facility. Assign highest applicable value from Table 13.

6.0 Computing the Migration Hazard Mode Score, S_M

To compute S_M, complete the work sheet (Figure 10) using the values of S_{gw}, S_{sw} and S_a obtained from the previous sections.

7.0 Fire and Explosion

Compute a score for the fire and explosion hazard mode, S_{FE}, when either a state or local fire marshall has certified that the facility presents a significant fire or explosion threat to the public or to sensitive environments or there is a demonstrated fire and explosion threat based on field observations (e.g., combustible gas indicator readings). Document the threat.

7.1 *Containment.* Containment is an indicator of the measures that have been taken to minimize or prevent hazardous substances at the facility from catching fire or exploding. Normally it will be given a value of 3 on the work sheet (Figure 11). If no hazardous substances that are individually ignitable or explosive are present and those that may be hazardous in combination are segregated and isolated so that they cannot come together to form incompatible mixtures, assign this factor a value of 1.

7.2 *Waste Characteristics.* Direct evidence of ignitability or explosion potential may exist in the form of measurements with appropriate instruments. If so, assign this factor a value of 3; if not, assign a value of 0.

TABLE 13.—VALUES FOR LAND USE (AIR ROUTE)

Assigned value=	0	1	2	3
Distance to Commercial-Industrial	> 1 mile	½ to 1 mile	¼ to ½ mile	< ¼ mile.
Distance to National/State Parks, Forests, Wildlife Reserves, and Residential Areas.	> 2 miles	1 to 2 miles	½ to 1 mile	< ½ mile.
Distance to Agricultural Lands (in Production within 5 years):				
Ag land	> 1 mile	½ to 1 mile	¼ to ½ mile	< ¼ mile.
Prime Ag Land [1]	> 2 miles	1 to 2 miles	½ to 1 mile	< ½ mile.
Distance to Historic/Landmark Sites (National Register of Historic Places and National Natural Landmarks).				Within view of site or if site is subject to significant impacts.

[1] Defined in the Code of Federal Regulations, 7 CFR 657.5, 1981.

	S	S^2
Groundwater Route Score (S_{gw})	66.33	4399.67
Surface Water Route Score (S_{sw})	8.39	70.39
Air Route Score (S_a)	0	0
$S^2_{gw} + S^2_{sw} + S^2_a$		4470.06
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a}$		66.86
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a} / 1.73 = S_M =$		38.65

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Max S_m = 44.65

with release to surface and ground water

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1	3	3	8.2
3 Containment	0 15	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	8	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			8	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			5400	21,600	
7 Divide line 6 by 21,600 and multiply by 100		S_{DC} = 25.00			

FIGURE 12
DIRECT CONTACT WORK SHEET

BILLING CODE 6560-50-C

June 28, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Warrensburg Board and Paper Site

LOCATION: Warrensburg, New York

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Not tested yet.

Rationale for attributing the contaminants to the facility:

Site inspection team observed a spring flo
from rock outcrop which was contaminate
with an orange leachate.

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Overburden and bedrock

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Approximately 0-20 feet based on proximity of Schroon R. and DEC file

Depth from the ground surface to the lowest point of waste disposal/ storage:

UNKNOWN MAX. Assume ≤ 20 ft., because much of the wastes reportedly dumped on the surface (See Section 6)

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

40 inches

Mean annual lake or seasonal evaporation (list months for seasonal):

26 inches

Net precipitation (subtract the above figures):

14 inches

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Sand, silty sand, some coarse fill

Permeability associated with soil type:

$< 10^{-3} > 10^{-5}$ cm/sec.

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Liquids, Solids

(See Section 6)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Liner

Method with highest score:

No liner present (Site Inspection)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

PCBs formaldehyde
toluene
xylene

(See Sections 6 and 7.3)

Compound with highest score:

PCBs (3,3)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

See Section 6 — A local resident has reported illegal dumping of black substances from a tank tru[ck] Site inspection revealed presence of half buried and buried drums. Also Two fully sealed drums on surface in woods.

Basis of estimating and/or computing waste quantity:

Estimated oil type waste quantity = ~ 8 months × 9,000 GALS./WK

32 WKS × 9,000 = 288,000 GALS. (equivalent of 5,760 drum[s] for HRS scor[ing])

* * *

QUANTITY BASED ON ACCOUNT OF EYE WITNESS, E. BAKER

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Drinking water

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

< 1/8 mile downgradient

Residence

Distance to above well or building:

< 2,000 ft (Approx 500 ft)

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

1000 - 3000 people; Residences downgradient plus less than 1 mile downstream are the Sugarloaf and Hickory Hill resort areas, which are served by private wells.

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

N/A

Total population served by ground water within a 3-mile radius:

1,000 - 3,000

(Approx 200 homes west of site plus the resorts = ~1,200+, Ref. NYSDEC Region 5, New York State Atlas of Community Water System Sources, 5/1982)

SURFACE WATER ROUTE

1 OBSERVED RELEASE uncertain

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

[illegible]

Rationale for attributing the contaminants to the facility:

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

>3% – 5%

Name/description of nearest downslope surface water:

Schroon River

Average slope of terrain between facility and above-cited surface water body in percent:

5-8%

(Site Inspection)

Is the facility located either totally or partially in surface water?

No although there is ponding on site

Is the facility completely surrounded by areas of higher elevation?

NO

1-Year 24-Hour Rainfall in Inches

2.0

Distance to Nearest Downslope Surface Water

< 1/8 mile

Physical State of Waste

liquid, solid (see sections 5.3, and 6

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

ADEQUACY OF COVER EVALUATED

Method with highest score:

FINDING INADEQUATE COVER (Site Inspection)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

PCBS formaldehyde
toluene
xylene

see Section 6 and 7.3)

Compound with highest score:

PCB'S

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

288,000 GALS

Basis of estimating and/or computing waste quantity:

Ref. COMMUNICATION w/ EYE WITNESS, ELLIS BAKER
[8 MOS OF DUMPING @ 9,000 GALS/WK]

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreation

(Note: Reservoirs within 3-miles are not within surface drainage area. They are at higher elevations.)

Is there tidal influence? No.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Wetlands 1-2 miles but at a much higher elevation in the mountains south of the site

No score

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

N/A

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None:

Warrensburg served by 2 reservoirs 1 to 1½ miles from site, but are located at much higher elevations in the mountains south of the site

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

N/A

Total population served:

NC population affected by downgradient surface water

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles.

N/A

AIR ROUTE

1 OBSERVED RELEASE None

Contaminants detected:

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi   0 to 1 mi   0 to 1/2 mi   0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

1/2 - 3/4

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

[illegible]

Distance to residential area, if 2 miles or less:

1 mile

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-12
July, 1981

5.

EPA

Potential Hazardous Waste Site

Preliminary Assessment

26

Preliminary Assessment

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER: NYD013349431

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): Warrensburg Board and Paper
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: Thurman Rd.
03 CITY: Warrensburg
04 STATE: NY
05 ZIP CODE: 12885
06 COUNTY: Warren
07 COUNTY CODE
08 CONG. DIST.
09 COORDINATES LATITUDE: __ __ __ . _ LONGITUDE: ___ __ __ . _
10 DIRECTIONS TO SITE (Starting from nearest public road): South side of Rt 418 along the Schroon River, 2 miles west of Warrensburg.

III. RESPONSIBLE PARTIES

01 OWNER (if known): Warrensburg Board and Paper
02 STREET (Business, mailing, residential): PO Box 8
03 CITY: Warrensburg
04 STATE: NY
05 ZIP CODE: 12885
06 TELEPHONE NUMBER: 518 623-3461
07 ~~OPERATOR~~ (If known and different from owner): PARENT COMPANY { Warrensburg Board & Paper Corp.
08 STREET (Business, mailing, residential): 510 WEST 27 ST.
09 CITY: NEW YORK
10 STATE: NY
11 ZIP CODE
12 TELEPHONE NUMBER: (212) 227-9804 NEW JERSEY Phone #

13 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL: ____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: ____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: ____ MONTH DAY YEAR ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ____ MONTH DAY YEAR ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES DATE 7 20 83 (MONTH DAY YEAR)
☐ NO
BY (Check all that apply): ☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☒ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ____ (Specify)
CONTRACTOR NAME(S): Ecological Analysts

02 SITE STATUS (Check one)
☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
unknown (BEGINNING YEAR) 1978 (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Plastics, petroleum products, formaldehyde, xylene, toluene, paper, wire, aluminum sulfate, waste oil possibly containing PCBs.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
GROUND WATER CONTAMINATION

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: Raymond Kapp
02 OF (Agency/Organization): Ecological Analysts Inc.
03 TELEPHONE NUMBER: (914) 692-6
04 PERSON RESPONSIBLE FOR ASSESSMENT: Paul Fleming
05 AGENCY
06 ORGANIZATION: "
07 TELEPHONE NUMBER: ("
08 DATE: 8 15 8 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

NYD0'33-8-38

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

EPA

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
[illegible]

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)
- X A. SOLID
- B. POWDER, FINES
- X C. SLUDGE
- D. OTHER ______ (Specify)
- E. SLURRY
- X F. LIQUID
- G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)
- TONS ______
- CUBIC YARDS ______
- NO. OF DRUMS unknown

03 WASTE CHARACTERISTICS (Check all that apply)
- X A. TOXIC
- B. CORROSIVE
- C. RADIOACTIVE
- X D. PERSISTENT
- E. SOLUBLE
- F. INFECTIOUS
- G. FLAMMABLE
- H. IGNITABLE
- I. HIGHLY VOLATILE
- J. EXPLOSIVE
- K. REACTIVE
- L. INCOMPATIBLE
- M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE	unknown		possibly containing PCBs
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	unknown		Xylene, toluene, formaldehyde
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS	-		FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

DEC files
Site inspection

NVD013347.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION — 02 ☒ OBSERVED (DATE 3/ /83) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED 1000-3000 — 04 NARRATIVE DESCRIPTION

Site inspection team observed a spring flowing from between some rocks with obvious contamination by an orange leachate

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED Zero — 04 NARRATIVE DESCRIPTION

No data, but leachate observed

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No data

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

None reported

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ~1,000 — 04 NARRATIVE DESCRIPTION

None reported but site not secure

01 ☒ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED NE (Acres) — 04 NARRATIVE DESCRIPTION

Soil contaminated [illegible] but extent unknown

01 ☒ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ~~1000-3000~~ — 04 NARRATIVE DESCRIPTION

See above

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

None reported

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

None reported

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE | 02 SITE NUMBER
NY | 0133484??

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (include name(s) of species)

None reported

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (spills/runoff/standing liquids, leaking drums) — 02 ☐ OBSERVED (DATE ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ______ 04 NARRATIVE DESCRIPTION

Waste [illegible] reported

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

NA

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE ______) ☐ POTENTIAL ☒ ALLEGED
04 NARRATIVE DESCRIPTION

Resident near the site reported a tank truck was dumping a black oily substance 2-3 times per week. EA's site inspection team confirmed the presence of a black oily substance at the location that the resident had reported.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 1000 - 3000

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Atlas of Community Water System Sources, 1982
DEC files
Site Inpection

EPA FORM 2070-12 (7-81)

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-13
July, 1981

EPA

Potential Hazardous Waste Site

Site Inspection Report

32

United States Environmental Protection Agency

Site Inspection Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE: NY | 02 SITE NUMBER: D01[illegible]

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Warrensburg Board & Paper Co.	Thurman Rd

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Warrensburg	NY	12885	Warren		

09 COORDINATES: LATITUDE __ __ __.__ LONGITUDE ___ __ __.__

10 TYPE OF OWNERSHIP (Check one): ☒ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
7,20 83 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	unknown / 1978 (BEGINNING YEAR / ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ______ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ______ (Name of firm)

☐ E. STATE ☒ F. STATE CONTRACTOR Ecological Analysts (Name of firm) ☐ G. OTHER ______ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Charles Houlik	Hydrogeologist	Ecological Analysts	(914) 692-67[illegible]

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Paul Fleming	Engineer	"	( )
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	8:45 A.M	Sunny, hot, dry

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Raymond Kapp	Ecological Analysts	(914) 692-67[illegible]

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Paul Fleming		"	"	8,17,83 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

NYD 013384 33

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
~~[illegible]~~	

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [x] A. SOLID
- [ ] B. POWDER, FINES
- [x] C. SLUDGE
- [ ] D. OTHER ________ (Specify)
- [ ] E. SLURRY
- [x] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS ________

CUBIC YARDS ________

NO. OF DRUMS unknown

03 WASTE CHARACTERISTICS (Check all that apply)

- [x] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [x] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE	unknown		possibly containing PCBs
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			toluene, xylene, formald[illegible]
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS	-		FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

DEC files
Site inspection

EPA FORM 2070-13 (7-81)

WVD013348633

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
~~NJ~~

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☒ OBSERVED (DATE [illegible]) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ~~1000-3000~~ — 04 NARRATIVE DESCRIPTION

Site inspection team observed a spring flowing from between some rocks; it was clearly contaminated as evidenced by an orange leachate

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED Zero — 04 NARRATIVE DESCRIPTION

No data, but leachate flows observed by F

01 ☒ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ______ — 04 NARRATIVE DESCRIPTION

No data

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ______ — 04 NARRATIVE DESCRIPTION

None reported

01 ☒ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ~1000 — 04 NARRATIVE DESCRIPTION

None reported, but site access not controlled

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE ______) — ☐ POTENTIAL — ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED ~5 (Acres) — 04 NARRATIVE DESCRIPTION — See Section 7.3

Extent unknown

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ~~1000-3000~~ — 04 NARRATIVE DESCRIPTION

See above (groundwater)

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE ______) — ☐ POTENTIAL — ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED ______ — 04 NARRATIVE DESCRIPTION

None reported

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED ______ — 04 NARRATIVE DESCRIPTION

None reported

EPA FORM 2070-13 (7-81)

NYD 013 348433

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
~~NY 1557 00 6~~

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (include name(s) of species)

None reported

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE 26 July 83) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ~1000
04 NARRATIVE DESCRIPTION: (site inspection)
Standing liquids on site; potential direct contact

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

NA

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE ________) ☐ POTENTIAL ☒ ALLEGED
04 NARRATIVE DESCRIPTION
Resident near site reported a tank truck was dumping a black oily substance 2-3 times per week. EA's site inspection team confirmed the presence of the black oily substance at the location that the resident reported.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 1000 - 3000

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

DEC files
Site inspection
NYS Atlas of Community Water System Sources 1982

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0[illegible]

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	UNKNOWN	
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

- ☒ A. BUILDINGS ON SITE

06 AREA OF SITE

~6 (Acres)

07 COMMENTS

Records indicate all waste received at landfill to have been generated by Wallenburg Board & Paper mill; however, condition of site @ time of inspection (ie, barrels, leachate, odors) clearly indicate presence of other waste.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☒ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

No manmade or natural liners present

northern berm created for purposes of directing runoff.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

DEC files

EA site inspection

EPA FORM 2070-13 (7-81)

NYD 0 3 3 - 2 4 3 2

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
~~N Y~~	~~5 - 7 - 016~~

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL	02 STATUS: ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A. ☒	B. ☒	A. ☐	B. ☐	C. ☐	A. 1 to 2 (mi)
NON-COMMUNITY	C. ☐	D. ☒	D. ☒	E. ☐	F. ☐	B. < 1/8 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING

☒ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)

☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available)

☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 1000 - 3000

03 DISTANCE TO NEAREST DRINKING WATER WELL < 1/8 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
≤ 20 (ft)	North / Northwest	≤ 20 (ft)	unknown (gpd)	☐ YES ☐ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Warrensburg water district, wells and reservoirs 1 to 2 miles from site. Private residences less then 1/4 mile downgradient from site. Warrensburg wells are upgradient and across the river from the site.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS	☐ YES ☐ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION DRINKING WATER SOURCE

☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES

☒ C. COMMERCIAL, INDUSTRIAL

☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Schroon River	☐	< 1/8 (mi)
Hudson River	☐	1/2 (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE	02 DISTANCE TO NEAREST POPULATION
A. ~1000 NO. OF PERSONS	B. ___ NO. OF PERSONS	C. ___ NO. OF PERSONS	< 1/8 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE

04 DISTANCE TO NEAREST OFF-SITE BUILDING ~1000 ft

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Large Village - Warrensburg
rural area in mountains around site
Sugarloaf Mtn. and Hickory Hills ski resorts within 2 miles and 1 mile of site respectively and downstream from site

EPA FORM 2070-13 (7-81)

NYD013 3…

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
~~[illegible]~~

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

Shale

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☒ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
Unknown (ft)	Unknown (ft)	Unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
14 (in)	2.0 (in)	3-5 %	North / Northwest	5-8 %

09 FLOOD POTENTIAL

SITE IS IN ______ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE A ______ (mi)

OTHER (upgradient) B 1-2 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

None known ______ (mi)

ENDANGERED SPECIES ______

13 LAND USE IN VICINITY

DISTANCE TO

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A 1/2-3/4 (mi)	B 1-2 (mi)	C. ______ (mi)	D ______ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Sugarloaf and Hickory Hill ski areas downriver from the site (3/4 mile and 1 1/2 miles)

Warrensburg state fish hatchery on the Hudson River, upstream but within 1 mile.

Wetlands 1-2 miles from site but at a much higher elevation in the mountains south of site

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

DEC files

Topographic maps

NYS DOH Atlas of Community Water System Sources, 1982

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NV	[illegible]

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF 3a
(Name of organization or individual)

03 MAPS ☐ YES ☐ NO

04 LOCATION OF MAPS

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

NY0013348457

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

EPA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
~~[illegible]~~	

II. CURRENT OWNER(S) / PARENT COMPANY (if applicable)

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER
Warrensburg Bd and Paper		WARRENSBURG BOARD & PAPER CORP	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
P.O. Box 8		510 WEST 27TH STREET	
05 CITY / **06 STATE** / **07 ZIP CODE**		**12 CITY** / **13 STATE** / **14 ZIP CODE**	
Warrensburg / NY / 12885		NEW YORK / NY	
01 NAME	**02 D+B NUMBER**	**08 ~~NAME~~**	**09 D+B NUMBER**
		PHONE 212-227-9804	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**12 CITY** / **13 STATE** / **14 ZIP CODE**	
01 NAME	**02 D+B NUMBER**	**08 NAME**	**09 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**12 CITY** / **13 STATE** / **14 ZIP CODE**	
01 NAME	**02 D+B NUMBER**	**08 NAME**	**09 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**10 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**11 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**12 CITY** / **13 STATE** / **14 ZIP CODE**	

III. PREVIOUS OWNER(S) (List most recent first) / IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**05 CITY** / **06 STATE** / **07 ZIP CODE**	
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**05 CITY** / **06 STATE** / **07 ZIP CODE**	
01 NAME	**02 D+B NUMBER**	**01 NAME**	**02 D+B NUMBER**
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	**04 SIC CODE**	**03 STREET ADDRESS** (P.O. Box, RFD #, etc.)	**04 SIC CODE**
05 CITY / **06 STATE** / **07 ZIP CODE**		**05 CITY** / **06 STATE** / **07 ZIP CODE**	

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

DEC files

EPA FORM 2070-13 (7-81)

NYD 013 348438

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
~~NY~~	~~[illegible]~~

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P O Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P O Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P O Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P O Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P O Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P O Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE
10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P O Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE
10 NAME	11 D+B NUMBER
12 STREET ADDRESS (P O Box, RFD #, etc.)	13 SIC CODE
14 CITY	15 STATE / 16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NYD	013348438

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D013348430

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D 1334943?

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ W. GAS CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ X. FIRE CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D133422432

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

5.3 SITE INSPECTION SUMMARY

On 20 July 1983 at 8:45 a.m., representatives from Ecological Analysts, Inc. began an inspection of the Warrensburg Board and Paper Corp. site. Representing EA were Chuck Houlik and Paul Fleming. The abandoned mill is located on the north side of Route 418, between the road and the Schroon River. The site is on the south side of Route 418.

The site consists of two cleared areas separated by a railroad right-of-way and a section of trees (Attachment 5.3-1). The first, lower clearing abuts Route 418; alongside the road there is a concrete building foundation. A barn behind the foundation was found to contain approximately three dozen cylinders containing a dried, asphalt type material. These cylinders were labeled "Steep". Directly in front of the loading dock entrance, there were four dozen sacks of "Essex aluminum sulfate". Three empty barrels, one of which was capped, were also in the entrance way. Piles of waste papers were scattered throughout the barn.

Behind the barn, in an area approximately 100 square feet in size, black seeps had surfaced through the sand cover material. The seeps appeared to be a liquidized asphalt. However, closer examination showed the material to be thinner than expected; in addition to which, the temperature was not yet warm enough to melt asphalt.

The inspection continued towards the upper clearing. An old site sketch (Attachment 5.3-2) indicated leachate in the depression west of the access road. The depression was found to contain an orange colored pond. The pond was being fed by a small, southern slope outflow, believed to be a spring. It was heavily orange colored. The flow was great enough to ripple the water surface. To the west of the pond, two barrels had been discarded. These barrels were partially filled with an unknown material; the lids were secured, with no signs of leaking.

The inspection team walked in a southerly direction from the leachate pond. A drainage pipe protruding from the hill was observed. There were no apparent signs of its having conducted runoff recently, nor whether it might have been discolored. The terrain in the southern direction is an increasing upwards slope; therefore, the upper clearing is sloping towards the Schroon River.

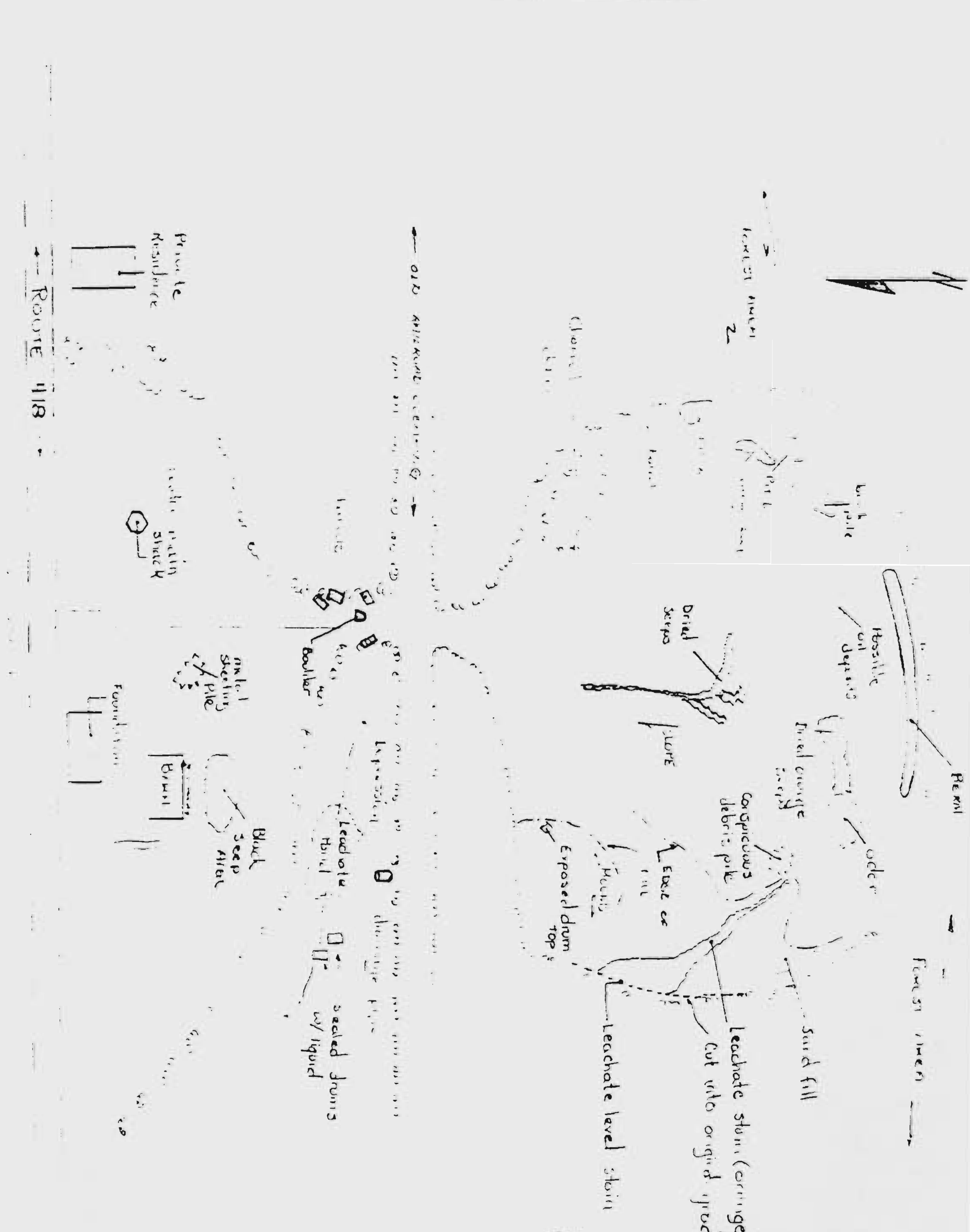
The upper clearing is a roughly circular area. The inspection began at the mouth of the circle and proceeded counterclockwise. To the west, the fill area had been cut out of the original slope. The exposed soil on the western sidewall was stained with dried, orange leachate. Judging by the markings, a leachate pond collected on the western perimeter. The leachate originated approximately 30 yards from the dried basin. This point of origin was found to be very interesting. The area stained by leachate is lower than the rest of the fill area level; the leachate exudes from the point at which the elevation difference is most noticeable. The section of the site was interesting because sand, uncommon to the site, was piled as if to be used as cover material. In addition, a very conspicuous pile of debris was left in a spot at the grade change; the spot appeared to be a likely place into which to back a vehicle for dumping purposes.

As the inspection resumed along the southern perimeter, more dried, orange seep areas were noticed. A slightly perceptible, foul odor was detected near the leachate spots. Intermixed with the orange seeps was a small area with a petroleum type odor and dark discoloration of the soil. Evidence of buried barrels was observed in this southern section. The outer perimeter of the southern end was bordered by a berm, which was to thwart runoff from traversing the site.

Along the eastern perimeter, two small pits were encountered. Both pits were dry, with orange stains indicating the level which the leachate had attained. The pits had vegetation growing within them. The southernmost pit contained a minimum of six crushed and partially exposed barrels. A barrel past the northern pit, partially buried, contained orange stained plastic/paper debris.

In the northeast corner, there was a large pile containing charred debris, presumably from the mill. Dried orange rivulets in the center of the upper clearing ran through the site as a main runoff route. Proceeding back down the hill towards Route 418, it was noticed that a boulder at the mouth of the upper clearing did not impede all vehicular traffic.

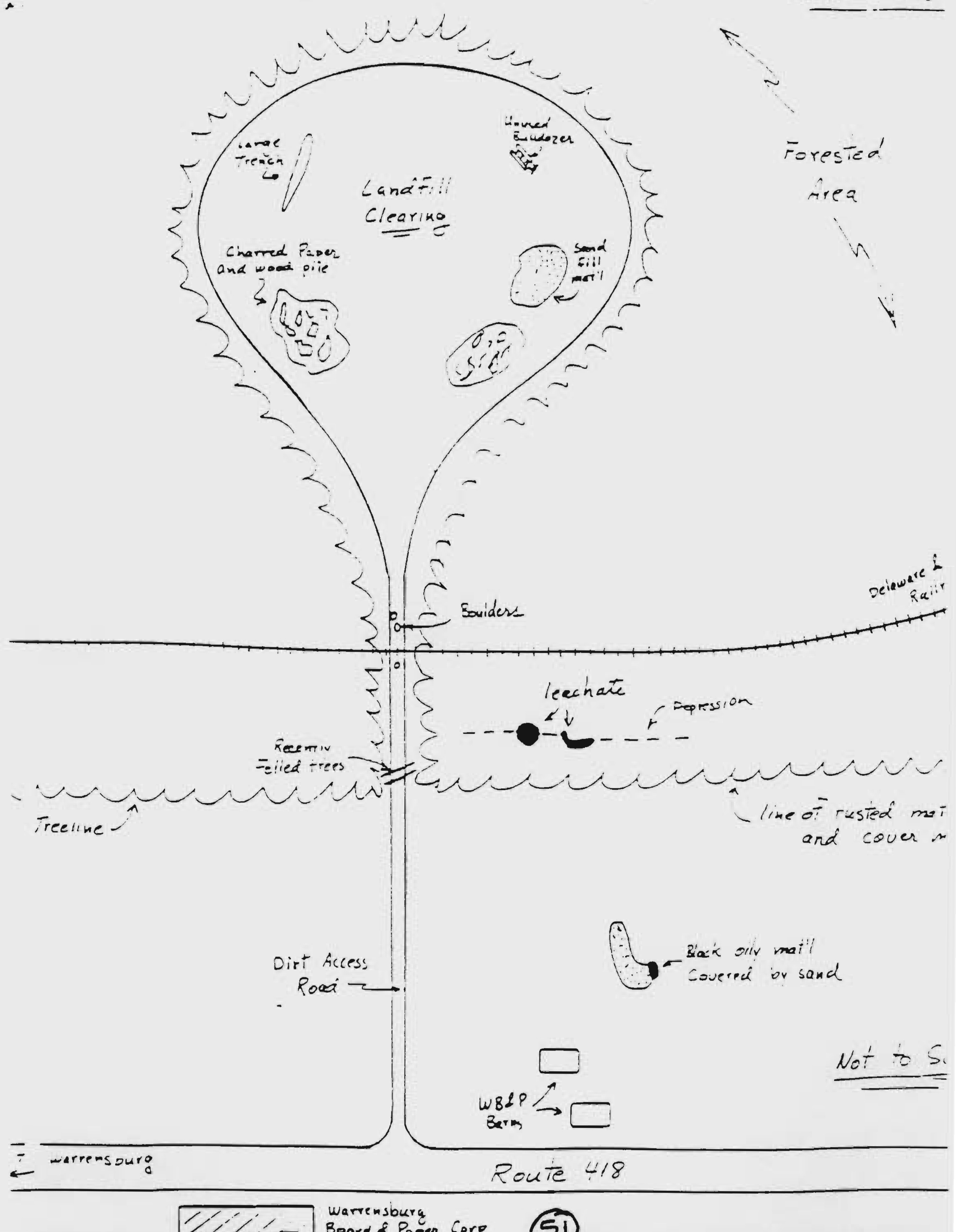
WARRENSBURG BOARD & PAPER



REPORT CONTAINED IN DEC FILE

53-2

Warrensburg



6. SITE HISTORY

The Warrensburg Board and Paper Corp. site is an inactive, 5-acre landfill located opposite the abandoned Warrensburg Board and Paper Corp. mill. The site, inactive since January 1978, received waste material from the mill, consisting of wire, wood, paper, and plastic shreddings. The DEC files contain a complaint filed in May 1979 (Attachment 6-1) from a nearby resident. The resident had observed a tank truck dumping 2,000-3,000 gallons of black liquid, roughly two to three times a week, at the site. Subsequent DEC inspections substantiated this report. The total quantity of black liquid disposed on the site is estimated to be 288,000 gallons. Illegal dumping occured from the time of the plant closure until the complaint was filed (Attachment 6-2).

Soil and water samples taken from the site for PCB analysis showed low trace concentrations. Information received by the DEC from a former plant employee suggests that xylene, toluene, and formaldehyde may have been disposed at the site (Attachment 6-3). DEC (Attachment 6-4) and EPA (Attachment 6-5) inspection records recognize the contamination potential for surface and ground water.

The property is owned by the Warrensburg Board and Paper Corp., 510 West 27th Street, New York, New York, (212)-227-9804.

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION Attachment 6.1

Region 5 - Complaint Log

In Person ✓ Letter ___ Telephone ___

Date: 5/14/79

Time: 11:00 AM

Complainee: ELLIS BAKER

Title: ___

Address: THURMAN

Phone: 623-4371

Bus.: 623-3254

RE: DUMPING OF BLACK LIQUID ON WARRENSBURG BOARD & PAPER

(T)(V)(C) WARRENSBURG (County) WARREN

Outline of Discussion:

Mr. Baker has observed a tank truck dumping 2000 gallons of black liquid two or three times a week into a on Warrensburg Board and Paper property. Mr. Baker is agu with some of the mill employees, and they told him th the truck is hauling the waste from downstate or New J None of the employees, nor Mr. Baker knows what is in waste. Mr Baker is concerned about groundwater contamination, and possible pollution of nearby water supplies.

Action to be Taken:

Site inspection by L. Cowen on 5/16/79. Located the a mentioned pit, and found evidence that a black liquid had dumped there. Soil and rocks in and around the pit have been stained black. The soil is coarse sand and grav and the water table is within 5 feet of the bottom o

Conference By: ___ (OVE

Mandays Expended: ___

There is a residence approx. 500' dire
the pit. The water supply for the resi
a "spring"- type dug shallow well.

Recommend that a procedure
monitor the site, and catch the dum
the waste is being hauled from down
to contain certain undesireable and p
substances.

6/29 No activity since the memo
Dumping occurred last week in a different loca

ATTACHMENT 6-2

1 of 1

ECOLOGICAL ANALYSTS, INC.

COMMUNICATIONS RECORD FORM

Distribution: (X) Warrensburg File , ( )

( ) , ( )

( ) Author

Person Contacted ELLIS BAKER Date 8/31/83

Title NEIGHBOR (518-623-4371)

Affiliation LODGED COMPLAINT w/ DEC CONCERNING MIDNIGHT DUMPING @ WARRENSBURG BOARD & PAPER

Type of Contact TELEPHONE

Address THURMAN RD. Warrensburg, NY

Person making Contact P. Fleming

Communications Summary

Mr. Baker said that the midnight dumping was occurring at the Warrensburg site through the summer of 1978 tapering off in the winter, and continuing right up to the time of his complaint. The complaint was lodged in May of 1979.

Mr Baker also stated that the area where the buildings are presently located in lower site area (barn & foundation) was at one time a large spring fed pond. The only existent pond is located in the depression between lower and upper dumping area. Mr. Baker's statement supports the observation made by EA inspection team which is that the water flowing into pond was a spring.

Signature Paul J. Fleming

ATTACHMENT

6.3

1 of 1

Ernest Schmalz
June 24, 1980

Warrensburg Board & Paper
Thurman Road
Warrensburg, New York (Warren County)

This is a small site on the premises of a closed paper mill plant which is being used for "midnight dumping" of a black liquid possibly coming from a printing type of operation.

The mill was heavily damaged during a flood in April 1976. The premises are not in use, and buildings are being vandalized and/or torndown.

A plant employee informed DEC that Xylene, Toluene and Formaldehyde had been dumped at the site in the past.

In the last few months, a black liquid was dumped on the ground. The residue appeared to the DEC engineer as possibly a printing ink type of material. No one has been apprehended during these midnight dumpings. It seems the truck arrives late in the evening, and is gone within an hour.

There are 6 houses in the area, one of which is only several hundred yards away.

The closest house uses a spring downstream from the site. Groundwater in the area is close to the surface.

There were no site maps in the DEC regional file.

It appears this site presents a potential threat to the 6 homes in the vicinity if the chemical dumping consists of toxic material. There are no laboratory analyses available for the wells yet. Two reports of analyses for PCB's from the site area show very little contamination (attached).

The Task Force recommends a site visit on a high priority basis with a view to sampling of the spill area and a testing of adjacent wells.

ATTACH[illegible] 6.4

14

5

DIVISION OF SOLID WASTE MANAGEMENT

FACILITY INSPECTION REPORT

1 TRANS. TYPE	2 FACILITY NO. 7	8 DATE 13	14 TIME 17
1 ☐ Delete 2 ☐ Add 3 ☐ Change	575 13	07 28 81	16 15

20 CARD TYPE 21	22 INSPECTOR'S NAME 36	37	38 REMARKS 72
1 1	W C COLDEN		EXTREMELY POOR OPERATION

20 CARD TYPE 21: 1 2

LEACHATE (57–59)
1. Leachate is entering surface water. ✓
2. Leachate is known to be contravening groundwater standards.
3. Refuse is being placed into water. ✓

BURNING (55–56)
4. Refuse is burning without permit or not under permit conditions.
5. There is evidence of unapproved previous burning.

COVER (52–54)
6. Previous days refuse is not covered. ✓
7. Refuse is protruding through daily, intermediate or final cover. ✓
8. Intermediate or final cover is not in place or improperly applied. ✓

GRADING (49–51)
9. Depressions, ponding, cracked cover, or slopes steeper than 3 to 1 exist. ✓
10. Vegetative cover is missing or inadequate on completed areas. ✓
11. Soil erosion or other drainage problems exist. ✓

SEPARATION DISTANCES (46–48)
12. Refuse is closer than 50 feet to site boundaries.
13. Refuse is being placed less than 5 feet above groundwater or bedrock. ✓
14. Refuse is being placed too close to surface water. ✓

NUISANCE CONDITIONS (41–45)
15. Odors are detectable off site.
16. Blowing dust or dirt is a nuisance.
17. Papers are uncontrolled or are blowing off-site. ✓
18. Methane gas is known to be leaving the site.
19. Noise is a nuisance off-site.

OPERATION CONTROL (35–40)
20. Operation Permit conditions are being violated. (List violations) ✓
21. Refuse is not sufficiently confined or controlled. ✓
22. Refuse is spread-in layers thicker than 2 feet. ✓
23. Refuse is not compacted or compacted insufficiently. ✓
24. The working face height is greater than 10 feet.
25. Equipment on the site is not adequate for proper operation. ✓

SAFETY AND HEALTH (32–34)
26. Salvaging is uncontrolled or is creating a nuisance.
27. Rodents, insects, birds, or other vectors are not controlled. ✓
28. Unsafe conditions or equipment exist. (List items) ✓

ACCESS CONTROL (28–31)
29. Access to the site is improper, unsafe, or inadequately controlled. ✓
30. The site is open without an attendant. ✓
31. Information about the site is not posted. (e.g., hours of operation) ✓
32. Access to the operating area is poor or unsafe.

OTHER (22–27)
33. Uncontrolled leachate is visible on, or near the site. ✓
34. The quality of cover material is inadequate.
35. The working face is steeper than a 3 to 1 slope.
36. Monitoring wells are not operative.
37. Unapproved wastes have been deposited since last inspection.
38. Operator is unfamiliar with site boundaries, operation plan or permit conditions.

MARK BOXES WITH "X" ONLY IF ANSWER IS YES

REGIONAL OFFICE COPY

PERSONS INTERVIEWED & TITLES

SITE SKETCH/COMMENTS (additional sheets attached ☐ YES ☐ NO)

28 ① Br[illegible] pile [illegible] a fire hazard

W Colden

INSPECTOR'S SIGNATURE

SITE INSPECTION REPORT 02 8008-03 | II | ATTACHME

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the u tion on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Was File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmenta tection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC

I. SITE IDENTIFICATION

A. SITE NAME: Warrensburg Board and Paper Corp

B. STREET (or other identifier): Thurman Road, Route 418

C. CITY: Warrensburg | D. STATE: N.Y. | E. ZIP CODE: 12885 | F. COUNTY NAME: Warren

G. SITE OPERATOR INFORMATION

1. NAME: Warrensburg Board & Paper Corp.
2. TELEPHONE NUMBER: 212-227-9804
3. STREET: W. 1st Avenue and Aldene Rd.
4. CITY: Roselle
5. STATE: N.J.
6. ZIP CODE: 07203

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: N/A
2. TELEPHONE NUMBER:
3. CITY:
4. STATE:
5. ZIP CODE:

I. SITE DESCRIPTION

Former paper mill dump suspected of being used as an illegal chemical dump

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.)

B. APPARENT SERIOUSNESS OF PROBLEM

☒ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: Peter M. Cangialosi, FCHA - Newark
2. TELEPHONE NUMBER: 201-621-6800
3. DATE (mo., day, & yr.): September 3, 1980

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: Peter M. Cangialosi
2. TITLE: Senior Environmental Engineer
3. ORGANIZATION: Fred C. Hart Associates, Newark, N.J.
4. TELEPHONE NO. (area code): 201-621-6800

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Edward Moore	Fred C. Hart Associates, Newark, N.J.	201-621-6800
Brian Jacot	"	"

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, resi. nts)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Alan Hall	Caretaker	WB & P, Thurman Rd.
	518-623-2811	

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

E. PHOTOS

1. TYPE OF PHOTOS: * being obtained

X a. GROUND   X* b. AERIAL

2. PHOTOS IN CUSTODY OF: FCHA - Newark, N.J.

3/10

F. SITE MAPPED?

YES. SPECIFY LOCATION OF MAPS: Sketch only

G. COORDINATES

1. LATITUDE (deg.-min.-sec.): 43° 28' 49"

2. LONGITUDE (deg.-min.-sec.): 73° 47' 57"

V. SITE INFORMATION

A. SITE STATUS

1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

2. INACTIVE (Those sites which no longer receive wastes.)

X 3. OTHER (specify): Suspected midnight dur

(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

1. NO   2. YES (specify generator's four-digit SIC Code): On-site paper mill is no longer active

C. AREA OF SITE (in acres): approx. 5 acres

D. ARE THERE BUILDINGS ON THE SITE?

1. NO   X 2. YES (specify): Old maintenance barns

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
						X	
	1. RAIL		1. PILE		1. FILTRATION	X	1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDME
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJEC
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicat which Supplemental Reports you have filled out and attached to this for..

1. STORAGE   2. INCINERATION   X 3. LANDFILL   4. SURFACE IMPOUNDMENT   5. DEEP WELL

6. CHEM/BIO/PHYS TREATMENT   7. LANDFARM   8. OPEN DUMP   9. TRANSPORTER   10. RECYCLOR/RECLAIME

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

X 1. LIQUID   X 2. SOLID   3. SLUDGE   4. GAS

B. WASTE CHARACTERISTICS

1. CORROSIVE   2. IGNITABLE   3. RADIOACTIVE   4. HIGHLY VOLATILE

5. TOXIC   6. REACTIVE   7. INERT   8. FLAMMABLE

* 9. OTHER (specify): unknown

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

Continue On Rev

C. Estimate the amount (specify unit of measure) of ...

a. SLUDGE	b. OI	c. SOLVENTS	d. CHEMIC	e. SOLIDS	f. OTH
AMOUNT	AMOUNT unknown	AMOUNT unknown	AMOUNT	AMOUNT unknown	AMOUNT 4
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF ME
'X' (1) PAINT PIGMENTS	'X' (1) OILY WASTES — X	'X' (1) HALOGENATED SOLVENTS	'X' (1) ACIDS	'X' (1) FLYASH	'X' (1) LABOR... PHARM...
(2) METALS SLUDGES	(2) OTHER(specify): Unknown chemicals from illegal dumping	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPI...
(3) POTW		(3) OTHER(specify): Xylene *, Toluene *, Formaldehyde *	(3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIO...
(4) ALUMINUM SLUDGE		* reported to have been dumped	(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNIC...
(5) OTHER(specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHE...
			(6) CYANIDE	(6) OTHER(specify): Metallic refuse waste paper plastic, wood.	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER(specify):		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X') a. SOLID	b. LIQ.	c. VAPOR	3. TOXICITY (mark 'X') a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT
PCB	X			X					3.0

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Descr... hazard in the space provided.

[X] A. HUMAN HEALTH HAZARDS

The site is unsecured. People can easily come in contact with hazardous chemica...

5/1

B. NON-WORKER INJURY/EXPOSURE

None

C. WORKER INJURY/EXPOSURE

None

[X] D. CONTAMINATION OF WATER SUPPLY

Possible, groundwater is used for drinking water down gradient of landfill.

E. CONTAMINATION OF FOOD CHAIN

None

[X] F. CONTAMINATION OF GROUND WATER

Probably, but not known

[X] G. CONTAMINATION OF SURFACE WATER

None evident during inspection, more probable during wet weather.

61

___ H. DAMAGE TO FLORA/FAUN

None

___ I. FISH KILL

None

___ J. CONTAMINATION OF AIR

None

___ K. NOTICEABLE ODORS

None

X L. CONTAMINATION OF SOIL

In vicinity of dumped chemicals and leachate areas

___ M. PROPERTY DAMAGE

None

VIII. HAZARD DESCRIPTION *(continued)*

☐ N. FIRE OR EXPLOSION

None

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

One small leachate pool noted, chemicals in soil probably contaminate storm runoff.

☐ P. SEWER, STORM DRAIN PROBLEMS

None

☐ Q. EROSION PROBLEMS

None

☒ R. INADEQUATE SECURITY

Unsecure area, no fence (Note: two trees and several boulders very recently placed across dirt road leading to landfill).

☐ S. INCOMPATIBLE WASTES

Unknown

VIII. HAZARD DESCRIPTION (continued)

X T. MIDNIGHT DUMPING

Midnight dumping has been witnessed by a nearby resident. A tar-like chemical was noted by state inspectors. The transporter of the waste has not been identified.

U. OTHER (specify):

During this inspection no evidence of midnight dumping was noted in the landfill are south of the railroad tracks, although the soil there is very sandy with several depressions around the site. Charred rolls of waste paper and wood, metallic junk, an other non-putrescible waste were in piles and in partially covered trenches and mounds in this area. North of the railroad tracks (see sketch) one small orange-col leachate pond was seen along with one dry area where apparently there was once an orange colored liquid. Several small accumulations of an unknown black substance was noted near these leachate areas. Closer to the road was a sand-covered (10' x 2 area where a black oily material was partially covered over with the sand. There wa line of old, rusted barrels along the treeline west of the access road. These had b covered long ago and trees have begun to grow over them.

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DIST TO S (specify
1. IN RESIDENTIAL AREAS	20 - 30	20 - 30	6	½ mi
2. IN COMMERCIAL OR INDUSTRIAL AREAS	0	0	3 (WB & P!)	adja
3. IN PUBLICLY TRAVELLED AREAS	0	0		
4. PUBLIC USE AREAS (parks, schools, etc.)	0	0		

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
Unknown	North	Unknown
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER**
Unknown	¼ - ½ mile	West

G. TYPE OF DRINKING WATER SUPPLY

- [ ] 1. NON-COMMUNITY < 15 CONNECTIONS
- [x] 2. COMMUNITY (specify town): > 15 CONNECTIONS Warrensburg
- [ ] 3. SURFACE WATER
- [ ] 4. WELL

Continue On Pag

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	C
None				

I. RECEIVING WATER

1. NAME: Schroon River

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

NYS Classification "C", Non-contact recreation and fishing

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
X	1. SAND				
	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☒ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☐ 1. YES ☐ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☐ 1. YES ☐ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: Fairly flat

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: Slight downslope to north towards Schroon River

J. OTHER GEOLOGICAL DATA

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIA (mark 'X') 1. YES	2. NO
None						

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

X NONE ☐ YES *(summarize in this space)*

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* inform on the first page of this form.

7. SITE DATA

7.1 SITE AREA SURFACE FEATURES

The Warrensburg Board and Paper Corp. site is situated in the Town of Warrensburg, Warren County, New York. The 5-acre site is located on the south side of Route 418, approximately one mile west of the Village of Warrensburg.

The topography of the site slopes downward from south to north. The slope is fairly constant throughout the site, except for a depressed area just north of the railroad clearing, which traverses the site. The railroad clearing separates the site into an upper and lower part. The upper section has a definite downward slope, is revegetated with grass and small shrubs, and is completely surrounded by trees. Below the railroad clearing, the terrain dips into a small depression and levels off towards Route 418. Presently, the lower site area contains a barn, a foundation to a second service building, and an access road. The northern border of the site rests along Route 418; to the west of the lower clearing there are trees. In the eastern diretion there is a tree line, behind which there are six residences within 1/4 mile. The EPA file contained information stating that the closest house, which is a few hundred yards away, is serviced by a spring downstream from the site (Attachment 6-2).

The Warrensburg Board and Paper Corp. mill, abandoned since 1978, is located opposite the site along the Schroon River. The landfill is approximately 500 feet from the river. The Schroon River flows into the Hudson River one mile downstream. Onsite surface water is accumulated in the depression just north of railroad crossing.

7.2 SITE HYDROGEOLOGY

The site, situated in south-central Warren County, lies within the Adirondack Physiographic Province. The New York State Museum and Science Service Geological Survey indicates a contact of two Precambrian bedrock formations in the site area. Granite gneiss is dominant south of the site, while metasedimentary rocks preside to the north. The metasedimentary rocks are gneisses, marble, and quartzite typical of the Adirondack Province.

Based on the regional topography, ground-water movement from the site is thought to be in a southerly direction towards the Schroon River. There is no site specific subsurface information available.

7.3 SUMMARY OF PAST SAMPLING AND ANALYSIS

Ground Water

No data are available.

Surface Water

Analytical data are available for two bodies of standing water (Attachment 7.3-1). Sampling was performed 3 July 1979 on standing water behind the barn on the site and on standing water in the upper clearing 250 yards south of Route 418. The samples were tested for PCB and Mirex. The results of the analyses indicated a low concentration of PCB (3.0 mcg/g).

Air

No data are available.

Soil

Three soil samples were collected on 3 July 1979 and tested for PCB and Mirex (Attachment 7.3-2). Two of the samples were collected in the upper clearing 400 yards south of Route 418. The third sample was collected behind the barn on the site. The results indicated a trace concentration of PCB (0.03 mcg/g).

Two soil samples taken from a dried leachate pond by NYSDEC (Attachment 7.3-3) showed iron, zinc, titanium, mercury, nickel, manganese, di-n-butylphthalate, pyrene, HCH (Delta), and heptachlor.

0589 Ray

ATTACHMENT
7.3-1
1 of 2

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

RESULTS OF EXAMINATION
(PAGE 1 OF 1)

LAB ACCESSION NO: C0872 YR/MO/DAY/HR SAMPLE REC'D: 79/07/03/14

REPORTING LAB: 17 EHC ALBANY
PROGRAM: 650 SOLID WASTES
STATION (SOURCE) NO:
DRAINAGE BASIN: NY GAZETTEER NO: 5660 COUNTY: WARREN
COORDINATES: DEG ' "N, DEG ' "W
COMMON NAME INCL SUBW'SHED: WARRENSBURG BOARD AND PAPER CO LANDFILL

EXACT SAMPLING POINT: STANDING WATER BEHIND BARN ACROSS ROAD FROM PLANT
TYPE OF SAMPLE: 21 SURFACE WATER
MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/03/99
REPORT SENT TO: CO (1) RO (1) LPHE (0) LHO (0) FED (0) CHEM (0)

PARAMETER		UNIT	RESULT	NOTATION
038003	P.C.B., AROCLOR 1016/1242	MCG/G	0.05	LT
038103	P.C.B., AROCLOR 1254	MCG/G	0.05	LT
039803	P.C.B., AROCLOR 1221	MCG/G	0.05	LT
041603	P.C.B.,AROCLOR 1260	MCG/G	3.0	

DATE COMPLETED: 2/22/80

NYS DEPT. OF ENVIRONMENTAL CON
REGION 5
RAY BROOK

0508 N YORK STATE DEPARTMENT OF LTH 2 of 2

DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

RESULTS OF EXAMINATION

LAB ACCESSION NO: 00873 YR/MO/DAY/HR SAMPLE REC'D: 79/07/03/14

REPORTING LAB: 17 EHC ALBANY
PROGRAM: 650 SOLID WASTES
STATION (SOURCE) NO:
DRAINAGE BASIN: NY GAZETTEER NO: 5660 COUNTY: WARREN
COORDINATES: [illegible]
COMMON NAME INCL SUBSHED: WARRENSBURG BOARD AND PAPER CO LANDFILL

EXACT SAMPLING POINT: POOLED WATER 250 YDS FROM ROAD ACROSS FROM PLANT
TYPE OF SAMPLE: 21 SURFACE WATER
MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/03/99
REPORT SENT TO: CO (1) RO (1) LPHE (2) LHO (0) FED (0) CHEM (0)

PARAMETER		UNIT	RESULT	NOTATIO
038009	P.C.B., AROCLOR 1016/1242	MCG/L	0.05	LT
038109	P.C.B., AROCLOR 1254	MCG/L	0.05	LT
039809	P.C.B., AROCLOR 1221	MCG/L	0.05	LT
039909	MIREX	MCG/L	0.05	LT
041609	P.C.B., AROCLOR 1260	MCG/L	0.05	LT

DATE COMPLETED: 2/04/80

NYS DEPT. OF ENVIRONMENTAL CON
REGION 5
RAY BROOK
NEW YORK 12977

ATTACHMENT 7.3-2

1/3

0417

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

Report/file

RESULTS OF EXAMINATION
(PAGE 1 OF 1)

LAB ACCESSION NO: 00869 YR/MO/DAY/HR SAMPLE REC'D: 79/07/03/14

REPORTING LAB: 17 EHC ALBANY
PROGRAM: 650 SOLID WASTES
STATION (SOURCE) NO:
DRAINAGE BASIN: NY GAZETTEER NO: 5660 COUNTY: WARREN
COORDINATES: DEG ' "N, DEG ' "W
COMMON NAME INCL SUBW'SHED: WARRENSBURG BOARD AND PAPER CO LANDFILL

EXACT SAMPLING POINT: 400 YDS OFF ROAD ACROSS FROM PLANT
TYPE OF SAMPLE: 60 SOIL, SAND
MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/03/99
REPORT SENT TO: CO (1) RO (1) LPHE (0) LHO (0) FED (0) CHEM (0)

	PARAMETER	UNIT	RESULT	NOTATIO
038003	P.C.B., AROCLOR 1016/1242	MCG/G	0.004	LT
038103	P.C.B., AROCLOR 1254	MCG/G	0.03	
039803	P.C.B., AROCLOR 1221	MCG/G	0.004	LT
039903	MIREX	MCG/G	0.004	LT
041603	P.C.B., AROCLOR 1260	MCG/G	0.004	LT

DATE COMPLETED: 2/21/80

NYS DEPT. OF ENVIRONMENTAL CON
REGION 5
RAY BROOK
NEW YORK 12977

2 of 3

0502

N YORK STATE DEPARTMENT OF LTH
DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

RESULTS OF EXAMINATION
(PAGE 1 OF 1)

LAB ACCESSION NO: 00870 YR/MO/DAY/HR SAMPLE REC'D: 79/07/03/14

REPORTING LAB: 17 EHC ALBANY
PROGRAM: 650 SOLID WASTES
STATION (SOURCE) NO:
~~DRAINAGE BASIN: NY GAZETTEER NO: 5660 COUNTY: WARREN~~
~~COORDINATES: DEG ' "N DEG ' "W~~
COMMON NAME INCL SUBW'SHED: WARRENSBURG BOARD AND PAPER CO LANDFILL

EXACT SAMPLING POINT: 400 YDS OFF ROAD ACROSS FROM PLANT
TYPE OF SAMPLE: ~~66 PLANT MATTER~~ Soil
MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/03/00
REPORT SENT TO: CO (1) RO (1) LPHE (0) LHO (0) FED (0) CHEM (0)

	PARAMETER	UNIT	RESULT	NOTATION
038003	P.C.B., AROCLOR 1016/1242	MCG/G	0.05	LT
038103	P.C.B., AROCLOR 1254	MCG/G	0.05	LT
039803	P.C.B., AROCLOR 1221	MCG/G	0.05	LT
039903	MIREX	MCG/G	0.05	LT
041603	P.C.B., AROCLOR 1260	MCG/G	0.05	LT

DATE COMPLETED: 2/04/80

NYS DEPT. OF ENVIRONMENTAL CON
REGION 5
RAY BROOK
NEW YORK 12977

SUBMITTED BY: RANKIN

0505

NE YORK STATE DEPARTMENT OF ALTH
DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

3-4-

RESULTS OF EXAMINATION
(PAGE 1 OF 1)

LAB ACCESSION NO: 00871 YR/MO/DAY/HR SAMPLE REC'D: 79/07/03/14

FILE

REPORTING LAB: 17 EHC ALBANY
PROGRAM: 650 SOLID WASTES
STATION (SOURCE) NO:
DRAINAGE BASIN: NY GAZETTEER NO: 5660 COUNTY: WARREN
COORDINATES: DEG ' "N. DEG ' "W
COMMON NAME-INCL SUBN'SHED: WARRENSBURGH BOARD AND PAPER CO LANDFILL

EXACT SAMPLING POINT: BEHIND BARN ACROSS ROAD FROM PLANT
TYPE OF SAMPLE: 60 SOIL, SAND
MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/03/99
REPORT SENT TO: CO (1) RO (1) LPHE (0) LHO (0) FED (0) CHEM (0)

PARAMETER		UNIT	RESULT	NOTATI
038003	P.C.B., AROCLOR 1016/1242	MCG/G	0.05	LT
038103	P.C.B., AROCLOR 1254	MCG/G	0.05	LT
039803	P.C.B., AROCLOR 1221	MCG/G	0.05	LT
039903	MIREX	MCG/G	0.05	LT
041603	P.C.B.,AROCLOR 1260	MCG/G	0.05	LT

DATE COMPLETED: 2/04/80

NYS DEPT. OF ENVIRONMENTAL CON
REGION 5
RAY BROOK
NEW YORK 12977

0614 NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

Attachment 7.3-3

07

PAGE 1 RESULTS OF EXAMINATION FINAL REPO

SAMPLE ID: 831006524 SAMPLE RECEIVED:83/11/14/11
PROGRAM: 650:DEC SOLID WASTES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:5660
POLITICAL SUBDIVISION:WARRENSBURG COUNTY:WARREN
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: WARRENSBURG PULP AND PAPER LANDFILL
DESCRIPTION:SOUTH UPPER FILL
REPORTING LAB: 10:LABORATORY OF INORGANIC ANALYTICAL CHEMISTRY - AL
TEST PATTERN: 10-999:NON SPECIFIC TEST PATTERN
SAMPLE TYPE: 600:SOIL,SAND
TIME OF SAMPLING: 83/11/03 13: DATE PRINTED:84/02/

	PARAMETER	RESULT	
25ARSENIC	ARSENIC IN DRY SOLIDS	20.	MCG/G
05CADMIUM	CADMIUM IN DRY SOLIDS	< 4.	MCG/G
05CHROMIUM	CHROMIUM IN DRY SOLIDS	< 20.	MCG/G
05COPPER	COPPER IN DRY SOLIDS	< 10.	MCG/G
05IRON	IRON IN DRY SOLIDS	220000.	MCG/G
05LEAD	LEAD IN DRY SOLIDS	< 20.	MCG/G
05MANGAN	MANGANESE IN DRY SOLIDS	40000.	MCG/G
05NICKEL	NICKEL IN DRY SOLIDS	32.	MCG/G
05TITANIUM	TITANIUM IN DRY SOLIDS	600.	MCG/G
05ZINC	ZINC IN DRY SOLIDS	100.	MCG/G
01DIGEST	DIGESTION OF SOLIDS FOR METALS	DONE	
02DIGEST	DIGESTION OF SOLIDS FOR MERCURY	DONE	
03MERCURY	MERCURY IN DRY SOLIDS	0.26	MCG/G
01SOLIDS	SOLIDS, DRY	16.	PERCENT

**** END OF REPORT ****

Samples collected [illegible]
[illegible]

COPIES SENT TO: CO(2), RO(1), LPHE(0), FED(0), INFO-P(0), INFO-L(1)

MR. S. BRASWELL
BUREAU OF SOLID WASTES
N.Y.S.DEPT. OF ENVIRONMENTAL CONSERVATIO SUBMITTED BY:TOFFLEMI
50 WOLF RD.,ROOM 417
ALBANY,N.Y. 12233

0254 NEW YORK STATE DEPARTMENT OF HEALTH
CENTER FOR LABORATORIES AND RESEARCH

Attachment IOT. 9.3-3

PAGE 1 RESULTS OF EXAMINATION FINAL REP

SAMPLE ID: 34710 SAMPLE RECEIVED:83/11/04/11
PROGRAM: 650:DEC SOLID WASTES
SOURCE ID: DRAINAGE BASIN: GAZETTEER CODE:5660
POLITICAL SUBDIVISION:WARRENSBURG COUNTY:WARREN
LATITUDE: . LONGITUDE: . Z DIRECTION:
LOCATION: WARRENSBURG PULP AND PAPER LANDFILL
DESCRIPTION:SOUTH UPPER FILL
REPORTING LAB: TOX:LAB FOR ORGANIC ANALYTICAL CHEMISTRY
TEST PATTERN: 625S:F.R.METHOD 625-STEAM DISTILLED
SAMPLE TYPE: 600:SOIL,SAND
TIME OF SAMPLING: 83/11/03 13: DATE PRINTED:84/02/

RECEIVED

	PARAMETER	RESULT	
I67103	PHENOL	< .05 MCG/G	
I66403	2-CHLOROPHENOL	< .05 MCG/G	
I66603	2-NITROPHENOL	< .05 MCG/G	
I66003	2,4-DIMETHYLPHENOL	< .05 MCG/G	
I66503	2,4-DICHLOROPHENOL	< .05 MCG/G	
I66303	4-CHLORO-3-METHYLPHENOL	< .05 MCG/G	
I67203	2,4,6-TRICHLOROPHENOL	< .05 MCG/G	
I49603	2,4,5-TRICHLOROPHENOL	< .05 MCG/G	
I66703	2,4-DINITROPHENOL	< .05 MCG/G	
I66903	4-NITROPHENOL	< .05 MCG/G	
I66503	4,6-DINITRO-O-CRESOL	< .05 MCG/G	
I67003	PENTACHLOROPHENOL	< .05 MCG/G	
I85003	BENZOIC ACID		NA
I68103	BIS(2-CHLOROISOPROPYL)ETHER	< .05 MCG/G	
I63903	BIS(2-CHLOROETHYL)ETHER	< .05 MCG/G	
I49703	1,3-DICHLOROBENZENE	< .05 MCG/G	
I44203	1,4-DICHLOROBENZENE	< .05 MCG/G	
I44103	1,2-DICHLOROBENZENE	< .05 MCG/G	
I65903	N-NITROSODI-N-PROPYLAMINE	< .05 MCG/G	
I65303	HEXACHLOROETHANE	< .05 MCG/G	
I65703	NITROBENZENE	< .05 MCG/G	
I65503	ISOPHERONE	< .05 MCG/G	
I66603	BIS(2-CHLOROETHOXY)METHANE	< .05 MCG/G	
I44003	1,2,4-TRICHLOROBENZENE	< .05 MCG/G	
I65603	NAPHTHALENE	< .05 MCG/G	
I52503	HEXACHLOROBUTADIENE (C-46)	< .05 MCG/G	
I49203	HEXACHLOROCYCLOPENTADIENE (C56)	< .05 MCG/G	
I64103	2-CHLORONAPHTHALENE	< .05 MCG/G	
I64903	2,6-DINITROTOLUENE	< .05 MCG/G	
I63103	ACENAPHTHYLENE	< .05 MCG/G	
I64703	DIMETHYLPHTHALATE	< .05 MCG/G	
I63003	ACENAPHTHENE	< .05 MCG/G	
I64803	2,4-DINITROTOLUENE	< .05 MCG/G	

**** CONTINUED ON NEXT PAGE ****

COPIES SENT TO: CO(2), RO(1), LPHE( ), FED( ), INFO-P( ), INFO-L( )

MR. S. BRASWELL
BUREAU OF SOLID WASTES
N.Y.S.DEPT. OF ENVIRONMENTAL CONSERVATIO
50 WOLF RD.,ROOM 417
ALBANY,N.Y. 12233

SUBMITTED BY:TOFFLEMI

Attachment 3 of T. 3-3

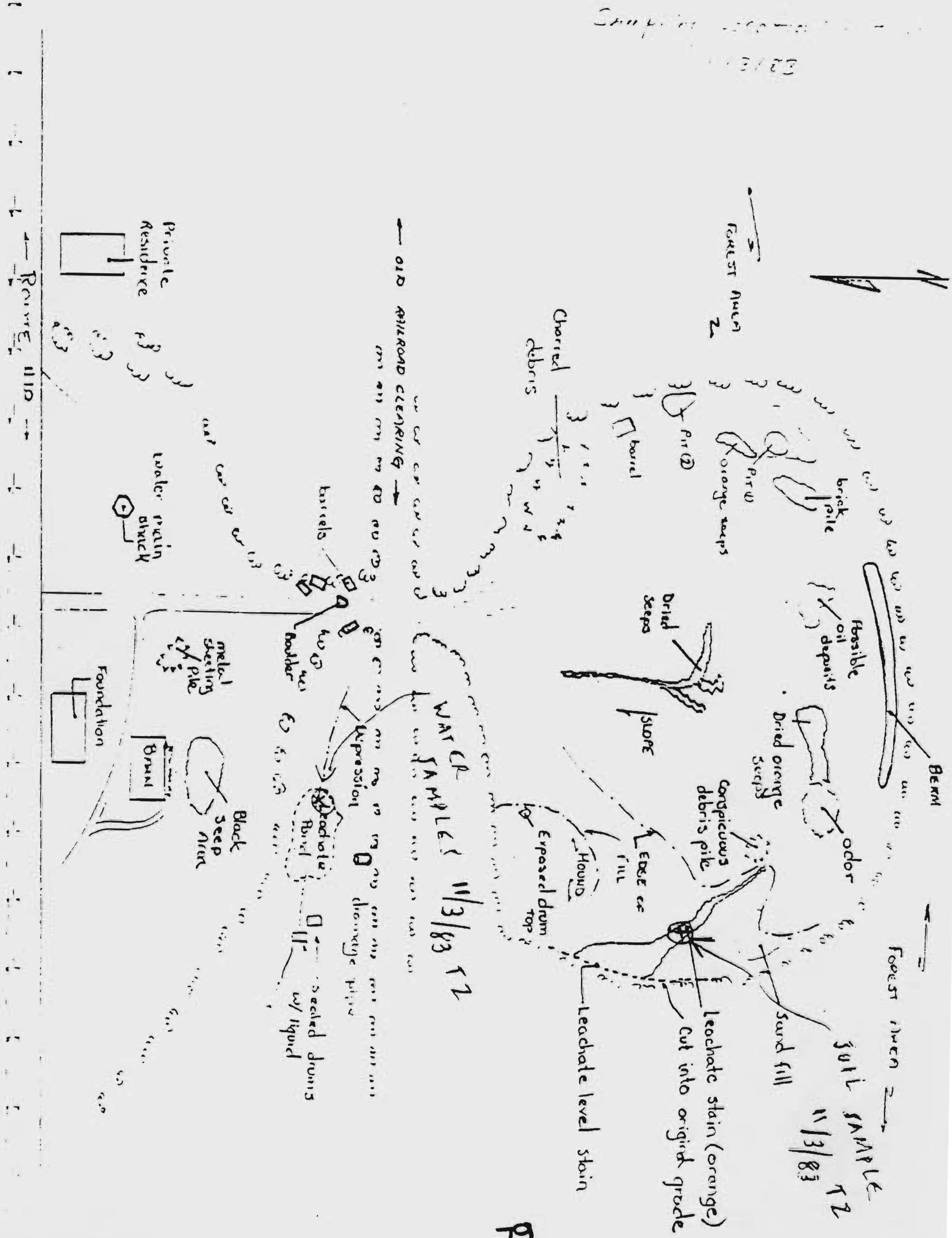
RESULTS OF EXAMINATION FINAL REPOR

SAMPLE ID: 34710 SAMPLE RECEIVED:83/11/04/11
POLITICAL SUBDIVISION:WARRENSBURG COUNTY:WARREN
LOCATION: WARRENSBURG PULP AND PAPER LANDFILL
TIME OF SAMPLING: 83/11/03 13: DATE PRINTED:84/02/1

	PARAMETER	RESULT	
T64603	DIETHYLPHTHALATE	< .05 MCG/G	
T65203	FLUORENE	< .05 MCG/G	
T66403	4-CHLOROPHENYL PHENYL ETHER	< .05 MCG/G	
T66003	N-NITROSODIPHENYLAMINE	< .05 MCG/G	
T65103	1,2-DIPHENYLHYDRAZINE	< .05 MCG/G	
T68303	4-BROMOPHENYL PHENYL ETHER	< .05 MCG/G	
T48803	HEXACHLOROBENZENE	< .05 MCG/G	
T66103	PHENANTHRENE	< .05 MCG/G	
T63203	ANTHRACENE	< .05 MCG/G	
T64403	DI-N-BUTYLPHTHALATE	.22 MCG/G	
T66003	FLUOROANTHENE	< .05 MCG/G	
T66203	PYRENE	4.5 MCG/G	
T63803	BENZIDINE	< .05 MCG/G	
T64003	BUTYL BENZYLPHTHALATE	< .05 MCG/G	
T63303	BENZ(A)ANTHRACENE	< .05 MCG/G	
T64503	3,3-DICHLOROBENZIDINE	< .05 MCG/G	
T64203	CHRYSENE	< .05 MCG/G	
T67903	BIS(2-ETHYLHEXYL)PHTHALATE	< .05 MCG/G	
T65003	DI-N-OCTYL PHTHALATE	< .05 MCG/G	
T63403	BENZO(B)FLUORANTHENE		ND
T63503	BENZO(K)FLUORANTHENE		ND
T63603	BENZO(A)PYRENE	< .05 MCG/G	
T65403	INDENO(1,2,3-CD)PYRENE	< .05 MCG/G	
T64303	DIBENZO(A,H)ANTHRACENE	< .05 MCG/G	
T63703	BENZO(GHI)PERYLENE	< .05 MCG/G	
T15703	HCH,ALPHA	< .05 MCG/G	
T15803	HCH,BETA	< .05 MCG/G	
T35603	HCH,GAMMA (LINDANE)	< .05 MCG/G	
T16003	HCH,DELTA	.22 MCG/G	
T08003	HEPTACHLOR	.08 MCG/G	
T07703	ALDRIN	< .05 MCG/G	
T08303	HEPTACHLOR EPOXIDE	< .05 MCG/G	
T43303	ENDOSULFAN 1	< .05 MCG/G	
T14803	D.D.E.-PARA-PARA	< .05 MCG/G	
T08503	DIELDRIN	< .05 MCG/G	
T08403	ENDRIN	< .05 MCG/G	
T14903	D.D.D.-PARA-PARA	< .05 MCG/G	
T43403	ENDOSULFAN II	< .05 MCG/G	
T67403	ENDRIN ALDEHYDE	< .05 MCG/G	
T67303	ENDOSULFAN SULFATE	< .05 MCG/G	
T14703	D.D.T.-PARA,PARA	< .05 MCG/G	
T39803	PCB,AROCLOR 1221	< 0.001 MCG/G	
T36003	PCB,AROCLOR 1016/1242	< 0.001 MCG/G	
T38103	PCB,AROCLOR 1254	< 0.001 MCG/G	
T41603	PCB,AROCLOR 1260	< 0.001 MCG/G	
T52203	PCB,AROCLOR 1248	< 0.001 MCG/G	

**** END OF REPORT ****

WARRENSBURG BOARD & PAPER



8. ADEQUACY OF AVAILABLE DATA TO PREPARE FINAL HRS

The available data are not adequate to prepare a final HRS. Contamination of ground water beneath the site is expected, as evidenced by seeps and leachate on site. Yet without verification through sampling and analyses, a release to ground water cannot be confirmed. Data are also lacking on the surface water quality in the Schroon River.

The preliminary Migration Score (S_m) for the site is 38.65. Confirmation of a release to surface and ground water would elevate the Migration score (Sm) to 44.65 (S_{gw} = 76.53, S_{sw} = 10.49. Detection of surface water contamination will only have a minor effect on the HRS because no public water supplies are at risk.

9. PHASE II WORK PLAN

The available data are sufficient only to indicate the need for further investigation. The entire property should be surveyed via geophysical techniques. For purposes of cost estimating, it is assumed on the basis of the site visit, that three hot spots will be identified.

9.1 DETAILED WORK PLAN

9.1.1 Remote Sensing

OVA and EM teams will perform perimeter surveys, followed by onsite grid traverses. OVA traverses will be performed in survey mode, followed by hot spot evaluation in chromatographic mode. EM surveying will be multi-depth. The number and value of depth settings will be determined on the basis of field conditions. Confirmation by resistivity sounding will be performed on an as needed basis.

During these traverses, areas of stressed vegetation, active seeps, and evidence of past seepage will be noted described and plotted on the base map.

9.1.2 Surficial Sampling

Actively flowing seeps, the asphaltic seeps and the leachate pond will be sampled. A sample will be obtained from the spring reported to serve the nearby residence.

All samples will receive full priority pollutant analysis (for cost estimating purposes, six samples are assumed).

9.1.3 Test Borings and Observation Wells

The locations and depths of test borings and observation wells will be selected on the basis of the results of the geophysical surveys.

For purposes of estimating cost, it is assumed that three borings will be advanced to a depth of 25 feet and converted to 4-inch PVC observation wells screened from 15 to 25 feet. These assumptions result in the assmption that three samples of ground water will be obtained for priority pollutant analysis.

9.2 HEALTH AND SAFETY PLAN

Activities

Phase II activities include remote sensing activitie, surface and ground water sampling, and leachate sampling.

General Corporate Occupational Health and Safety (COSH) Plan

The four levels of personnel protection which have been identified for use in the current project are summarized below.

Level 1: Self-Contained Positive Resource Demand -- Breathing apparatus with fully encapsulated suit.

Level 2: Self-Contained Positive Resource Demand -- Breathing apparatus (4-hour portable or line) with TYVEK-SARAN encapsulated disposable suit (with chemical splash suits as necesary), boots, and gloves (double NEOPRENE over VITON).

Level 3: Air purifying respirator with chemical cartridge (standard organics/acid gases/radionuclides/fumes/mists/dusts/particles), TYVEK-SARAN or polylaminated-coveralls (with hood and booties), safety boots, gloves (NEOPRENE over VITON), hard hats with integral face shield and goggles, and personal first-aid kit.

Level 4: Ibidem Level 3 except respirator use is optional. Respirators must be available in beltpack at all times.

Additionally, specific standard operating procedure manuals will be developed for each phase of work. These manuals include instructions for use of respirators, Draeger tubes, and portable Organic Vapor Analyzers (OVA). Emergency medical information will also be included. Basic field procedures, such as site entry and exit, will be presented.

Warrensburg Site COSH Plan

Level 4 protection is recommended for the geophysical and OVA surveys. Level 3 will likely be required for boring and sampling activities, as dictated by OVA monitoring. No protection is recommended for the residential tap sample.

9.3 COST ESTIMATE

Work Element	Estimated Cost
OVA/Draeger survey	$ 3,000
Geophysical survey	6,500
Surficial sampling	2,000
Test borings, observation wells, and ground-water sampling	10,000
Laboratory analysis	10,100
Remedial cost estimates	2,500
Report preparation	2,500
Project management and administration	2,900
Total Estimated Cost	$ 39,500

APPENDIX

HAZARDOUS WASTE DISPOSAL SITES REPORT,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

HAZARDOUS WASTE DISPOSAL SITES REPORT
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Code: ____________

Site Code: 557006

Name of Site: Warrensburg Board and Paper Corp. Region: 5

County: Warren Town/City Warrensburg

Street Address Thurman Rd.

Status of Site Narrative:

Inactive landfill, approx 5 acres, that received bailing wire, paper and plastic wastes and may have received formaldehyde, toluene and xylene. Evidence of midnight dumping of a black liquid. Leachate is being generated; no visible leachate offsite

Type of Site: Open Dump ☐ Landfill ☒ Structure ☐ Treatment Pond(s) ☐ Lagoon(s) ☐ Number of Ponds ___ Number of Lagoons ___

Estimated Size 5 Acres

Hazardous Wastes Disposed? Confirmed ☐ Suspected ☒

*Type and Quantity of Hazardous Wastes:

TYPE	QUANTITY (Pounds, drums, tons, gallons)
plastics & petroleum products	
Xylene, paper, wire,	
toluene	unknown
formaldehyde	
Waste oil possibly containing PCBs	≈ 12,000 gallons

* Use additional sheets if more space is needed.

Name of Current Owner of Site: Warrensburg Bd. and Paper

Address of Current Owner of Site: Thurman Rd. Warrensbur

Time Period Site Was Used for Hazardous Waste Disposal:

unknown, 19 To , 19 78

Is site Active ☐ Inactive ☒

(Site is inactive if hazardous wastes were disposed of at this site and site was closed prior to August 25, 1979)

Types of Samples: Air ☐ Groundwater ☐ None ☐ Surface Water ☒ Soil ☒

Remedial Action: Proposed ☐ Under Design ☐ In Progress ☐ Completed ☐

Nature of Action:

Status of Legal Action: State ☐ Federal ☐

Permits Issued: Federal ☐ Local Government ☐ SPDES ☐ Solid Waste ☐ Mined Land ☐ Wetlands ☐ Othe

X Assessment of Environmental Problems:

Leachate is being generated, however, surface leachate ponding appears to be contained on the Leachate pond on premises believed to be spring fed, therefore highly suspect groundwater contamination. Some nearby residents served by wells.

Assessment of Health Problems:

X Persons Completing this Form:

Ecological Analysts Inc.

for:

New York State Department of Environmental Conservation

New York State Department of Health

Date Aug. 9, 1983

6/3/81
RPM:cl

REFERENCE NO. 22

‌:D-3016 D1940

REMEDIAL INVESTIGATION
WARRENSBURG BOARD AND PAPER SITE
WARRENSBURG, NEW YORK

Volume 1: Text

July 1989

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Solid and Hazardous Waste
50 Wolf Road
Albany, New York 12233

ecology and environment, inc.

BUFFALO CORPORATE CENTER
368 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060

nternational Specialists in the Environment

TABLE OF CONTENTS

Table of Contents (Cont.)

Table of Contents (Cont.)

Table of Contents (Cont.)

LIST OF TABLES

List of Tables (Cont.)

LIST OF ILLUSTRATIONS

List of Illustrations (Cont.)

EXECUTIVE SUMMARY

The Warrensburg Board and Paper (WB&P) site is an inactive landfill associated with the WB&P mill facility located in upstate New York. During the operation of the mill, which became inoperable by flood and fire damage in 1976 and 1978, respectively, the site was used by the company for disposal of solid refuse. The site was abandoned in 1978. In May 1979 the New York State Department of Environmental Conservation (NYSDEC) was notified that the site was receiving materials from illegal dumping activity. This notification triggered an immediate investigation by NYSDEC which found low, but detectable, quantities of metals, PCBs, and other organic compounds on site. Additional research into the site's operation suggested it also received ash and fuel oil from the mill and possibly xylene, toluene, and formaldehyde. As such, the site was judged to exhibit potential to pose a significant threat to the public health and environment by ground and surface water contamination which in turn resulted in the determination by NYSDEC to conduct a Remedial Investigation/Feasibility Study (RI/FS).

As part of the RI/FS, Ecology and Environment, Inc. (E & E) performed the RI for the WB&P site under contract to NYSDEC.

This report documents the methods, procedures, and results of the RI at the WB&P site. The objectives of the RI were to:

- Identify the sources of site contamination as defined by priority pollutant analyses of soils and groundwater and surface waters;
- Determine the areal and vertical extent of contamination; and

- o Determine the physical characteristics (geology, hydrogeology, etc.) of the site to determine potential pathways of migration and assess health risks so that appropriate long-term remedial measures can be evaluated and selected, if necessary.

Determinations of the RI will be used to provide a basis for the Feasibility Study (FS), also to be performed by E & E.

Report Findings

Metals and PAH contaminants found on site support the reported history of the site as receiving solid refuse, ash, and hydrocarbon product (most probably fuel oil) from the operation of the WB&P mill. However, evidence of gross contamination as a result of the reported illegal dumping activity was not detected by site observations and the physical and chemical examination of site soil, groundwater, and surface waters leading to the conclusion that the extent of this reported activity may have been overestimated at 288,000 gallons; the material discharged may not have contained large or persistent quantities of hazardous constituents but rather levels reflecting the low concentrations found by NYSDEC during the initial site investigations; or the physical properties of the discharged material, in combination with the porous properties of the site soils and the high groundwater flow velocity underlying the site, allowed for the migration of the discharged material off site within a short period of time.

Other specific findings include:

- o The extent of onsite soil contamination is not significant with the exception of an elevated lead content in soils along the south and southeast portions of the north landfill area;

- o Metal contamination of site groundwater, which has resulted in several exceedances of primary and secondary drinking water standards, apparently does not impact offsite (downgradient) drinking water sources or the quality of the Schroon River to which groundwater from the site ultimately discharges;

- o The deposition of fuel oil products on the site has resulted in a localized area of surface and subsurface soil staining and low concentrations of PAH compounds in a downgradient monitoring well; however, the impact of this contamination is limited to the immediate site area and does not include offsite (downgradient) drinking water sources or affect the quality of the Schroon River; and

- o Based on plausible site-use scenarios which include recreational use, state support service base, or municipal public works facility, the risk assessment concluded that: no remedial action would be necessary to keep adult exposure to onsite contaminants within ranges that are generally considerable acceptable by regulatory agencies; the highest potential health risk may be the exposure of children and adolescents to lead in the site soils under the recreational use scenario; in addition, removal and/or isolation of site physical hazards associated with the site (discarded surface debris and the existing on site structure) is required for either of the future use scenarios.

Recommendations

- o Complete the FS phase of this project in order to determine the appropriateness of remedial actions for developing the site with respect to the potential future land uses identified.

1. INTRODUCTION

1.1 PURPOSE OF REPORT

Ecology and Environment, Inc. (E & E) was contracted by the New York State Department of Environmental Conservation (NYSDEC) to perform a Remedial Investigation (RI) and a Feasibility Study (FS) for the Warrensburg Board and Paper (WB&P) site, Town of Warrensburg, Warren County, New York. The purpose of this report is to present the findings and conclusions of the RI portion of the project.

This RI was oriented toward the compilation of data needed to assess the type and location of hazardous materials at the site and subsequently to evaluate feasible alternatives to eliminate the materials as sources of environmental contamination (i.e., to support the FS phase). The specific objectives of the RI are to:

- Identify the locations of hazardous materials at the site;
- Define the types and quantities of hazardous materials identified at the site;
- Define the contaminants released to the environment;
- Determine the movement of contaminants in different matrices, including:
  - Present extent of contamination,
  - Direction of movement,
  - Exogenous factors influencing movement,
  - Future movement factors;
- Based on the data compiled, evaluate the long-term impacts of contaminant releases, both present and potential, at the WB&P site.

The evaluations, conclusions, and recommendations presented herein are based on the data gathered during the period August 26, 1987 to the date of this report. The nature and volume of contaminated material has been estimated based on field and analytical data collected during the period September 21, 1987, through April 26, 1988.

1.2 SITE BACKGROUND

1.2.1 Site Description

The WB&P site is located in the Town of Warrensburg, 1.8 miles west of the Town of Warrensburg, Warren County, New York (see Figure 1-1). The site, which is approximately 12 acres in area, is bordered on the north by Route 418, on the east and west by sparse rural development (the nearest residence is within 100 feet of the site's east boundary), and on the south by a forest. The Schroon River is located approximately 170 feet from the site's north boundary. Less than 1 mile downstream from this location, the Schroon River discharges into the Hudson River. The inactive WB&P mill facility is located north of the site between Route 418 and the Schroon River.

As shown on Figure 1-2 (see back pocket of this report), the site is bisected by an abandoned segment of the Delaware and Hudson Railroad. This division separates two terraced landfills which comprise the major portion of the site. The upper terrace landfill area, hereafter referred to as the south landfill, encompasses the entire portion of the site south of the abandoned railroad tracks and is approximately 30 feet higher in elevation than the northern portion of the site. Sporadic landfilling activity apparently occurred in this area which is defined, in part, by the perimeter of remaining forest. A large amount of discarded material exists in the northeast corner of this area. Discarded material is also visible along the area's perimeter. In the southwest corner, orange-stained soil is evident, identifying this location as an area of potential contamination. This area has also been identified as receiving discharge from illegal dumping activity.

The lower terraced landfill area, hereafter referred to as the north landfill, is located to the south and west of a barn and concrete foundation, and is defined to the west and south by the remaining forest and to the east by a dirt road which provides access to the south landfill. To the east of this access road a second, smaller, wet low-lying area exists in the northeast corner of the site, beyond which a private residence is located. This low-lying area is characterized by a small amount of discarded surface material. No soil staining or unnatural topographic features were observed in this area. The main portion of the north landfill area is elevated about 10 feet above Route 418 which is located to the north. An area of well-defined black-stained soil is located south of the barn, identifying this location as an area of potential contamination. Discarded material is located along the south and east sides of the barn structure. A wet low-lying area, hereafter referred to as the hollow (or Area C in analytical data), is located between the north landfill and the abandoned railroad tracks. This area also contains discarded material. In the eastern portion of the hollow, a natural spring discharges from the abandoned railroad embankment creating a small pool. This pooled water has a characteristic orange color (described in previous investigations [Ecological Analysts 1984] as a possible leachate from the south landfill). Drainage from the hollow is toward the west via a poorly defined channel, hereafter referred to as the intermittent stream. This drainage is confined to the site by natural topography and an abandoned railroad siding.

Access via the abandoned railroad corridor which bisects the site allows for routine traversing of the site by local residents. Open access to the north landfill from Route 418 allows any type of unauthorized activity to occur. Movement to the south landfill from the north landfill was restricted by a large boulder placed in the middle of the north-south access road. (This boulder was moved to allow free passage for vehicles used in the performance of the RI.) Other site features shown on Figure 1-2 are discussed in detail in Section 3.1.

1.2.2 Site History

The WB&P property is owned by the Warrensburg Board and Paper Corporation, 645 West 1st Avenue, Roselle, New Jersey, 07203. In April 1976, the mill, located on the north side of Route 418 along the Schroon River, was heavily damaged by a flood. In January 1978, the mill sustained fire damage, after which the WB&P site became inactive. Prior

January 1978, the site was used by the company for disposal of solid refuse, such as baling wire, paper, wood, metal drums, and plastic shredding. During this investigation, cloth rags were also observed to be part of the solid refuse deposited from the mill's operation. Apparently, landfilling activity at the site began on the north portion of the site, behind and adjacent to the barn. Landfilling in the southern portion of the site followed.

In May 1979, a nearby resident reported to the NYSDEC Warrensburg office that a tank truck was dumping a black liquid at the site. Based on an assumed dumping of 2,000 to 3,000 gallons of black liquid occurring two to three times per week over an eight-month period, the total quantity of liquid waste dumped was estimated at 288,000 gallons (Ecological Analysts 1984). Additional contamination also may have occurred prior to 1978, possibly involving the disposal of xylene, toluene, and formaldehyde, as reported by a former mill employee. During this investigation, additional information provided by a former mill employee indicated that coal ash and fuel oil were deposited on the site from the operation of the mill, filling in a previously existing pond (now referred to as the north landfill) and that a large number of drums containing debris from the mill's operation were placed in the south landfill area.

Subsequent site inspections by NYSDEC and the United States Environmental Protection Agency (EPA) substantiated site conditions and recognized the contamination potential for surface and groundwater. As a result, the site was nominated by NYSDEC for inclusion onto the National Priority List but was rejected by EPA, thus requiring the NYSDEC Superfund to provide the primary funding source for the remedial program (NYSDEC 1987a).

1.2.3 Previous Investigations

NYSDEC conducted an initial site inspection on May 16, 1979, two days after receiving a complaint from a nearby resident of suspicious dumping. Evidence that a black liquid had been dumped was observed--soil and rocks were stained black in and around the area where the truck was reported to have dumped. The site was monitored in an attempt to identify and apprehend the responsible party. No site activity was observed. On July 3, 1979, NYSDEC collected soil and surface water samples to be analyzed for PCBs and Mirex. A sample collected from an area of standing water located behind the barn exhibited a low concentration of PCBs, expressed as 3.0 micrograms/gram (µg/g) or parts per million (ppm). A second sample collected from standing water in the south landfill exhibited no detectable levels of PCBs. One of two soil samples collected from the south landfill showed a low concentration of PCBs (0.03 µg/g), whereas no PCBs were detected in the soil sample collected from the north landfill. Mirex was not found at detectable concentrations for either the surface water or soil samples.

On August 26, 1980, an EPA contractor, Fred C. Hart Associates of Newark, New Jersey, conducted a site inspection. Based on this inspection the seriousness of the problem was judged to be high. Following this inspection, NYSDEC performed a facility inspection on July 28, 1981, and concluded that the landfilling of the facility was extremely poor. NYSDEC collected an additional soil sample from the orange stain area on the south landfill (see Figure 1-2) on November 3, 1983, for analysis of priority pollutant metals, base/neutral and acid extractable compounds, volatile organic compounds (VOCs), and pesticides/PCB compounds. The analysis yielded concentrations of arsenic (20 µg/g); iron (220,000 µg/g); zinc (100 µg/g); titanium (600 µg/g); mercury (0.26 µg/g); nickel (32 µg/g); manganese (40,000 µg/g); di-n-butylphthalate (0.22 µg/g); pyrene (4.5 µg/g); delta BHC (0.22 µg/g); and heptachlor (0.08 µg/g).

As part of the NYSDEC Superfund program, in 1983 NYSDEC contracted Ecological Analysts, Inc., of Middletown, New York to prepare a Phase I Investigation to quantify the risk associated with the site. Based on a site inspection, file search, a review of available analytical data, and the reported illegal dumping activity, the Phase I report (September 1984) concluded that the site exhibited extensive indication of leachate generation and potential contamination of groundwater and offsite surface drainage into the Schroon River. As such this site was classified as having the potential to pose a significant threat to the public health or the environment (NYSDEC 1986).

In October 1986, NYSDEC solicited proposals to perform an RI/FS. E & E was awarded the contract and given authorization to proceed in August 1987.

1.3 REPORT ORGANIZATION

Organization of this report is based upon RI report format as set forth by the EPA guidelines and is as follows:

- **Section 1** **Introduction:** presents a general explanation of the purpose of the report, followed by site description and site history as they pertain to the presence of contamination.
- **Section 2** **Site Investigation Methodology:** presents an overview of the investigative methods employed to acquire site characterization data.
- **Section 3** **Physical Characteristics of Study Area:** presents data on the physical characteristics of the site and surrounding area to the extent necessary to define potential transport pathways and receptor populations, and to provide sufficient engineering data for development and screening of remedial alternatives.
- **Section 4** **Nature and Extent of Contamination:** utilizes physical site characterization and analytical results to determine the locations and concentrations of contaminants and outlines possible former sources that may have contributed to the detected contaminants.
- **Section 5** **Contaminant Fate and Transport:** presents data on the potential routes of migration, contaminant persistence, and migration.
- **Section 6** **Risk Assessment:** discusses potential environmental and public health impacts.
- **Section 7** **Summary and Conclusions:** presents an overall statement of extent of contamination, risk assessment, and recommendations for future work to be conducted at the site.
- **Section 8** **References:** presents a list of all reference works referred to in this report.

2. SITE INVESTIGATION METHODOLOGY

2.1 BACKGROUND DATA INVESTIGATION

A review of previous investigations at the WB&P site has provided background data concerning site history (see Section 1.2.2), demography, water resources, meteorology, ecology, geology, hydrology, and contaminant source data (see Section 3). The primary source of these data is the Phase I Summary Report prepared for NYSDEC (Ecological Analysts 1984). This report, which contains all investigation data and information compiled from May 1979 to September 1984, has been verified by the RI site reconnaissance. In addition, groundwater quality data of nearby residential private wells and a water quality report for surface waters of New York State have been obtained from NYSDEC. Regional information gathered by the United States Geological Survey (USGS) provided additional background data on water, soil, and surficial geologic resources.

2.2 SURFACE FEATURES INVESTIGATION

As part of the RI site reconnaissance, the surface features of the site were investigated by aerial photography and ground survey crews. The aerial photography and ground surveying was used to construct a base topography map of the WB&P site. The aerial photographs provided land use data and residence locations. Due to the extensive site vegetation and the irregular topography which prevented line-of-sight orientation between the south and north portions of the site, it was necessary to visually inspect the site by ground survey crews to provide data on surface features not observable from the aerial photographs, and to eliminate any distortion caused by aerial photography magnification. Furthermore, the ground survey crews also established a site boundary and grid control system which became invaluable for site orientation, geophysical instrumentation transect lines, and sample location.

2.3 CONTAMINANT SOURCE INVESTIGATION

The contaminant source investigation was conducted in five stages:

- Onsite air monitoring survey;
- Geophysical investigation;
- Soil and vadose zone investigation;
- Surface water, sediment, and private well water investigation; and
- Groundwater investigation.

The methodology and specific goals of each contaminant source investigation stage are described below.

2.3.1 Onsite Air Monitoring Survey

As part of the Health and Safety Plan, an onsite air monitoring survey was conducted continuously during onsite reconnaissance and the various activities of site investigation such as trench excavation, soil boring, and sampling. The air monitoring survey included the use of field instrumentation to detect volatile organic compounds and other health risk conditions commonly associated with landfill areas such as explosive or reactive conditions. The field instruments used included an organic vapor analyzer (OVA), HNu photoionization detector, oxygen meter, explosimeter, and a hand-held draeger pump fitted with cartridges specific for the detection of formaldehyde. Results of this survey are presented where necessary in this report when describing site conditions or areas of significance to this investigation.

In addition, a mini-ram (real-time dust monitor) was present on site for use during trenching and drilling activity. Periodic use of this monitor from mid-October to mid-November showed only one occurrence when suspended matter was present in the air at a detectable level above ambient conditions. This occurred on November 13, 1987 during the drilling of MW4 in which a value of 0.01 mg/m^3 was recorded.

2.3.2 Geophysical Investigation

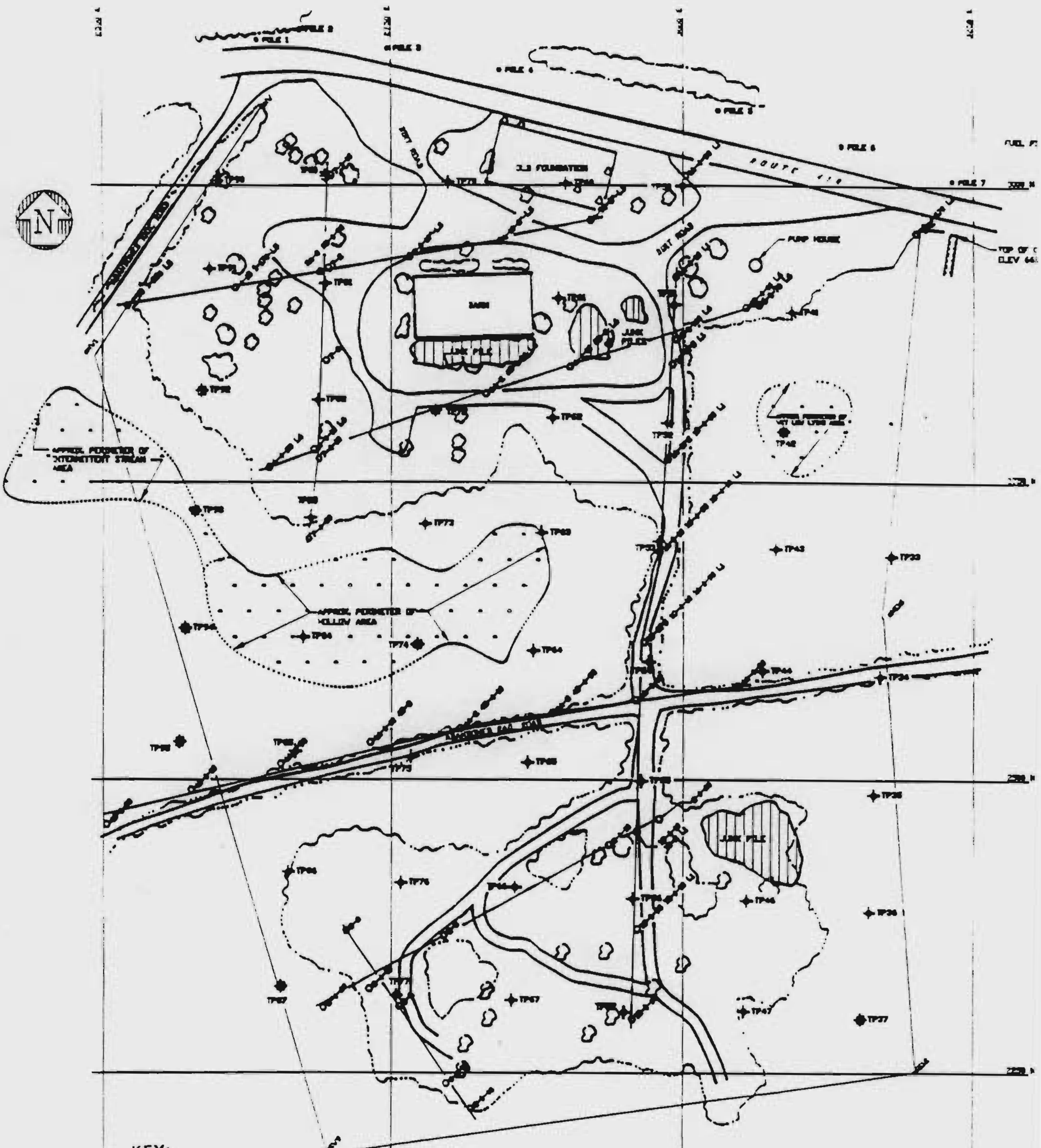
The geophysical investigation included the use of an electromagnetic (EM) survey, a magnetometer/metal detection survey, and a 12-channel seismic refraction survey. Information obtained from this investigation was used to describe the geological setting (Section 3.4) and groundwater hydrology (Section 3.6). For the EM survey, a 100-foot grid system was established across the entire site as identified by turning point (TP) locations, as shown on Figure 2-1. By combining the EM Geonics units 31 and 34, the position of subsurface anomalies (e.g., a contaminated plume) can be identified because of the potential for high ionic concentrations as indicated by high conductivity readings. A magnetometer and metal detector were also used to determine the position of metal objects in the subsurface, such as buried metal, utility lines, and drains. The magnetometer/metal detector survey was conducted across the 100-foot grid system.

The twelve-channel seismic refraction survey was conducted by Hager-Richter Geoscience, Inc., of Windham, New Hampshire, using an EG & G/Geometric Model ES1225 multiple channel signal enhancement seismograph coupled to a 12-element, 240-foot seismic refraction spread cable to define the depth to bedrock, delineate the thickness of glacial outwash gravels, and assist in the placement and depth of the monitoring wells. The seismic survey also assisted in identifying bedrock topography which may influence heavier-than-water contaminant migration. The survey ran four east-west and three north-south survey lines (see Figure 2-1) across the entire site. The exact number of survey lines and their positions were determined on site and in accordance with the preliminary results of the EM survey.

Prior to the installation of monitoring wells and test pits discussed below, the geophysical data underwent review by E & E and NYSDEC field geologists. The field geologists were on site during all surveys and had access to all field data.

2.3.3 Soil and Vadose Zone Investigation

The soil and vadose zone investigation was conducted in areas of suspected contamination, i.e., the area of alleged illegal dumping in the southwest corner of the south landfill area; the area of potential



KEY:

Seismic Refraction Survey

TP37 Taped-in Grid Point

TP36 Surveyed Grid Point

SCALE

0 125 250 500 FEET

Figure 2—1 WARRENSBURG GEOPHYSICAL SURVEY contamination behind the barn; and the perimeter of the leachate pond in the hollow directly north of the railroad. In addition, areas where anomalies were identified by the geophysical investigation were also investigated in order to identify the source of the anomaly. Eleven test trench areas were excavated using a backhoe for site investigation purposes. The backhoe was operated by Clean Harbors, Inc., of Albany, New York. Examination of the trenches also provided for description of surface geology (see Section 3.4.1). A total of 12 onsite surface and subsurface soil and material samples also were collected as described in Table 2-1. Samples collected during the excavation with the backhoe are identified as "Cataug" samples. Samples collected using a hand auger are identified as "Auger" samples. In addition, a sample was collected from an undisturbed offsite area to characterize background surface soil conditions, as discussed in Section 4, and for comparison purposes an offsite sample of liquid material was collected from the WB&P mill's fuel storage building in accordance with the request of NYSDEC. All fourteen soil and solid material samples were analyzed for priority pollutant metals and iron, VOCs (including xylene), base/neutral and acid extractables, pesticide/PCBs, and cyanide.

Iron was not initially selected for analysis in the soil samples but, during the course of the investigation, was included to examine the high ferric content associated within bedrock and soil conditions (see Section 3) with respect to the high iron concentrations detected in all site groundwater samples and the upgradient well. During all sample collection and trench examination, an organic vapor analyzer (OVA) and/or HNu were used to field-screen for VOCs.

2.3.4 Surface Water, Sediment, and Adjacent Residence Drinking Water Source Investigation

Samples were collected from both onsite and offsite locations as described in Section 4. Surface water and sediment samples were collected from the Schroon River upstream and downstream from the site to determine the potential for offsite migration to influence river water quality. Two surface water samples and one duplicate sample were collected from the hollow area to test for potential onsite leachate contamination. A sediment sample and a duplicate sample were collected

Table 2-1

DESCRIPTION OF SOIL, SELECTED SOLID, AND SEDIMENT SAMPLES

Sample Name[1,2]	Sample Location	Date of Collection	Sample Type[3]	Composite Depth (feet)
Soil				
Auger 1	Hollow Area	Oct. 10, 1987	Composite	0-6
Cataug 2	North Landfill Trench	Oct. 15, 1987	Composite	0-6
Cataug 3	North Landfill Trench T1	Oct. 15, 1987	Composite	0-6
Auger 4	North Landfill Trench T2	Oct. 15, 1987	Composite	0-6.7
Cataug 5	South Landfill Trench TP86A	Oct. 15, 1987	Composite	0-6
Cataug 6	South Landfill Trench TP78	Oct. 15, 1987	Composite	0-8
Cataug 7	South Landfill Trench TP87	Oct. 15, 1987	Composite	0-8.5
Cataug 8	South Landfill MW8	Oct. 15, 1987	Composite	0-8
Cataug 10	South Landfill MW5	Oct. 15, 1987	Composite	0-8
Orange Stain Soil	South Landfill	Nov. 24, 1987	Grab	0-0.5
Background	South of South Landfill (off site)	Nov. 24, 1987	Grab	0-0.5
Selected Solids				
Ash (Cataug 9)	North Landfill Trench T9	Oct. 16, 1987	Grab	Excavated Material
Mill Tank	Mill's Fuel Storage Bldg. (offsite)	Oct. 16, 1987	Grab	0-0.5 of material
Tar-like Substance	North Landfill Trench T1	Oct. 16, 1987	Grab	Excavated Material
Sediments				
Intermittent Stream	Intermittent Stream Area	Nov. 24, 1987	Grab	0-0.5
Intermittent Stream (Duplicate)	Intermittent Stream Area	Nov. 24, 1987	Grab	0-0.5

Table 2-1 (Cont.)

Sample Name[1,2]	Sample Location	Date of Collection	Sample Type[3]	Composite Depth (feet)
Schroon River	Upgradient	Oct. 21, 1987	Grab	0-0.5
Schroon River	Downgradient	Oct. 21, 1987	Grab	0-0.5

Source: Ecology and Environment 1988.

Notes:
1. Auger identifies the sample was collected using a hand-powered auger.
2. Cataug identifies the sample was collected with the assistance of the backhoe.
3. Composite samples were collected by using a stainless steel spoon, composited into a stainless steel bowl, and placed into a 12-ounce glass sample jar.

from the intermittent stream area west of the hollow. Water samples were collected from private drinking water wells located downgradient of the site (residences of Durni, which included a duplicate sample, Brown, Dingman, and Monroe) to determine the presence of offsite migration of contaminants. Permission to sample these residences was obtained by NYSDEC. Residences east of the site are serviced via the Warrensburg Public Water System.

The three sediment samples and the duplicate sample (see Table 2-1) were analyzed for the same contaminants as the soil samples (see Section 2.3.3). The surface and drinking water source samples were also analyzed for those contaminants listed in Section 2.3.3 in addition to chlorides, nitrates, barium, and magnesium.

2.3.5 Groundwater Investigation

The groundwater investigation for the WB&P site involved three components: installation of monitoring wells, groundwater sampling, and aquifer testing.

Eight monitoring wells were installed within and adjacent to the site to ascertain the direction and magnitude of possible contaminant migration. A magnetometer/metal detector was used to screen sites prior to drilling. The backhoe unit used for trenching purposes was also used to clean and prepare certain monitoring well locations such as MW5 and MW8. The locations of these wells were chosen to determine whether any downgradient groundwater contamination threatened the Schroon River (MW3); the presence of contamination in the northern portion of the site (MW1, 2, and 4); the presence of contamination in the southern portion of the site (MW5, 6, and 7); and the upgradient background conditions to the south (MW8). E & E assumed that if bedrock was not encountered, the seven shallow wells (MW1, 2, 3, 5, 6, 7, and 8) constructed of 2-inch stainless steel casing and screen would be 50 feet deep or less, depending on the depth of the water table; the well screens for these wells were installed to penetrate 10 feet into the water table. The actual depths of monitoring wells were determined in the field based on drilling conditions and depth to water. A 4-inch stainless steel-cased well (MW4), which extended to bedrock (93 feet), was screened over the entire aquifer (70 feet) and was used to determine the vertical hydraulic gradients and to test for the presence of heavier-than-water contaminants (i.e., nonaqueous-phase liquids) in the deeper portions of the aquifer.

Because of the heterogeneity of the glacial debris which characterize the site (boulders, cobbles, and sand-size sediments), a hollow-stem auger with the required tungsten or diamond-coated bits was used to drill the seven shallow wells. R & R International, Inc. of Akron, Ohio, installed the seven shallow wells. The deep well, installed by CATOH Environmental Companies, Inc. of Westport, New York, was drilled using an air rotary hammer technique. Core samples were obtained at 2-foot intervals for all wells. All samples and drill cuttings (dry and wet) were screened on site with an OVA portable gas chromatograph (GC) to ascertain potential zones of contamination.

Well casing extended above the existing surface, and protective surface casing covers were installed over them. The annulus above the screen was sealed with bentonite and grouted up to the surface. Each well was developed by pumping, surging, or jetting for at least 1 hour, or until it was producing clear, non-turbid water.

All wells were surveyed to the nearest 0.01 foot and water level measurements were taken as simultaneously as possible on various occasions to determine the directions of groundwater flow (see Section 3.6).

Before a groundwater sample was obtained, the static water was purged to ensure that a representative groundwater sample was taken. The static water level and total depth of the well were measured with a calibrated weighted line. The number of linear feet of static water (difference between static water level and total depth of well) was determined so that the static volume can be calculated. Care was taken to decontaminate equipment between each use to avoid cross contamination of wells. A minimum of three static water volumes was purged from the well prior to collecting the samples. Purging and sampling was performed using a stainless steel bailer.

Temperature, pH, and conductivity were monitored during sampling. All wells were sampled and analyzed for EPA priority pollutants including VOCs, base/neutral and acid extractables, pesticides, PCBs, metals, and cyanide in order to confirm or deny the presence of the contaminants suspected to be present on site based on existing data. In addition, groundwater samples were analyzed for chlorides, nitrates, barium, iron, magnesium, and xylene. A duplicate sample was collected from MW2.

To determine hydraulic conductivity, E & E conducted an aquifer (pump) test using the 4-inch well (MW4) to determine aquifer characteristics, anisotropic directions, and the interconnection between wells (see Section 3.6). The pump test was conducted over a 24-hour period. During this 24-hour period, three adjacent wells (MW1, 2, and 3) were used as observation wells. Water levels in the pumping well and in the observation wells were monitored using pressure transducers and a data logger to electrically record all water level measurements.

2.4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Field sampling techniques, field sampling QC, chain-of-custody, and other documentation and laboratory work were conducted in accordance with E & E's Quality Assurance Project Plan (QAPP) and Laboratory and Field Personnel Chain-of-Custody Documentation and Quality Assurance/ Quality Control Procedures Manual. All QA/QC procedures were conducted in accordance with applicable professional technical standards, EPA requirements, NYSDEC regulations and guidelines, and specific project goals and requirements.

2.4.1 Documentation

A detailed chronological log of onsite day-to-day events was kept during the field work. In addition, logbooks for drilling, boring, and survey information were maintained. Chain-of-custody forms were prepared for each sample shipment and accompanied the sample shipment to the laboratory.

2.4.2 QA/QC Samples

During the course of field sampling, eight QA/QC samples were collected and analyzed as part of the WB&P site investigation. These samples included duplicate field samples, distilled water rinsate (field blanks) collected from the decontaminated sampling implements, and trip bottle blank samples, prepared in the lab for both soil and water sample containers. The trip blanks were prepared by filling the containers with deionized water and adding preservatives as required of water sample analyses.

2.5 DECONTAMINATION PROCEDURES

Drilling equipment and tools were decontaminated prior to and following the drilling of each monitoring well and/or soil boring. Soil and water sampling equipment (i.e., spoons, bailers, etc.) were decontaminated prior to the collection of each sample.

All drilling equipment was decontaminated by high-temperature steam cleaning. Decontamination tap water was obtained from municipal supplies which provided the source of the steam. All decontamination of soil and water sampling equipment involved a trisodium phosphate and tap water scrub, a tap water rinse, 10% nitric acid rinse (metals only), tap water rinse, reagent grade acetone rinse, reagent grade hexane rinse, deionized water rinse, and air drying. At various times when deionized water was not available, distilled water was used in its place. Decontamination deionized water was obtained from E & E's Analytical Services Center (ASC), and decontamination distilled water was purchased locally.

3. PHYSICAL CHARACTERISTICS OF STUDY AREA

3.1 SURFACE FEATURES

The WB&P site comprises approximately 12 acres which is separated into two landfill areas as described in Section 1.2.1, on both of which are several large piles of discarded materials (see Figure 1-2). On the north landfill, discarded material piles located near and adjacent to the barn contain various amounts of abandoned machine components, metal, wood, and concrete debris, and bulk paper rolls ranging in diameter from 3 to 5 feet. Found within the barn are steel pipe, bales of rags, two pallets of tar-like slugs labeled "Steep", and two pallets of leaking aluminum sulfate. Behind the barn, black-stained soil occurs sporadically over an area of approximately 100 square feet. The black material had an appearance of a weathered tar-like substance. This original condition has been disturbed by test trench activity. The south boundary of this area, which forms the northern portion of the swampy area (hollow), described below, shows exposed landfill material. This material consists of wood, discarded machine components, abandoned vehicles, and scattered drums (approximately half open and half closed). Observations of drum contents showed them to either be empty, having a small amount of rain water, or to have various amounts of solid refuse from the mill's operation (e.g. rags, wood, wire, etc.) In addition, numerous boulders are scattered about the north landfill area.

Between the north landfill and the railroad embankment to the south, lies a wooded swampy hollow. A spring discharges into this area from the hillside approximately 50 feet north of the railroad embankment creating a small pool and several wet areas to the west. Contributing to the discharge of the spring is a small culvert observed by NYSDEC which extends through the bed of the railroad track to drain surface runoff that collects along the south side of the railroad track bed. The pool created by the spring is characterized by an orange-colored sediment at its bottom. During and after periods of heavy precipitation, flow from the spring is toward the west along a poorly defined course within the hollow, hereafter referred to as the intermittent stream area. The hollow is bounded by the abandoned railroad siding to the west; the surface water in this area does not go directly into the river, but sinks into the ground.

A smaller hollow, apparently formerly an extension of the first, occurs east of the access road leading to the south landfill. This entire area is wooded and appears to be undisturbed. However, several pieces of miscellaneous scrap and metal machine components are on the surface in this area. Also located in this area is a shed (identified as a pumphouse on Figure 1-2), housing a hydrant apparently used as part of the mill's former fire fighting system. The geophysical surveys detected readings adjacent to this shed which most likely indicate metal water supply lines for the fire fighting system.

The appearance of the south landfill, suggests a haphazard approach was taken during landfilling. The center of the landfill is for the most part lacking surface debris. About the perimeter of the clearing, starting from the northeast in a clockwise direction, is a large junk pile containing charred wood, exposed drums, rolled paper, and metal and plastic material (see Figure 1-2). Metal gas cylinders also are observed half buried in front of this pile. Adjacent to the pile a small area (4 square feet) of a black tar-like substance was found. This material is similar to that observed behind the barn on the north landfill. The presence of this small amount of tar-like substance appears to be an isolated instance. A crushed drum containing the same type of black material was found nearby. No tar or ash was found in any of the test trenches excavated on the south landfill area, as were found in most trenches on the north landfill. Toward the southeast corner of the landfill clearing a small earthen mound is located with red bricks adjacent to it. Along the south central portion of the clearing an area of approximately 30 x 60 feet is characterized by numerous depressions of about 1.5 feet in diameter. West of this area an orange stain originates and follows the slope of the land along the west boundary of the clearing toward the northwest corner. This area also has been identified as receiving discharge from the illegal dumping activity. In the northwest corner, a well-defined earthen mound is located. Scattered empty drums and metal scrap occur around the entire perimeter of the south landfill.

Figure 3-1 (see back pocket) is a 1 inch = 50 feet scale map showing 2-foot contours of the site. The general slope declines to the north with elevations ranging from 700 feet above sea level in the southeast to 650 feet above sea level at the north boundary (along Route 418). Outside the site to the south mountainous terrain rises to over 1,300 feet. Within the south landfill the elevation ranges from 700 feet above sea level, at the southeast corner, to 672 feet above sea level in the northwest corner. The excavation and landfilling activities which occurred on the south landfill are visible in the topography, particularly along the west boundary where a steep grade has been created apparently from the excavation of soils for use as cover material.

The topography of the north landfill is characterized by a steep slope along the abandoned railroad which declines from approximately 676 feet along the railroad right-of-way to 650 feet above sea level in the hollow and the low-lying area in the northeast corner of the site. The relatively flat area about the barn and the concrete foundation has a gentle slope from south of the barn at 660 feet above sea level toward the northwest. At the northwest corner the elevation decreases from 656 feet to the grade level of Route 418 (650 feet). An inspection of the site's topography and vegetation as well as the topographic map (see Figure 1-1), suggests that the ramp between the hollow and the low-lying area located in the northeast portion of the site was artificially created to give access to the south landfill.

3.2 METEOROLOGY

The site is located in the Adirondack Low Mountain Region (about 60 miles north of the City of Albany, New York). Based on historic meteorological data (NOAA 1983), the average daily summer temperatures range from 65 to 70°F while the average daily winter temperature is about 15°F. The prevailing winds are southerlies having a mean speed of about 9 miles per hour. The annual average relative humidity is 70% and the annual mean sea level pressure is 30 inches.

Precipitation is most important for recharge of aquifers and reservoirs in the Warrensburg region. The annual precipitation ranges from 40 to 44 inches (42.9 inches mean); the average annual hours of sunshine is 2,200. The mean annual lake evaporation is 26 inches. The highest periods of precipitation have historically occurred during the months of July (4.21 inches) and September (4.05 inches). The mean annual total snowfall for the region is about 93 inches. Field work for this study took place from September 1987 through April 1988 under relatively seasonal weather conditions.

3.3 SURFACE WATER HYDROLOGY

The WB&P site lies within the Schroon River watershed which is part of the upper Hudson River basin. Based on the mean annual precipitation of 42.9 inches, the region receives an estimated 746×10^6 gallons per square mile (NOAA 1983). Surface and groundwater intercepted by the Schroon River flows westerly into the Hudson River and is ultimately discharged into the Atlantic Ocean. The WB&P site is located 0.75 mile upstream of the Schroon River's confluence with the Hudson River.

Although acid precipitation is a significant problem in the basin, the surface water quality is generally good to excellent. Two exceptions are in the Schroon River at Warrensburg where untreated discharges from combined sewer overflows have caused a moderate impairment of water quality, and at Schroon Lake, located upstream from Warrensburg, where PCB and mercury contamination have resulted in a fishing advisory (NYSDEC 1988). At the Warrensburg location, water designated for fishing and fish propagation and for primary and secondary recreation has had its quality impaired by the untreated sewage. Sediment analysis at Warrensburg has shown relatively high lead and zinc levels (NYSDEC 1988).

As part of the WB&P site investigation, water and sediment samples were collected from locations upstream and downstream from the site. The results of this sampling and analysis efforts are discussed in Section 4.

At the WB&P site, surface water flows follow the site's topography and are not controlled by structures such as storm sewers or extensive drainage culverts. Figure 3-1 indicates that surface drainage on the south landfill is generally to the north, with exceptions in the southeast corner and along the west boundary where localized drainage is toward several closed depressions. The most evident example of localized drainage is along the west boundary of the south landfill area where soil staining has occurred, as discussed in Section 3.1.

In the north landfill, surface drainage from the south and central areas is toward the hollow. During periods of heavy precipitation, flow occurs in the hollow in a westerly direction along the ill-defined intermittent stream. This "stream" only occurs in the extension of the hollow, and it sinks back into the ground beside the abandoned railroad siding which bounds a portion of the northwest corner of the site. The second low-lying area located in the east portion of the north landfill across the access road to the south landfill intercepts only localized surface drainage. The remaining parts of the north landfill drain north-northwest along the south grade of Route 418. Surface water flow would have to cross the crown of Route 418 to directly enter the Schroon River.

There are no perennial streams or surface water located on the site, with the exception of the spring which creates a small pool and several small areas of standing water in the hollow, as discussed in Section 3.1.

3.4 GEOLOGICAL SETTING

The WB&P site is situated above a preglacial valley and valley side on an outwash deposit composed of Pleistocene and recent alluvium up to some 100 feet thick which was derived from the surrounding Adirondack Precambrian granulite-gneiss terrain. Sediments formed by the glacial ice which once covered the WB&P site and transported via glacial melt waters contain all sizes of particles (from silt and sand to enormous boulders). The resulting stratified deposit is referred to as outwash. Meandering of glacial runoff channels (during the Pleistocene period), recent meandering of the nearby Schroon River, and the braiding of meltwater streams have created layers of sand, gravel, and boulders with occasional silt layers which vary rapidly both vertically and laterally at the WB&P site.

Furthermore, these outwash plains are commonly marked by "kettle holes," shallow rounded lakes marking the location of isolated ice remnants which are receptacles for silt or clay-sized material (Driscoll 1988).

3.4.1 Geology of Unconsolidated Overburden and Soils

All boreholes and trenches excavated during this investigation penetrate glacial outwash or more recent river channel alluvium (see Appendix A). These materials cover the entire site and vary in overall thickness from 30 feet at the southwest corner to over 100 feet just north of the barn (see Appendix B).

Cross sections were constructed through the site (see Figure 3-2), running from MW8 at the southeast corner of the site to MW3 at the northwest corner. Figure 3-3 shows the cross section (A-A') through MW8 and MW7, the spring in the hollow, MW4, MW1, and MW3. Figure 3-4 shows the cross section (B-B') through MW8, MW6, MW5, the hollow, MW2, and MW3. An indication of bedrock elevations illustrated in Figures 3-3 and 3-4 is given, based on the seismic data (see Appendix B). It is very clear that there are two different geologic settings on site, essentially corresponding to the south landfill/railroad embankment area and the north landfill, with the hollow marking the boundary between the two.

Under the south landfill, depth to bedrock averages 30 to 50 feet. MW5 was the only well which was drilled close to bedrock as defined by the seismic survey. This well encountered a silt layer and a perched water table during drilling but was completed into the main water table above the bedrock. The remaining wells (MW6, 7, and 8) were completed into what is apparently the same perched water table found in MW5 and which issues from the ground as the spring or seeps in the hollow (see Figures 3-3 and 3-4). However, MW8 has been observed by both E & E and NYSDEC personnel to flow out on the surface of the ground after periods of high rates of infiltration such as heavy rain or rapid snow melt. The implication is that the silt layer(s) which support the perched water table also can act as a confining layer when the hydraulic head in the underlying "main" aquifer above bedrock rises sharply. At such times the perched water table ceases to be perched and saturation

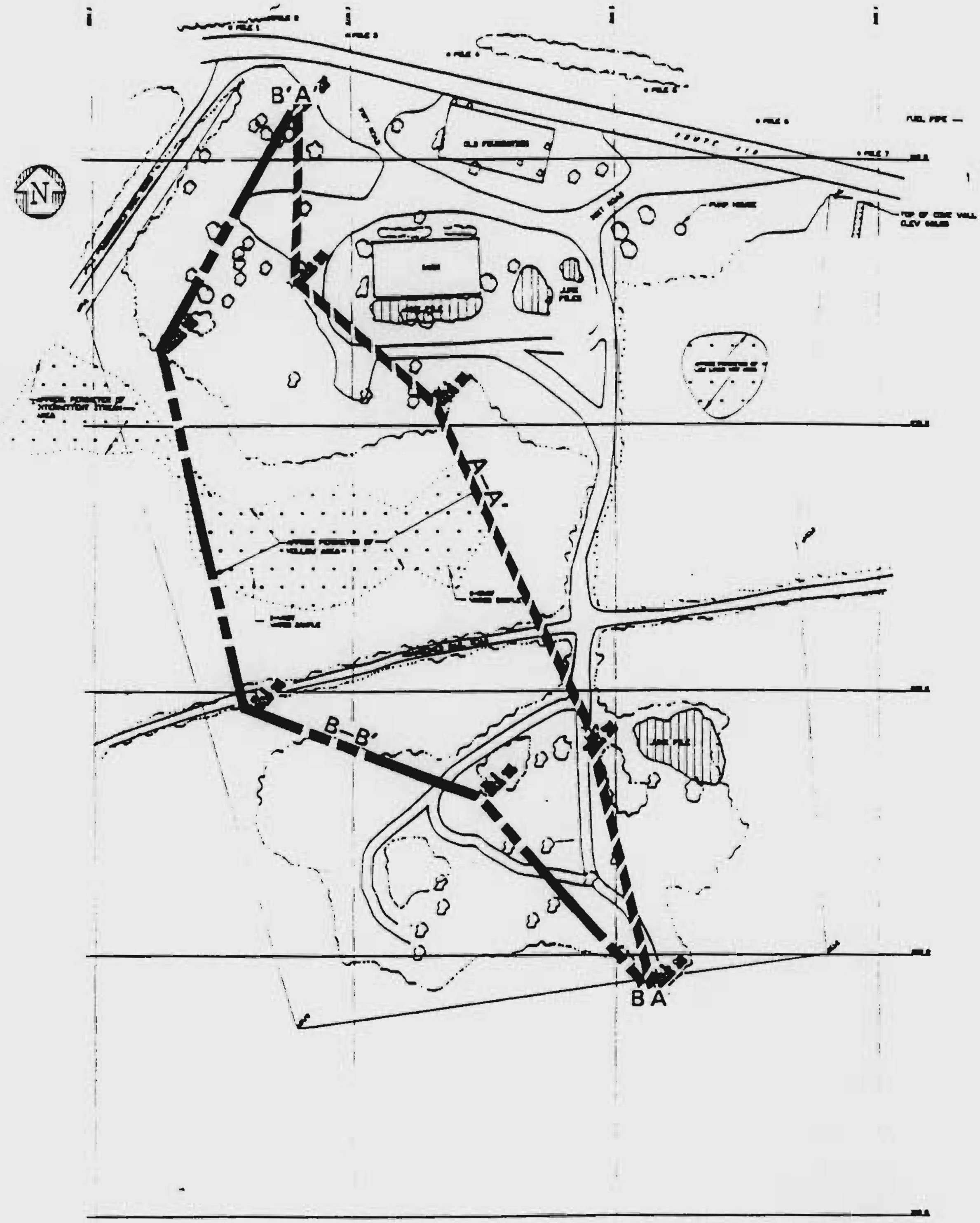


Figure 3–2 GEOLOGIC CROSS SECTION ORIENTATION

extends from the water table to the bedrock. It is clear that the hydrostatic head in the main aquifer can even exceed ground surface elevations and the wells extending through the perched layer such as MW8 can provide a discharge point for the artesian aquifer. The postulated water levels for the main aquifer as shown in Figures 3-3 and 3-4 are based on the assumption that the materials in the main aquifer under the south landfill are similar to those encountered in MW5. If this is so, the very steep hydraulic gradient (approximately 8%) postulated for an aquifer resting on relatively impervious bedrock would preclude anything but a thin aquifer under normal conditions, because the volume of flow in the aquifer materials at such a gradient would be higher than that calculated by the water balance of the area (see Appendix D). It should be noted that for the area of the south landfill, the "main" water table was permanently encountered only in MW5, where the aquifer was only about 10-12 feet thick. If there is a rapid change in the nature of the aquifer materials to the south, then this aquifer could thicken and may frequently merge with the perched water table, as it clearly does at times in MW8.

Beginning under the area of the hollow, the bedrock drops off approximately 50 feet and there is apparently a depression in the bedrock running approximately east-northeast/west-southwest just south of the barn, with some indication of a subsequent slope upward to the north toward the road (see Figure 3-5) and Section 3.4.2. This results in thicknesses of sediment above the bedrock under the north landfill ranging up to 110 feet. As seen in MW1 and MW2, sediments under the north landfill showed silt or organic-rich muck layers probably of low permeability. Both wells were completed in what is obviously a perched water table. But if either well encountered the layer of relatively low permeability which must support this localized perched water table, they penetrated it (see Section 3.6). With only two wells completed into this water table, the direction of flow is impossible to define. Neither of the remaining wells, MW3 and MW4, encountered either a silt layer or a perched water table. Both were drilled entirely in sand, gravel, and boulders; MW3 to 35 feet and MW4 to 93 feet (the latter reaching close to bedrock, as defined by the seismic survey).

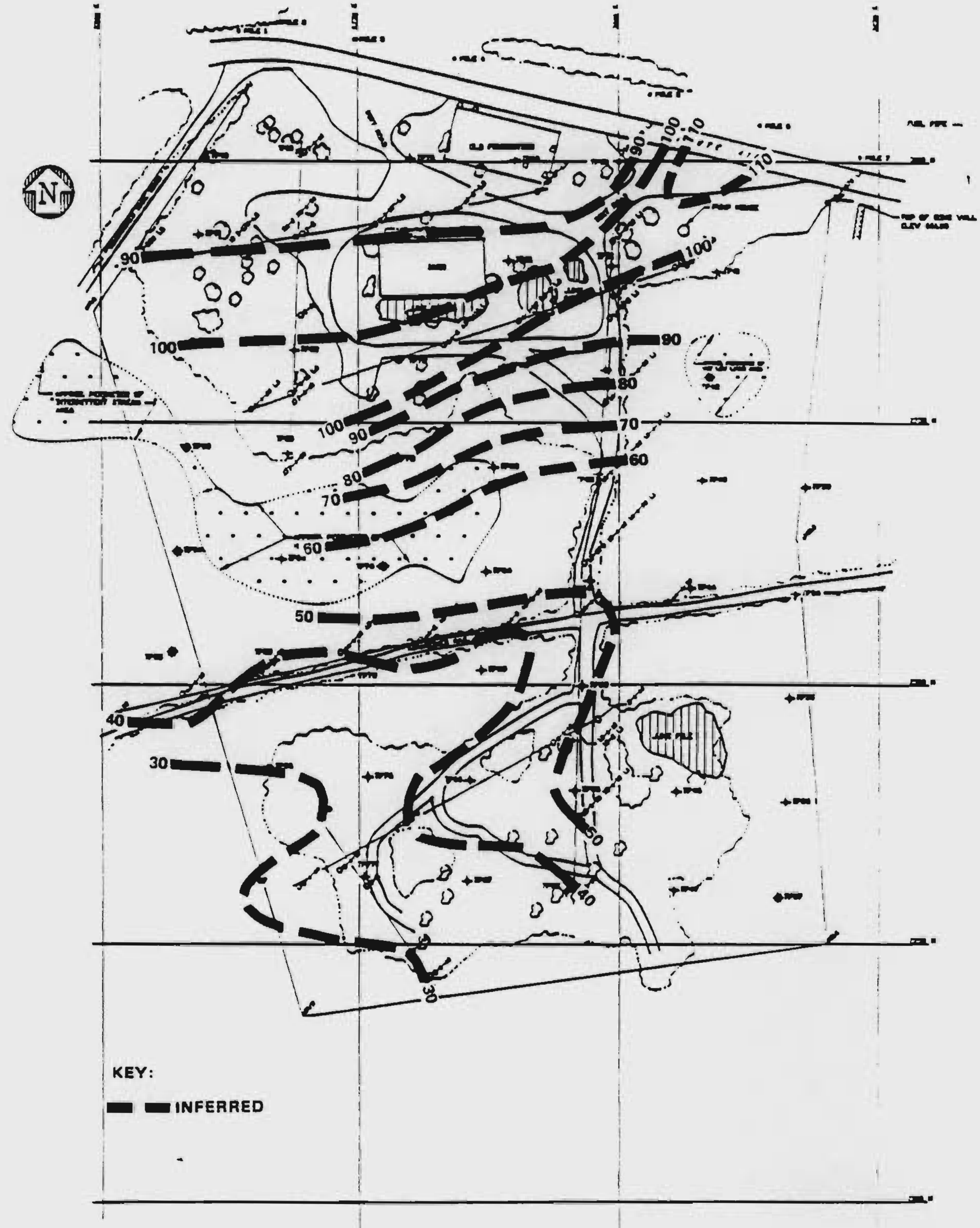


Figure 3–5 ISOPACH MAP OF OVERBURDEN THICKNESS FROM SEISMIC SURVEY

The logs of MW1 and MW2 show fill or disturbed materials mixed with fill from surface to 9 feet in MW1 and to 12.5 feet in MW2. In the latter well there is a strong suggestion that the layer at 12 to 12.5 feet was the former soil or sediment associated with a formerly existing pond, as it is logged as showing a "black muck with preserved grass roots." This is at an elevation of approximately 646 feet above mean sea level, which is below the present surface of the hollow (650 feet above mean sea level) but not so far as to indicate that it could not have been a deeper part of the same depression, which has been filled in. The EM 31, EM 34 electromagnetic surveys (Appendix C) would certainly suggest that this is the case (see Figures 3-6, 3-7, and 3-8). These surveys also indicate that MW3 (just north of TP80) and MW4 (near TP72) would not be expected to encounter fill materials, silt, or organics at shallow depths, as indeed they did not. MW1 (near TP81) also is obviously on the edge of the landfill/natural depression, and it did not encounter the type of fill or the layers of organic materials found in MW2.

The conductivity anomaly found to the east of the south landfill area, within the wooded area at the edge of the site around TP35 (see Figure 3-8), could be of two possible origins. It could be an earlier landfill of such an early date that no surface debris remains and trees have grown over it. This seems highly unlikely, since there is no historic data to support it, and other areas of the south landfill are easier of access and would probably have been used first. The alternative interpretation is that the conductivity anomaly is caused by a natural layer such as silt or peat.

MW4 encountered "black water" at approximately 574 feet above mean sea level (87 feet below surface), and despite the fact that only coarse sand and boulders were encountered in the hole itself, it is clear that there is an organic-rich layer close to the well at depths just above the bedrock. This may indicate that the bedrock depression identified by the seismic survey was the site of a pond, swamp, or peat bog suitable for the creation and preservation of such an organic-rich layer.

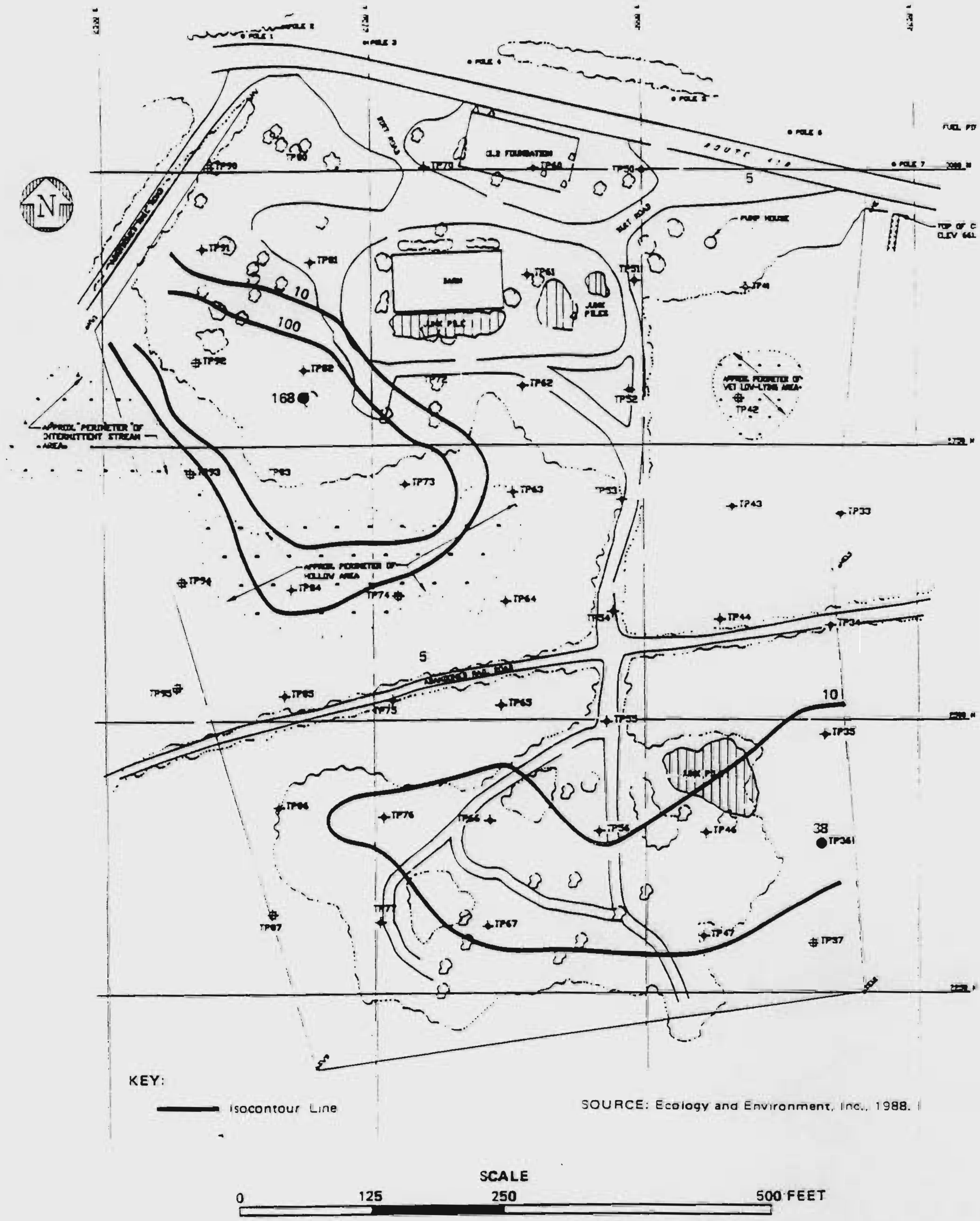


Figure 3–6 CONDUCTIVITY MEASUREMENTS IN MILLIMHOS/METER (EM-31 INSTRUMENT AT A 2.78-METER EFFECTIVE VERTICAL PENETRATION)

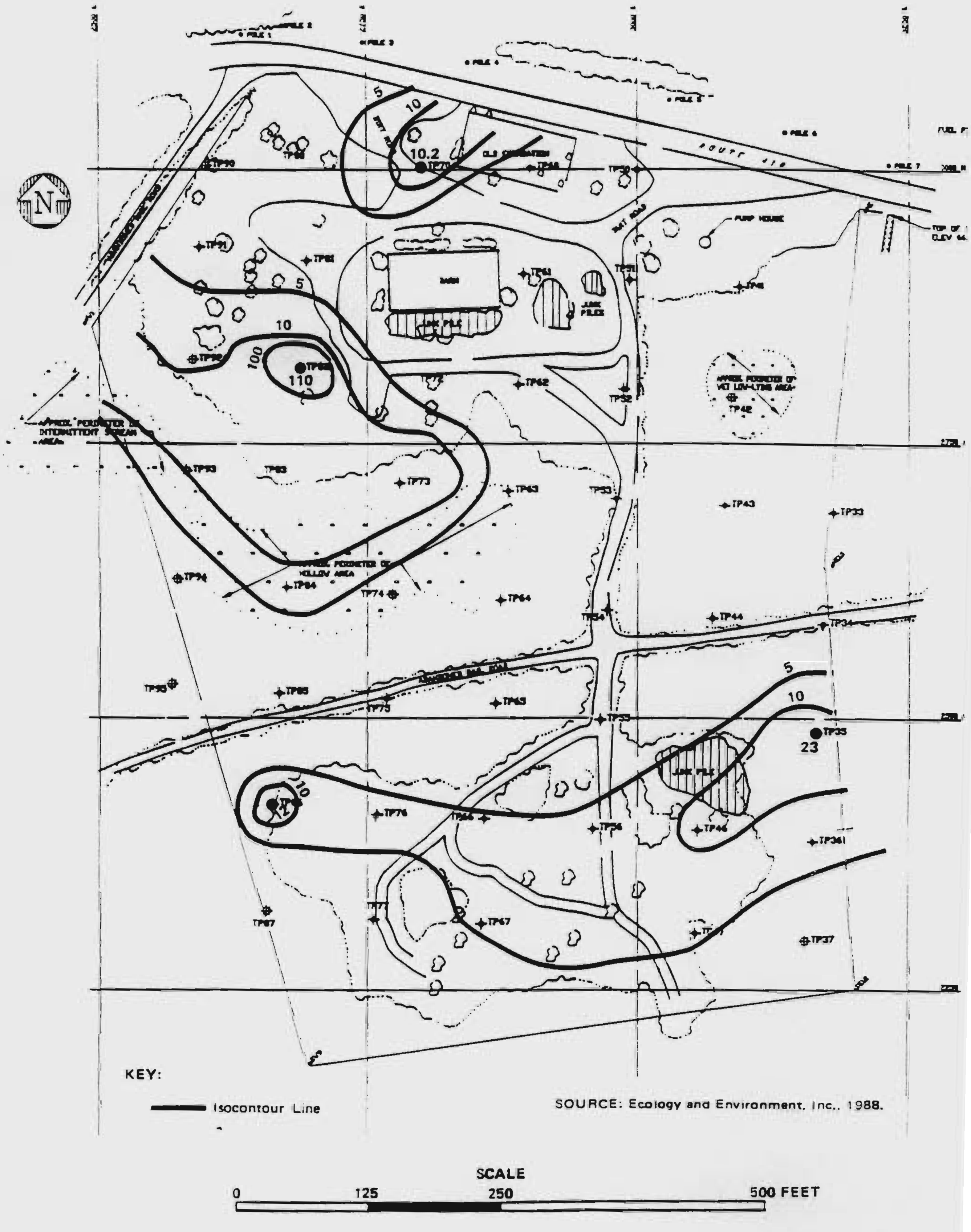


Figure 3–7 CONDUCTIVITY MEASUREMENTS IN MILLIMHOS/METER (EM-34 INSTRUMENT AT A 7.5-METER EFFECTIVE VERTICAL PENETRATION)

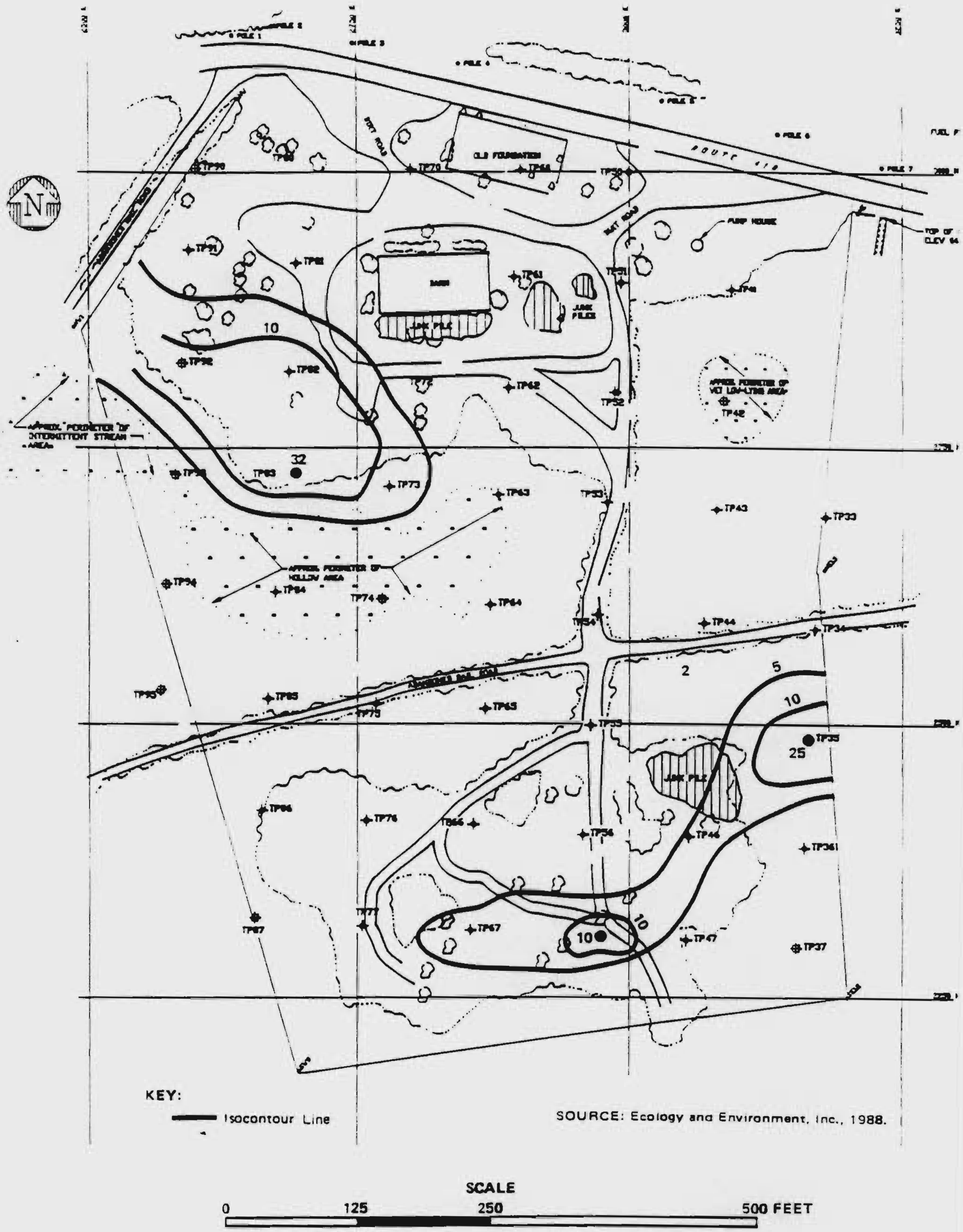


Figure 3–8 CONDUCTIVITY MEASUREMENTS IN MILLIMHOS/METER (EM-34 INSTRUMENT AT A 15-METER EFFECTIVE VERTICAL PENETRATION)

3.4.2 Bedrock

Observations of bedrock outcrops in the Schroon River, which runs westward approximately 200 feet north of the site boundary, show that the bedrock in the river is at approximately 630 feet above mean sea level, whereas under the barn the seismic survey indicates bedrock at approximately 550 feet above mean sea level (see Appendix B). This strongly suggests that the site overlies a buried glacial valley in the bedrock (see Figure 3-5), which may have an influence on groundwater flow.

Samples of the bedrock were collected from the Schroon River and examined petrographically. Composition shows that the rock is a high grade metamorphic rock of granulite facies composed of quartz, microcline, plagioclase, hornblende, biotite, and diopside. Ilmenite and magnetite are common accessory minerals which are particularly iron-rich, and will tend to release iron into the groundwater on weathering. This may indicate one source of the high iron levels in the groundwater under the site (see Section 4.2.2).

3.5 SOILS

The principal soils on site include Plainfield loamy sand, Bice very bouldery fine sandy loam, and Hinckley cobbly sandy loam. Loamy sand has about 85-90% sand, and silt comprise the remaining 10 to 15%.

The storage or holding capacity of a given type of site soil will be influenced by organic-matter content, soil moisture content, biological degradation activity, temperature, colloidal swelling, compaction, and slope. Porosity values vary from 10-55% (Fetter 1988) for the types of soils found. As described in Section 3.4.1, the different strata on site are composed of material ranging from huge boulders to sand and silt particles. Their composition is a reflection of parent source rocks and weathering history. The parent minerals, as visually observed in the soil and by inference from bedrock data, consist of quartz, microcline, plagioclase, hornblende, biotite, diopside, and iron oxides. Accordingly, these minerals may break down into their components (Si, Fe, Al, K, Na, Ca, Mg, and Mn) as a result of weathering. During this weathering process, cations are adsorbed to the soil particles. As they are rather loosely held, they can be exchanged for other cations or, once broken down, the constituent elements may dissolve in the associated water medium. In addition, any fine-grained mineral and any organic material (Mitchell 1932) may also exchange ions. Although both cation and anion exchange may occur, cation exchange is the most prevalent in natural soils (Fetter 1988). As such, this natural exchange of minerals may result in the high metal concentrations found in upgradient soil and groundwater samples (see Section 4.2).

Organic colloids in the WB&P site soil are more common in the filled area of the north landfill and in the hollow. These localities are therefore likely to show higher metal concentrations. For example, Cu occurs in concentrations above background (see Section 4) in those samples associated within or adjacent to the hollow (Auger 1, Cataug 2, Cataug 3, Auger 4, and the intermittent stream). Those samples not associated with organic material contain little if any Cu (e.g., Cataugs 6, 7, 8, and 10 collected from the south landfill).

The most striking other site example of adsorption appears to be what has been visually identified as hydrous manganese and iron oxides which occur as coatings around silicate grains and as discrete grains of oxide mineral particularly in MW6 at a level below the perched water table where black manganese coatings were noted as thick as 1/2 inch. Hydrous manganese oxides, in particular, often have extremely high adsorption affinities for heavy metals (e.g., Cu, and Ni).

3.6 GROUNDWATER HYDROLOGY

As has already been mentioned in Section 3.4.1, of the unconsolidated overburden and soils, the only aquifers penetrated by the eight wells were in the unconsolidated overburden. The bedrock is unlikely to be a significant aquifer compared to the much more permeable and porous sediments.

Three aquifers were identified: a perched water table under the south landfill which appears to discharge into the hollow; another perched water table of limited extent in the landfilled area of the north part of the site; and the main unconfined aquifer extending under the entire site. The perched water table under the south landfill was encountered in MW5, 6, 7, and probably 8. It appears to be created by silt layer or layers within the glacial outwash, although none was noted in MW6 or MW7. The hydraulic gradient of this aquifer was estimated from the water levels in MW6, 7, and 8 (screened in this aquifer) and the level at which it was first encountered in MW5, as well as the elevation of the spring in the hollow which appears to be the main discharge point for this aquifer (at approximately 656 feet above mean sea level) (see Figure 3-9). The perched water table gradient is approximately 8%, which is close to the average slope of the ground surface. Because of this steep gradient and consequent rapid rate of flow, this aquifer is probably thin (less than 10 feet at maximum and probably much less on average) given that an aquifer consisting primarily of sand would discharge a greater volume of flow than recharge could sustain at this gradient.

The underlying bedrock in the south part of the site is at relatively shallow depth (because bedrock is at only 30 to 50 feet), and slopes at approximately 4.5%-6% generally to the north. As a consequence, it is postulated that the main aquifer above the bedrock also has a water table with a similar gradient. As only MW5 in this area was screened in the main water table, this cannot be verified. Because of its relatively steep gradient in relatively permeable sediments, it is expected that this aquifer, like the perched water table, also is thin (MW5 shows it to be approximately 10-12 feet thick).

The hollow appears to be, as noted above, an area in which the perched water table crops out as surface water. The well adjoining the hollow, MW2, has a water level at, or very close to, the surface water level in the hollow, and this perched water table in which both MW2 and MW1 are completed may well be an extension of the surface water in the hollow. This is consistent with the possibility that the landfilled area in which these two wells are located may have been created by filling in a former extension of the hollow which was occupied by the previously existing pond (see Figure 3-4). Although both MW1 and MW2 are completed with the bottom of the screens against permeable sediments (boulders in MW1 and sand in MW2), it could be that a silt layer that was not encountered in these two wells underlies them. What is known is that the water table in these wells cannot be the main water table because the coarse sediments encountered in all four wells (MW1, 2, 3 and 4) could not possibly sustain the steep gradients which would

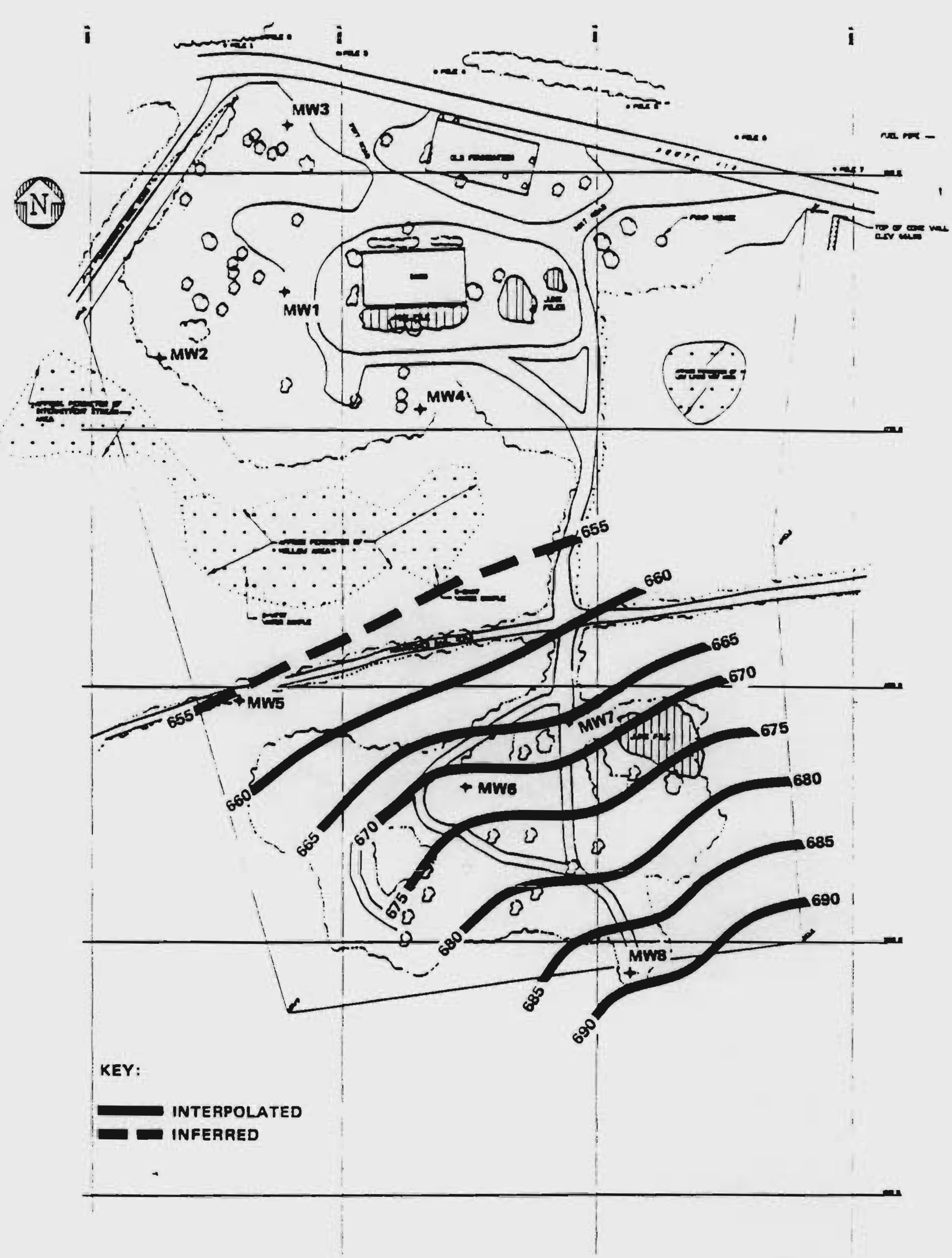


Figure 3–9 UPPER LANDFILL PERCHED WATER TABLE

have to be postulated between MW1 and 2 and MW3 and 4. (Compare cross sections A-A′ and B-B′ in Figures 3-3 and 3-4, respectively.) As there are only two wells completed in this perched water table, no flow direction can be inferred. It is possible that the water levels in either or both MW1 and MW2 do not accurately represent the perched water table in the fill. Instead they may represent a level resulting from an equilibrium between water from the perched water table entering the well screen near the top and water draining out of the well screen into an underlying unsaturated zone at the base of the screen. In such a case, the well penetrates the layer on which the water table is perched but is screened both above and below it. Typically such a well would be expected to show larger fluctuations in water elevations from dry to wet periods than adjoining wells, and, in fact, both MW1 and well MW8 do fluctuate in this way (see Table 3-1 and below).

Three wells are completed into the main water table, MW3, 4, and 5. These show a flow direction generally north northwest from MW5 (see Figure 3-10). Discharge of the main aquifer under the site to surface water is postulated to be to the Schroon River, which flows in a westerly direction north of the site.

Hydraulic Properties

In order to evaluate the route of groundwater movement, it is necessary to examine the hydraulic properties of the aquifer(s) beneath the WB&P site. This was done through collection and analysis of 24-hour pump test data conducted at MW4, supplemented by several individual well slug tests. Application of hydraulic theory in the form of curve matching, mass balance, and empirical graphs and equations applied to these data provided estimates of groundwater flow characteristics, as presented in Appendix D.

It is important to incorporate the known geologic character of the site described from well logs with evaluation of the analytical results from aquifer test data. Cross-sections of the site are included on Figures 3-3 and 3-4. MW4 was drilled almost to bedrock (based on geophysical data) and screened through the entire above-bedrock main aquifer unit. The pump test data indicated a transmissivity in Well MW4 on the order of 10^4 gpd/ft ($K = 10^2$ gpd/ft^2) for the main site

Table 3-1

RECORDED GROUNDWATER CONDITIONS

Sampling Period 1	11/24/87 Temp. (C°)	11/24/87 pH	11/24/87 Conductivity umhos/cm	11/23/87 Water Elevation	12/17/87	12/31/87	01/14/88	01/25/88	03/23/88	03/29/88	03/30/88
MW1	7.2	6.50	230	643.66	647.31	646.54	647.11	643.27	646.96	644.59	645.34
MW2	6.1	6.10	680	649.34	649.49	649.37	649.15	649.21	648.88	649.55	649.63
MW3	8.3	6.75	190	628.28	628.44	628.27	629.21	628.98	627.31	628.19	628.40
MW4	8.1*	6.30*	130*	--	--	--	--	629.27	628.03	628.69	628.86
MW5	7.2	6.05	255	643.31	644.75	644.75	644.28	643.76	640.73	640.53	640.61
MW6	8.9	6.15	390	674.81	674.68	674.39	673.92	672.44	672.23	672.36	672.55
MW7	--	--	--	666.37	666.35	666.22	666.09	665.77	665.38	665.34	665.44
MW8	7.8	6.15	130	692.49	692.08	691.04	689.40	688.48	687.29	690.79	691.84

*Data collected 1/28/88.

Source: Ecology and Environment, Inc. 1988.

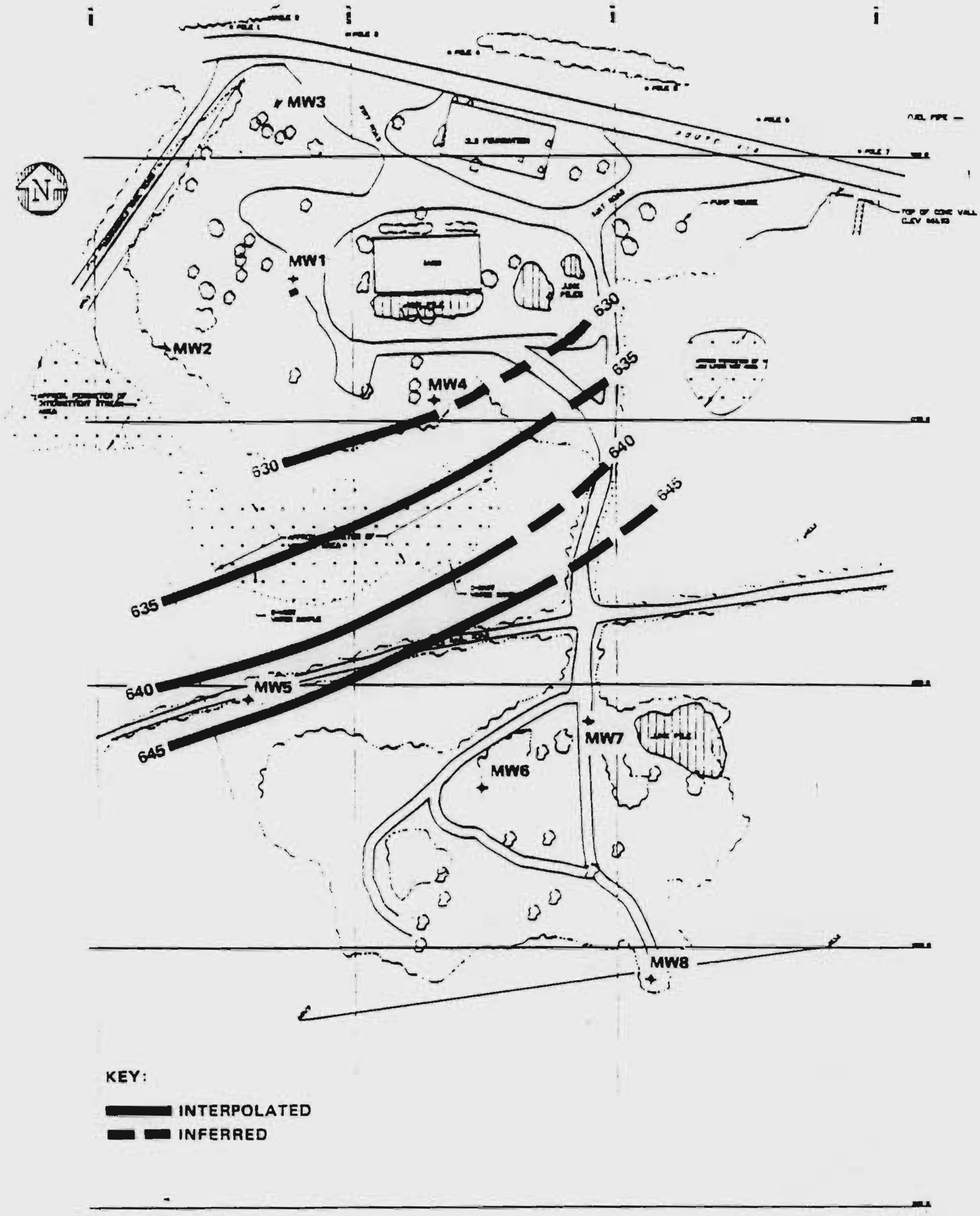


Figure 3–10   MAIN WATER TABLE

aquifer. This value falls within the silty to clean sand range of typical transmissivities. This agrees with the lithology logs which describe the main site aquifer as consisting of graded bedding or mixed sands ranging from silty sand to massive boulders.

The slug tests on other wells indicate that the filled area at MW1 and MW2 has a slower hydraulic conductivity than the main site aquifer (on the order of 10^1 gpd/ft^2 as compared to 10^2 gpd/ft^2). The material encountered in MW1 appears to impede flow more than the fill encountered in MW2 so that the hydraulic conductivity in MW1 is half that in MW2. The water levels in MW1 and MW8 have oscillated as much as 4 feet in the three-month period between December 17 and March 23, whereas the water level in all the other wells has fluctuated by no more than 1.44 feet with an average change of only 0.83 feet. It is possible that both MW1 and MW8 are partially in communication with the unsaturated zone beneath the perched water table of each landfill area in which they are at least partly screened, as was noted above. This could result in an apparent loss of head when recharge from the upper aquifer is not equal to drainage into the lower unsaturated zone.

The hydraulic conductivity calculated in MW3 (40 gpd/ft^2 and which is believed to intersect the main aquifer) from slug test data is much lower than for MW4. The most likely explanation for this is that the hydraulic conductivity of the main site aquifer increases with depth.

The slug tests of near surface hydraulic conductivities in the perched aquifer are, by nature of the technique itself, less accurate than the pump test of MW4. The slug tests do, however, appear to indicate that the perched aquifer in the north of the site is less conductive than the main site aquifer by one order of magnitude (K perched = 8-40 gpd/ft^2).

In summary, the most representative calculations of groundwater flow velocity across the site are those conducted on the pump test data from the deep 4-inch well, MW4, since it transects the entire main aquifer. These data indicate a value of hydraulic conductivity equal to 340 gpd/ft^2 from curve matching. This estimate was generally supported by specific capacity and mass balance calculations (Appendix D). Based on this apparent hydraulic conductivity, the velocity of groundwater in the main aquifer which underlies the north portion of the site is on the order of 0.3 ft/day depending on the gradient about MW4 (.0015 ft/ft) and an assumed porosity of 30%.

3.7 DEMOGRAPHY AND LAND USE

The 1980 census population for the Town of Warrensburg, New York, is 3,810 (Rand McNally 1987). Of this number, approximately 2,400 are connected to the Warrensburg Water District water supply (NYSDOH 1982). Big Brook Reservoir (consisting of two separate reservoirs) and two well fields, all of which are located upgradient to the south and east of the WB&P site, provide the source of water to support this community system. The residence closest to the site (within 100 feet of the site's east boundary) is served by this system, but its service ends at the east boundary of the site. Residences to the west of the site obtain water from wells and surface water sources. The closest residence to the west is the Arnold Preg trailer, approximately 825 feet from the site's boundary. The closest residence to the west from which a sample of the drinking water supply was collected is the Monroe residence, located at a distance of 1,125 feet from the site's boundary.

Land use adjacent to the site included rural residential/commercial developments to the east and west, and forest land to the south. The north is bordered by Route 418, the abandoned WB&P mill facility, and the Schroon River. According to the 1977 Lake Champlain-Lake George Regional Planning Board land use recommendation plan, the WB&P site is considered as a rural area (Galow 1988).

The Town of Warrensburg is in the process of holding public hearings on a proposed land use and zoning plan which will most likely only pertain to the Village of Warrensburg (Smith 1988).

The regulating agency for land use and zoning of the WB&P site is the Adirondack Park Agency (APA). The site is located within an area zoned as low intensity, or a minimum of 3.2 acres/principal structure (a garage or shed being an ancillary structure). In addition, the site is within the Schroon River corridor (a New York State-designated recreational river), which includes 1/4 mile on both sides of the river. The Schroon River is on the Final List of Potential Wild, Scenic, and Recreation Rivers (United States Department of the Interior 1981), and as a result the APA has jurisdiction over land use within the corridor which includes the site.

A future use of the site has been suggested by the Town of Warrensburg. The town has recently expressed an interest in using the site as a location for a municipal sewage treatment facility.

3.8 ECOLOGY

The WB&P site is bordered by natural forest habitat which can support diverse ecological communities native to the Adirondack lower mountain region. A state forest and wildlife management area is located approximately 1 mile to the west of the site (New York State Office of Parks, Recreation, and Historic Preservation [NYSOPRHP] 1983). Onsite disturbances have limited the forest habitat to the site's periphery.

Grasses occur over virtually all of both the north and south landfills and help to protect the soil surface from erosion. The groundcover annuals on the site include goldenrod (Solidago sp.), raspberry (Rubus sp.), wild strawberry (Frageria sp.), clover, plantain (Plantago sp.), and Timothy. Other species growing on the site could not be identified. In addition, the following tree species were observed: white pine (Pinus strobus); paper birch (Betula papyrifera); yellow birch (Betula alleghanensis); red maple (Acer rubrum); quaking aspen (Populus tremuloides); striped maple (Acer pensylvanicum); American beech (Fagus grandifolia); eastern hemlock (Tsuga canadensis); American hornbeam (Carpinus caroliniana); sumac (Rhus sp.) and oak (Quercus sp). These tree species reflect both naturally occurring residential species of the Adirondacks and disturbed, pioneer species. Fauna observed on site are red squirrels, white-tailed deer, and various birds. Mice and mole burrows in the snow were observed at the perimeter of the site, but none were observed on the actual landfill areas. The site does not provide critical habitat for an endangered species nor is it recognized as part of a wildlife refuge (Ecological Analysts, Inc. 1984). Furthermore, two low-lying wet areas which exist on the northern portion of the site (the hollow) do not provide habitat conditions to support typical species diversity commonly associated with a true wetland biota.

Furthermore, observations by E & E and NYSDEC personnel during the investigation and post-investigation activities indicate the site to have a lack of abundance of wildlife (limited sightings and tracks) and suggest that the area is a habitat of limited value. This may, in part, be due to the amount of historical (landfilling) and recent (all-terrain vehicle tracks and target shooting evidence) disturbance on-site and the existence of more preferable habitats (e.g. non-disturbed conditions) adjacent to the west, south, and southeast portions of the site.

4. NATURE AND EXTENT OF CONTAMINATION

4.1 POTENTIAL AREAS OF SOURCE CONTAMINATION

Based on the history of the WB&P site, previous investigations, and data presented in Section 3 of this report, several potential areas of source contamination can be identified. Of primary concern is contamination from the illegal dumping occurrences upon the south landfill western boundary. This action alone has identified this area as a potential source of contamination. In addition, activities associated with the mill produced solid refuse, such as bailing wire, paper, wood, metal, drums, and plastic shredding, which were disposed of into the north and south landfill areas. These types of material were found in trench excavations in both the north and south landfills. Biodegradation of the waste is active as methane gas was detected at various levels during trench excavations. It is also apparent the site has received discarded machine components and abandoned automobiles. In addition, xylene, toluene, formaldehyde, coal ash, and fuel oil were reported as possibly being disposed of on site. During the site investigation, neither xylene or toluene were detected on site; nor was formaldehyde detected during onsite air monitoring surveys. However, during the excavation of Trenches T1 behind the barn, T2 and T9 west of the barn, and Trench Area C southwest of the barn (see Appendix A), a subsurface deposit of ash was found ranging in depth from <1 foot to >6 feet. This suggests the ash apparently rings the perimeter of the filled pond of the north landfill area. Also observed in these trenches was a thin layer of a tar-like substance ranging from 1 inch to 5 inches in thickness, possibly due to the disposal of fuel oils. As such, both landfill areas are considered potential areas of contamination for which various soil, surface water, and groundwater samples were collected, the results of which are discussed in Section 4.2.

The location of Trench T1 (see Figures 4-1 [back pocket] and 1-2) coincides with the area of black-stained soil (a potential area of source contamination resulting from the depositing of fuel oil in the landfill during the mill's operation). From this area, a sample of the tar-like material as well as a subsurface soil sample were collected as identified in Section 4.2.1 as "tar-like" and "Cataug 3," respectively. Additional subsurface soil samples were collected from Trenches T2 and Area C (north of the hollow), identified in Section 4.2.1 as "Auger 4" and "Cataug 2," respectively. From Trench T9, a sample of the ash was collected and identified as "ash" (Cataug 9) in Section 4.2.1. For comparison of the tar-like substance found on site to fuel oil used at the mill, a sample of liquid material from the mill's fuel storage building was collected (identified as "mill tank sample").

As a low-lying area, the hollow is hydraulically connected to both surface water and groundwater site features (see Sections 3.3 and 3.6). This area, which also has discarded material (i.e., machine components, automobiles, and drums), was sampled in 1979 by NYSDEC; the results showed a low concentration of PCBs (3.0 μg/g [ppm]). For this investigation, Auger 1 was collected to characterize surface and subsurface soil quality and two surface water samples were collected, identified as site surface water Area C west and Area C east in Section 4.2.2. As described in Section 3.3, the hollow fills toward the west along a course which has been referred to as the intermittent stream area. A sediment sample and duplicate were collected from this intermittent stream area (see Section 4.2.1) to determine the extent of contaminant migration into this area. The Area C east surface water sample and a duplicate were collected from the pool created by the spring which discharges from the hillside below the abandoned railroad bed. This pool has been previously described as containing leachate as identified by an observed orange coloration (Ecological Analysts 1984). As part of this investigation, a water sample from this area was microscopically examined, which indicated the presence of iron-producing bacteria. Based on morphological characteristics as described by Bergey in Manual of Determinative Bacteriology (1974), the bacteria are members of the sheathes Sphaerotilus-Leptothrix group. In this respect, a thin filament is comprised of a series of cells coming out of their sheath and resemble Leptothrix sp. These bacteria have the ability to remove iron from solution by precipitating insoluble ferric hydroxide outside their cells. In addition, the bacteria also excrete extracellular polysaccharides onto which ferric hydroxide accumulates and becomes impregnated and encrusted, resulting in a reddish/orange color, as is observed on the WB&P site.

The environmental conditions most conducive to iron bacteria growth of this nature include shallow conditions (less than 400 feet), water temperature of about 10°C, dissolved ferrous iron concentrations greater than 0.25 milligrams per liter (mg/L), a pH range between 6 and 8, dissolved oxygen levels around 1.0 to 3.0 mg/L, and a conductance range of 300 to 700 micromhos/centimeter (µmhos/cm). These conditions are in keeping with those found at this location. From September 1987 to April 1988, no other wet area on site, including the separated western portion of the hollow area (the intermittent stream area), contained such bacteria.

At the south landfill area, the geophysical surveys noted two locations of high magnetometer deflections (see Appendix C), one in the east-central area and the second in the south-central area. The first anomaly was confirmed by Trench TP36 to be a thick layer (6 feet) of decomposing waste thought to be from the mill operation (in combination with possible natural interferences (see Section 3.4.1); whereas the second area is suspected of being a location of buried metal drums, possibly cans, as suggested by the small circular surface depressions observed (see Section 3.1). Air monitoring along the latter area did not identify the presence of volatile organic gases. However, direct monitoring within a small subsurface cavity showed the air space to be void of oxygen indicating a possible ongoing decaying process. No trenching was performed at this location.

To investigate the illegal dumping, Trenches TP86, TP86A, TP87, and TP78 were constructed. This area also coincides with the orange-stained soil which appears to originate at the southwest area of the southern landfill (see Figure 1-2). NYSDEC collected a surface water sample from this area in 1979 (at the approximate location of Trench TP86A) and a soil sample from the orange-stained soil which showed 0.03 µg/g [ppm] of PCBs, as well as an additional soil sample in 1983 which showed high metal concentrations and low concentrations of several organic compounds (see Section 1.2.3). As part of this investigation, subsurface samples were collected from trenches TP86A, TP87, and TP78, which are identified as Cataug 5, 6, and 7, respectively, in Section 4.2.1. In addition, a surface soil sample of the orange-stained soil was also collected for analysis.

The analytical results for the samples collected from the potential sources of contamination as well as other soil and water samples collected to characterize and identify contaminant migration pathways are presented in Section 4.2.

4.2 ANALYTICAL RESULTS

During this investigation, chemical components from site and offsite solids and liquid samples were identified and are listed in Appendix E. For this section, data for each medium were directly compared to background levels and acceptable ranges (when available) of trace chemical element concentrations as recorded by EPA and NYSDEC, as applicable.

As part of field and laboratory quality assurance, trip and method blanks were analyzed to assess possible field and laboratory contamination. Common field decontamination and laboratory solvents, such as acetone, methylene chloride, and chloroform, and common phthalate esters from the handling of samples with disposable gloves were identified in some field and method blanks and reported. The presence of these compounds does not affect data quality, but the analyte detected in the sample at a comparable level to that found in the blank is not regarded as indicative of sample contamination. Only those specific data which are thought to represent environmental contaminants and/or pollutants are discussed in the following subsections.

4.2.1 Soils, Sediments, and Selected Site Solids

Ten site soil samples were collected to characterize site conditions and are identified as auger, cataug, and "orange stain" samples on Figure 4-1 (see back pocket) and Table 4-1. The auger designation signifies samples collected using a two-man gas-powered auger. The cataug designation signifies samples collected during trench excavations

Table 4-1

CONCENTRATIONS OF PRIORITY POLLUTANT COMPOUNDS
DETECTED IN SITE SOILS, SELECTED SOLIDS, AND SEDIMENTS

	Site Soils											Selected Solids			Sediments				Common Range
	Auger 1	Catalog 2	Catalog 3	Auger 4	Catalog 5	Catalog 6	Catalog 7	Catalog 8	Catalog 10	Orange Stain	Back-ground	Mill Tank	Tar-Like Sub-stance	Ash (Catalog 9)	Int. Stream	Int. Stream Dup.	Schroon River Upstream	Schroon River Downstream	Common Range USGS, Eastern USA*
Inorganics (mg/kg)																			
Arsenic	5.18	--	--	--	--	--	--	--	--	--	--	--	--	--	20.8	20.7	--	--	<0.1-73
Chromium	12.8	9.67	8.16	6.99	4.98	3.87	7.40	5.37	3.64	3.86	7.04	--	6.38	4.36	6.6	6.37	3.08	2.84	1-1,000
Copper	109	203	46.5	22	10.8	--	--	--	--	3.02	3.24	--	3.33	57.6	110	89.8	--	--	<1-700
Lead	39.7	189	106	32.5	8.12	--	2.41	--	--	3.34	15.9	--	7.63	20	836	6.23	4.92	6.12	<10-300
Mercury	--	0.68	--	0.43	--	--	--	--	--	--	0.46	--	--	--	0.33	0.39	--	--	0.01-3.4
Nickel	28.5	12.8	10.4	6.02	5.24	--	3.7	5.56	--	4.12	4.21	--	8.66	7.06	45.1	37.7	--	--	<5-700
Selenium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.18	5.70	--	--	<0.1-3.9
Zinc	667	228	170	89.1	42.8	2.23	26.8	16.5	2.23	53.9	99.7	6.07	27.8	25.8	636	607.0	20.4	16.8	<5-2,900
Iron	30,200	16,800	14,900	11,000	11,800	8,960	9,940	8,860	8,100	27,900	17,600	186	11,300	7,770	[illegible],600	27,300	4,780	5,010	0.01->10%
Pesticides and PCBs (ug/kg)																			
1254	--	--	--	300	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Volatile Organic Compounds (ug/kg)																			
Methylene chloride	--	10B	12B	11B	10B	12B	11B	14B	10B	38BJ	8B	75B	8B	7B	7BJ	60B	15B	15B	
Acetone	960B	--	--	--	--	--	--	17B	--	40B	30T	220B	--	31B	1,200ET	34,000ET	8BJ	--	
Carbon disulfide	--	--	--	--	--	--	--	--	--	--	18B	--	--	--	--	110B	--	--	
2-Butanone	200B	10BJ	--	12B	--	13B	--	11BJ	--	--	--	46BJ	15B	21B	--	--	15B	28B	
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	7	--	--	--	--	--	
Total xylenes	--	--	--	--	--	--	--	--	--	--	--	2,600	--	--	--	--	--	--	
Toluene	--	--	--	--	--	--	--	--	--	--	--	570	--	--	--	--	--	--	
Ethylbenzene	--	--	--	--	--	--	--	--	--	--	--	830	--	--	--	--	--	--	
Base/Neutral Compounds (ug/kg)																			
Naphthalene	--	--	62J	--	--	--	--	--	--	--	--	11,000J	--	--	--	--	--	--	
Fluorene	--	--	--	--	--	--	--	--	--	--	--	14,000J	--	--	--	--	--	--	
Acenaphthene	--	--	220J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Diethylphthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<150BJ	--	
Phenanthrene	5,200	--	2,400	--	--	--	--	--	--	--	--	55,000J	--	--	460J	490J	--	--	
Anthracene	--	--	210J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Di-n-butyl phthalate	1,400BJ	380B	560BJ	340BJ	310BJ	240BJ	220BJ	260BJ	220BJ	340BJ	830B	--	--	310BJ	920	1,100B	189BJ	70BJ	
Fluoranthene	--	--	430J	--	--	--	--	--	--	--	--	--	--	--	530J	820J	--	--	
Pyrene	--	--	470J	--	44J	--	--	--	--	--	--	12,000J	--	--	490J	520J	--	--	
Butyl benzyl phthalate	--	--	--	--	180J	--	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200J	--	--	
Bis(2-ethylhexyl) phthalate	--	220BJ	430BJ	11,000	--	--	150BJ	--	84BJ	300BJ	1,800B	--	890BJ	140BJ	[illegible],600	2,700B	147BJ	530B	
Chrysene	--	--	690J	--	--	--	--	--	--	--	--	--	1,900J	--	--	380J	--	--	
Di-n-octyl phthalate	--	--	--	--	--	--	--	310J	--	--	200BJ	--	--	--	--	160TJ	--	--	
Benzo(b)fluoranthene	--	--	270J	--	60J	--	--	--	--	--	--	--	--	--	--	550J	--	--	
Benzo(a)pyrene	980J	--	260J	--	--	--	--	--	--	--	--	--	1,100J	--	--	240J	--	--	
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200J	--	--	
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--	--	--	690J	--	--	190J	--	--	
2-Methylnaphthalene	--	--	660J	--	--	--	--	--	--	--	--	65,000J	--	--	84J	--	--	--	

* H. Shacklette and J. Boerngen, U.S. Geological Survey Professional Paper 1270, Table 2 (geometric means), 1984.
B Denotes analyte found in laboratory method blank as well as in the sample; result should be disregarded.
E Denotes an approximate concentration which exceeds the calibration range.
T Denotes analyte found in field trip blank as well as in the sample; result should be disregarded.
J Denotes level of presence of the compound that meets the identification criteria but the result is estimated at a concentration less than the specified detection limit though greater than zero.
-- Denotes compound was tested for but not detected.

which allowed a subsurface soil sample to be composited from material exposed by the backhoe unit (see Table 2-1). The orange stain designation signifies a sample collected from a portion of the soil stained orange in the south landfill. The background sample represents offsite surface soil conditions. This sample labeled as background was a surface soil sample collected about 145 feet upgradient of the site from the top 6 inches of soil (see Figure 4-1). In addition, to characterize upgradient subsoil conditions, the sample labeled Cataug 8 was collected as a composite sample of the soil encountered in a backhoe trench at the site of the upgradient monitoring well, MW-8. The selected solids represent three material types identified with the site. The mill tank sample was collected from the offsite fuel storage tank associated with the mill's operation. The intent of this sample was for comparative purposes to identify fuel material deposited on site during the mill's operation (see Section 1.2.2). The tar-like substance and ash (Cataug 9) samples were collected to characterize these materials found during trench excavations of T1 and T9, respectively.

Four sediment samples were collected from the intermittent stream area and the Schroon River. The intermittent stream area is characterized by a sample and duplicate sample taken for QC purposes. The Schroon River sediment samples were collected from locations approximately 300 feet upstream and approximately 1,850 feet downstream of the WB&P mill dam along the south bank of the Schroon River. These locations are respectively upstream and downstream of the WB&P site.

The analytical results for all of these samples are presented in Table 4-1 and Figure 4-1. These results are discussed below by sample type (i.e., site soil, selected solids, etc.) with respect to inorganic and organic analytes identified. In addition, several samples exhibited gas chromatograph peaks which allowed for the tentative identification of compounds other than those specifically identified by the analytical protocol. The qualification (determined by statistical curve matching) and quantification (from area under the curve) of these tentatively identified compounds must be viewed with caution, although examination of such data can provide some insight toward identification of a contaminant source and sample characterization. However, contaminant interpretation is based primarily on the analytical results for the specific compounds given in Table 4-1 and the knowledge of the environmental conditions under which the samples were collected.

4.2.1.1 Inorganics

Site Soils

Metal concentrations found in the site soil samples exceed those detected in the soil background sample and the upgradient subsurface sample Cataug 8. The values above background/upgradient level occur in Auger 1--arsenic (found only in Auger 1), chromium, copper, lead, nickel, zinc, and iron; Cataug 2--mercury; Cataug 2 and Cataug 3--chromium, copper, lead, nickel, and zinc; Auger 4--copper, lead, and nickel; Cataug 5--copper and nickel; Cataug 7--chromium; and orange stain--iron. Cataug 8 had nickel levels above the background sample but this is representative of upgradient conditions. Although these metals were found at concentrations above the background/upgradient sample levels, no value exceeded the common range for metals in soils as observed in the eastern United States by the U.S. Geological Survey (USGS 1984). In addition, none of the metal concentrations found in the background sample exceeded the maximum of the normal range concentrations in soils in the eastern United States.

Selected Solids

Several concentrations of metals found in the tar-like and ash samples were greater than those found in the soil background sample. These metals included copper and nickel in the tar-like sample; and copper, lead, and nickel in the ash sample.

Sediments

Intermittent stream and intermittent stream duplicate sample concentrations for arsenic, copper, nickel, zinc, and iron all exceed background values. In addition, lead concentrations for the intermittent stream sample are also above background levels and common range for the eastern United States. The selenium concentrations for both the intermittent stream and the duplicate sample are also above both the background and common values for the eastern United States.

4.2.1.2 Pesticides and PCBs; Volatile Organic Compounds; Base/Neutral and Acid Extractable Compounds

Site Soils

Pesticides and PCBs were not recorded in any samples except in Auger 4 which contained 360 micrograms/kilogram (μg/kg) (0.360 ppm) of PCB-1254. Trace levels of volatile organic compounds such as methylene chloride, acetone, and 2-butanone have been identified in many soil samples and attributed to bottle or laboratory contamination.

Tentatively identified volatile organic compounds were detected in Auger samples 1 and 4 and Cataug samples 2, 3, 7, and 8. In Auger sample 4 and Cataug samples 2, 7, and 8 only hexane was tentatively identified. This is attributed to onsite decontamination procedures (see Section 2.5). In addition to hexane, Cataug 3 also contained four unidentifiable compounds, ranging in estimated concentrations from 4 to 77 μg/kg. No hexane was detected in Auger 1. Propylbenzene isomer (740 μg/kg), benzene (3,900 μg/kg), an unknown (370 μg/kg), and three unknown hydrocarbons (790 to 6,400 μg/kg) were observed in Auger 1.

As explained above, field and laboratory phthalate contamination has resulted in di-n-butyl phthalate being detected in all site soils samples, and bis (2-ethylhexyl) phthalate compounds being detected in most site soil samples. The exceptions are 180 μg/kg of butyl benzyl phthalate in Cataug 5; 11,000 μg/kg of bis (2-ethylhexyl) phthalate in Auger 4; and 310 μg/kg of di-n-octyl phthalate in Cataug 8. No contamination was detected for butyl benzyl phthalate and di-n-octyl phthalate in field or laboratory blanks in Cataug 5 and 8 samples. Moreover, of the 11,000 μg/kg of bis (2-ethylhexyl) phthalate in Auger 4, only 60 μg/kg was found in the method blank. These results imply that the contamination in the samples is actually present.

The remaining base/neutral compounds, primarily PAHs, identified in the site soil samples include 62 μg/kg of naphthalene, 660 μg/kg of 2-methylnaphthalene, and 220 μg/kg of acenaphthene in Cataug 3; 5,200 μg/kg and 2,400 μg/kg of phenanthrene in Auger 1 and Cataug 3, respectively; 210 μg/kg of anthracene and 430 μg/kg of fluoranthene in Cataug 3; 470 μg/kg and 44 μg/kg of pyrene in Cataug 3 and Cataug 5, respectively; 690 μg/kg of chrysene in Cataug 3; 270 μg/kg and 60 μg/kg of benzo(b)fluoranthene in Cataug 3 and Cataug 5, respectively; and 980 µg/kg and 260 µg/kg of benzo(a)pyrene in Auger 1 and Cataug 3, respectively. These PAH compounds were not detected in the background sample.

Tentatively identified base/neutral and acid extractable compounds were present in all site soil samples except the "orange stain." A single unidentified hydrocarbon compound was present in Cataug samples 6, 7, and 8, as well as in the laboratory blank. This compound was also present in Cataug samples 2, 5, and 10 and Auger sample 4. In Auger sample 4, an additional unknown compound (possibly an amide) was identified at an estimated concentration of 650 µg/kg. This compound was also detected in Cataug 2 (1,400 µg/kg) and Cataug 10 (1,100 µg/kg). Cataug 10 also contained a single unidentified hydrocarbon compound at an estimated concentration of 370 µg/kg. Cataug 2 contained an additional four unidentified hydrocarbon compounds (210 to 2,600 µg/kg) and one unidentified phthalate compound (290 µg/kg). In Auger sample 1 and Cataug samples 3 and 5, various types of tentatively identified compounds were observed. Auger 1 contained two unknowns (14,000 to 47,000 µg/kg), twelve unknown hydrocarbons (8,700 to 53,000 µg/kg), five naphthalene isomers (6,300 to 18,000 µg/kg), and tetramethyl phenanthrene (150,000 µg/kg). Cataug 3 contained 7-methylhexadecane (22,000 µg/kg) and 19 unknown hydrocarbon compounds (720 to 19,000 µg/kg). Cataug 5 contained two unknowns (440 to 2,300 µg/kg), two unknown nitrogen compounds (410 to 890 µg/kg), and an additional 16 unknown hydrocarbon compounds (360 to 8,800 µg/kg).

Selected Solids

As observed for the site soil samples, several selected site solid samples thought to represent wastes disposed of on site were identified as containing traces of methylene chloride, acetone, and 2-butanone but these are attributable to container and laboratory contamination.

The mill tank sample was found to contain 2,600 µg/kg of total xylenes, 570 µg/kg of toluene, and 830 µg/kg of ethylbenzene. Seven µg/kg of 1,1,1-trichloroethane was found in the tar-like sample. None of these compounds were identified in the background sample. Tentatively identified volatile organic compounds were also present in the mill tank and tar-like samples. The mill tank contained various unknown hydrocarbons (220 to 500 µg/kg) and cyclohexane isomer compounds (65 to 830 µg/kg), whereas the tar-like samples contained hexane in addition to these unknown compounds (6 to 47 µg/kg). These unknown compounds exhibited retention times and estimated concentrations which agree closely with the unknown volatile organic compounds observed in Cataug sample 3.

Di-n-butyl phthalate was detected in the ash samples, and bis(2-ethylhexyl)phthalate was detected in both the tar-like and ash samples. The presence of these compounds is attributable to field and laboratory contamination.

Other base/neutral compounds (PAHs) identified in the selected solid samples include 11,000 µg/kg of napthalene, 14,000 µg/kg of fluorene, 55,000 µg/kg of phenanthrene, 12,000 µg/kg of pyrene, and 65,000 µg/kg of 2-methylnaphthalene in the mill tank sample. In addition, 1,900 µg/kg of chrysene, 1,100 µg/kg of benzo(a)pyrene, and 690 µg/kg of benzo(ghi)perylene were present in the tar-like sample. None of these compounds were detected in the background sample.

Tentatively identified base/neutral and acid extractable compounds were present in the mill tank and tar-like samples. In addition, the unidentified hydrocarbon compound previously dismissed as attributable to laboratory contamination associated with the site soil samples was also present in the ash sample. However, the mill tank contained 16 unknown hydrocarbons (160,000 to 590,000 µg/kg) and four structurally different decane compounds (190,000 to 340,000 µg/kg). The tar-like sample contained decosane (24,000 µg/kg), two unknown compounds (7,500 to 20,500 µg/kg), two substituted aromatic hydrocarbons (9,000 and 10,000 µg/kg), and 16 unknown hydrocarbons (2,950 to 49,500 µg/kg).

Sediments

All of the sediment samples analyzed contained traces of methylene chloride, several contained traces of acetone, and both Schroon River samples were identified as containing traces of 2-butanone. These concentrations are all attributable to field and laboratory contamination. Traces of carbon disulfide were found in the intermittent stream duplicate and are due to laboratory contamination. Low levels of various phthalate compounds were detected in the sediment samples. The presence of some of these compounds is attributable to field and laboratory contamination. The exceptions are 920 µg/kg of di-n-butyl phthalate and 2,000 µg/kg of bis(2-ethyl hexyl)phthalate found in the intermittent stream sample.

Other base/neutral compounds found in both the intermittent stream and intermittent stream duplicate samples, respectively, are the following: 460 µg/kg and 490 µg/kg of phenanthrene; 530 µg/kg and 820 µg/kg of fluoranthene; and 490 µg/kg and 520 µg/kg of pyrene. There was 84 µg/kg of 2-methylnaphthalene in the intermittent stream sample. In addition, there were the following compounds identified in the intermittent stream duplicate sample: 200 µg/kg of benzo(a)anthracene; 380 µg/kg of chrysene; 550 µg/kg of benzo(b)fluoranthene; 240 µg/kg of benzo(a)pyrene; 200 µg/kg of indeno(1,2,3-cd)pyrene; and 190 µg/kg of benzo(ghi)perylene. None of these compounds were detected in the background sample.

4.2.2 Site Monitoring Wells, Site Surface Water, and Background

Seven onsite groundwater monitoring wells were installed to determine the presence and migration of contaminants associated with the WB&P site. The locations of these wells are illustrated on Figure 4-2 (see back pocket). These wells were constructed as discussed in Section 2.3.5 and intercept aquifer media described in Section 3.6. In addition, three site surface water samples identified as Area C east, Area C east duplicate, and Area C west were collected from standing water found in the hollow area, as discussed in Section 4.1. To provide information on upgradient conditions, MW8 was installed in a similar manner to the seven onsite monitoring wells. In addition, the collection of upstream and downstream surface water samples from the Schroon River provided information on offsite conditions. These samples were collected from the same locations as the Schroon River sediment samples (described in Section 4.2.1) approximately 300 feet upstream and approximately 1,850 feet downstream of the WB&P's dam.

The analytical results for these samples are discussed below using a format similar to the soil sample discussion (i.e., by sample type and analyte, as identified in Section 2.3.4). Discussions of the tentatively identified compounds are also provided below. All analytical results are presented in Table 4-2 and also Figure 4-2.

4.2.2.1 Inorganics

Site Monitoring Wells

Various metals, nitrate-nitrogen, and chloride were found to be at higher concentrations than those detected in the upgradient well MW8. These higher concentrations include nitrate-nitrogen in MW1 and MW2; chromium, nickel, zinc, chloride, and nitrate-nitrogen in MW3; chloride in MW4; chromium, magnesium, nickel, zinc, and nitrate-nitrogen in MW5; all parameters except manganese, mercury, and total cyanide in MW6; and cadmium and manganese in MW7.

The following metals were found in concentrations which exceed NYSDEC drinking water standards: cadmium (MW7); chromium (MW3, 5, and 6); iron (all wells, including the upgradient well MW8); lead (MW6 and MW8); and manganese (MW7). Only chromium (in MW6 and the background well) and lead (in all samples), exceeded proposed EPA maximum contaminant level goals.

Site Surface Water

Observable site surface water was limited to the hollow area from which three samples were collected, Area C west, Area C east, and Area C east duplicate. Most inorganic concentrations found in the Area C west sample are much greater than those in Area C east, Area C east duplicate, Schroon River upstream and Schroon River downstream samples. For Area C west, cadmium, iron, and lead exceeded NYSDEC and EPA drinking water standards. In the Area C east sample, only iron exceeded NYSDEC and USEPA drinking water standards. None of the Area C east duplicate inorganic concentrations exceeded either the NYSDEC or USEPA drinking water standards.

In comparison to the EPA water quality criteria, cadmium, iron, lead, mercury, and nickel in the Area C west sample and iron in the Area C east and Area C east duplicate samples exceeded the criteria levels. In the Area C west and Area C east samples, lead exceeded the proposed EPA maximum contaminant goal. In addition, cadmium exceeded the proposed maximum contaminant goal for Area C west.

Table 4-2

CONCENTRATIONS OF PRIORITY POLLUTANT COMPOUNDS DETECTED IN SITE GROUNDWATER AND SURFACE WATERS

	Site Monitoring Wells*									Site Surface Water			Schroon River		Applicable Water Quality Standards and Criteria				
															Drinking Water Standards (ARARs)		USEPA Proposed Maximum Contaminant Level Goal[3]	USEPA Ambient Water Quality Criteria[4]	NYSDEC Ambient Water Quality Guidance Values[5]
	MW1	MW2	MW2 Dup.	MW3	MW4	MW5	MW6	MW7	MW8	Area C West	Area C East	Area C East Dup.	Schroon River Upstream	Schroon River Downstream	NYSDEC[1]	USEPA[2]			
Inorganics (mg/L)																			
Arsenic	--	--	--	--	--	--	0.015	--	0.012	--	--	--	--	--	.025	0.05	0.05P	0.002	--
Barium	0.[illegible]49	0.0[illegible]	.07	0.245	0.011	0.297	0.873	0.034	0.375	0.184	--	--	--	--	1	1	1.5	1.0	--
Beryllium	--	--	--	0.002	--	0.004	0.007	--	0.004	--	--	--	--	--	--	--	--	0.007	0.003
Cadmium	--	--	--	--	--	--	0.008	0.023	--	0.012	--	--	--	--	0.01	0.01	0.005P	0.001	--
Chromium	0.014	--	--	0.065	--	0.095	0.209	0.024	0.046	0.021	--	--	--	--	0.05	0.05	0.12	0.05	--
Copper	0.016	--	--	0.05	--	0.062	0.193	0.14	0.064	0.697	--	--	--	--	1.0	1.3P	1.3P	1	--
Iron	10.5	77.6	77.9	77.1	1.58	124	270	43.9	129	58.6	1.05	0.981	0.16	0.14	0.3	0.3S	--	0.3	--
Lead	0.006	--	0.006	0.018	--	0.016	0.064	--	0.031	0.584	0.006	--	--	--	.025	0.05†	0.00P	0.05	--
Magnesium	4.97	9.83	10.0	17.8	3.51	19.7	35.1	4.3	18.1	2.29	2.26	2.2	1.32	1.32	--	--	--	--	35
Manganese	--	--	--	--	--	--	--	1.45	--	--	--	--	--	--	0.3	0.05S	--	0.05	--
Mercury	--	--	--	--	--	--	--	--	--	0.0004	--	--	--	--	0.002	0.002	0.003P	0.0002	--
Nickel	--	--	--	0.047	--	0.066	0.259	0.016	0.044	0.152	--	--	--	--	--	--	--	0.013	--
Zinc	0.198	0.109	0.041	0.355	0.02	0.36	0.814	0.019	0.348	1.82	0.152	0.017	--	--	5	5S	--	5.0	--
Chloride	0.9	1.7	2.6	9.6	5.4	0.9	2.6	--	1.7	0.9	0.9	0.9	0.9	7.9	250	250	--	--	--
Nitrate-Nitrogen	2.7	2.1	2.1	2.2	1.1	2.1	2.1	0.45	1.9	2.8	1.8	1.8	0.8	2	10	10	10	10.0	--
Total cyanide	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2	--	--	0.2	--
Pesticides and PCBs (ug/L)																			
Methoxychlor	--	--	--	--	--	--	--	--	1.1	--	--	--	--	--	35	100	[illegible]	100	--
Volatile Organic Compounds (ug/L)																			
Methylene chloride	4BJ	4BJ	4BJ	4BJ	1BJ	4BJ	4BJ	2BJ	3BJ	7B	8B	8B	7B	5B	--	--	--	--	50
Acetone	17B	21B	27B	34B	14B	19B	47B	17B	22B	22B	15B	15B	22B	9BJ	--	--	--	--	--
Chloroform	--	--	--	1J	1BJ	--	--	--	--	--	--	--	--	--	100	100	--	0.19	--
2-Butanone	13B	14B	11B	17B	3BJ	12B	18B	--	14B	25B	26B	20B	17B	14B	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	4BJ	--	--	--	--	--	--	--	--	--	--	200	200	0.6	50
Toluene	--	--	--	--	--	--	--	--	--	--	--	--	2BJ	2BJ	--	--	2,000P	14,300	50
Base/Neutral Compounds (ug/L)																			
Naphthalene	--	--	--	1J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10
Fluorene	--	--	--	2J	--	--	--	--	--	--	--	--	--	--	--	--	--	2×10^{-5}	50
Di-n-butyl phthalate	--	--	--	--	4BJ	5BJ	--	4BJ	--	18B	5BJ	6BJ	4BJ	5BJ	770	--	--	34,000	--
Bis(2-ethylhexyl phthalate)	11T	9TJ	--	11T	9BJ	6TJ	5TJ	33T	8TJ	--	--	--	3BJ	4BJ	4,200	--	--	15,000	--
Di-n-octyl phthalate	--	--	--	71T	--	11T	28T	--	30T	150B	110B	190B	--	2BJ	--	--	--	--	50
Benzoic acid	--	--	--	--	--	--	--	--	--	33J	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	--	--	--	3B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acid Extractable Compounds (ug/L)																			
4-Methylphenol	--	--	--	--	--	--	--	--	--	3J	--	--	--	--	--	--	--	--	--

1 For Class GA groundwater -- NYSDEC Class GA Quality for Groundwater, New York State Codes, Rules and Regulations, Title 6, Chapter X, Part 703.5.
2 U.S. Environmental Protection Agency, National Primary and Secondary Drinking Water Regulations, 40 CFR 142 and 143.
3 U.S. Environmental Protection Agency, Superfund Public Health Evaluation Manual, EPA/540/1-86/060.
4 U.S. Environmental Protection Agency, Quality Criterion for Water (Protection of Human Health Through Water and Fish Ingestion), 1986, EPA/440/5-86-001.
5 For Class GA groundwater--NYSDEC, 1987, Ambient Water Quality Standards and Guidance Values, Division of Water, Technical and Operational Guidance Series (1.1.1).
B Denotes analyte found in laboratory method blank as well as in the sample; result should be disregarded.
T Denotes analyte found in field trip blank as well as in the sample; result should be disregarded.
P Proposed value.
S Secondary standard based on organoleptic properties (taste, odor, color).
† 0.005 mg/l has recently been proposed as the drinking water standard for lead.
J Denotes level of presence of the compound that meets the identification criteria but the result is estimated at a concentration less than the specific detection limit though greater than zero.

Schroon River

None of the Schroon River upstream or downstream inorganic concentrations exceeded the NYSDEC or USEPA drinking water standards or the USEPA water quality criteria standards.

4.2.2.2 Pesticides and PCBs; Volatile Organic Compounds; Base/Neutral and Acid Extractable Compounds

Site Monitoring Wells

With the exception of 1 µg/L of chloroform found in MW3 all concentrations of methylene chloride, acetone, 2-butanone, and 1,1,1-trichloroethane detected in the samples are attributable to laboratory blank contamination. This concentration of chloroform is well below NYSDEC drinking water standard, but it exceeds USEPA water quality criteria.

All of the phthalate compounds detected also are attributable to field or laboratory blank contamination. Other base/neutral compounds (PAHs) were detected only in MW3 (naphthalene, 2-methyl-naphthalene, and fluorene). None of these compounds were found in the upgradient well.

Tentatively identified compounds were present in several of the monitoring wells, the majority of compounds being found in MW3 and MW7. In MW1, 2, 3, 5, and 8, a common unidentified oxygenated hydrocarbon was present at similar low concentrations (51 µg/L). In MW3 the following compounds were found: two ethylbenzene isomers (9 and 13 µg/L), seven naphthalene compounds (13 to 44 µg/L), undecane (9 µg/L), 1,1'-biphenyls (15 µg/L), an unknown aromatic hydrocarbon (15 µg/L), and tetradecane (6 µg/L). In MW7, an unknown volatile organic compound (18 µg/L) was present in addition to four unknown base/neutral compounds (14 to 74 µg/L).

Site Surface Water

The detectable volatile organic compounds and phthalate compounds found in sample Area C east, Area C east duplicate, and Area C west are attributable to laboratory blank contamination with the exception of 80 µg/L of methylene chloride in the Area C east duplicate sample.

There was one base/neutral compound which was detectable; 33 µg/L of benzoic acid was identified in the Area C west sample. In addition, 3 µg/L of 4-methylphenol, an acid extractable compound, was identified in the Area C west sample. The NYSDEC guidance value for methylene chloride was exceeded in the Area C east duplicate sample. However, none of the USEPA or NYSDEC drinking water standards or the USEPA water quality criteria values were exceeded.

4.2.3 Adjacent Residence Drinking Water Sources

Concentrations of metals, chloride, and nitrate-nitrogen detected in samples from four adjacent (downgradient) residences which use groundwater and surface water as a primary drinking source were found to be well below the drinking water standards. The pH values in the Brown, Dingman, and Monroe water sources are slightly below the drinking water standard range, indicating slightly acidic conditions.

With the exception of 3 µg/L of di-n-butyl phthalate in the Monroe sample, which is well below NYSDEC standards, all volatile organic and base/neutral compounds detected are attributable to laboratory blank contamination.

A summary of the compounds detected are presented in Table 4-3. These results agree well with historical data collected by the New York State Department of Health contained in Appendix F. In this appendix, a location map is provided to show the relative distances of the residences from the WB&P site.

Table 4-3

CONCENTRATIONS OF PRIORITY POLLUTANT COMPOUNDS DETECTED IN ADJACENT DOWNGRADIENT RESIDENCES' DRINKING WATER WELLS

	Residence					Drinking Water Standards	
	Durni	Durni Dup.	Brown	Dingman	Monroe	NYSDEC[1]	USEPA[2]
Inorganics (mg/L)							
Copper	0.030	0.047	--	0.038	--	1	1
Magnesium	1.37	1.34	1.08	1.41	0.75	--	--
Iron	--	0.064	0.119	0.042	--	0.3	0.3
Zinc	--	--	0.017	0.011	--	5	5
Volatile Organic Compounds (ug/L)							
Methylene chloride	13B	13B	13B	4BJ	12B	--	--
Acetone	14B	22B	14B	9BJ	11B	--	--
2-Butanone	12B	14B	14B	14B	16B	--	--
Toluene	2BJ	2BJ	2BJ	--	2BJ	--	--
Base/Neutral Compounds (ug/L)							
Di-n-butyl phthalate	3BJ	3BJ	3BJ	3BJ	3J	770	--
Bis (2-ethylhexyl) phthalate	--	3BJ	--	--	--	--	--
Di-n-octyl phthalate	--	4BJ	--	--	4BJ	--	--
Well Water Characteristics							
Conductivity (uhmos/cm)	92	92	60	58	38	--	--
Temperature (°F)	50	50	51	51	50	--	--
pH	6.6	6.6	6.3	5.9	5.6	6.5-8.5	6.5-8.5

B Denotes analyte found in laboratory method blank as well as in the sample; result should be disregarded.
1 NYSDEC Class GA Quality for Groundwater, New York State Codes, Rules and Regulation, Title 6, Chapter X, Part 703.5.
2 U.S. Environmental Protection Agency, National Primary and Secondary Drinking Water Regulations, 40 CFR 142 and 143.
J Denotes level of presence of the compound that meets the identification criteria but the result is estimated at a concentration less than the specified detection limit though greater than zero.
-- Denotes compound was tested for but not detected.

5. CONTAMINANT FATE AND TRANSPORT

5.1 POTENTIAL ROUTES OF MIGRATION

Field work at the site took place from September 1987 through April 1988 in generally seasonal weather. During this period, no runoff channels were observed on site and ponding was limited to two restricted patches in the hollow. Previous reports and associated field observations support the existence of active surface water movement and ponding (see Section 1.2.3). But onsite surface water movement (e.g., the intermittent stream) apparently occurs only during wet periods (see Section 3.3) and, in any case, sinks back into groundwater before leaving the site.

The movement of groundwater was estimated by measuring groundwater elevation in the eight monitoring wells, and by the elevation of a spring, as discussed in Section 3.6.

Since wastes at this site were disposed of at the surface or at shallow depths generally above the water table, the aquifers of most immediate concern are those closest to the surface. On this site this meant two perched water tables: one in the south landfill area, discharging to the hollow to the north, and the perched water table in the area of MW1 and MW2.

Since the hollow only sustains an intermittent stream during and after periods of wet weather, and this sinks back into the ground before leaving the site, it might be regarded as a temporary outcrop of groundwater. Without gathering additional data it is difficult to tell if, when it sinks back into the ground, the intermittent stream remains "perched" on a relatively impervious layer or sinks down to the main water table, which is only 14 to 16 feet below it in the area of the north landfill. Another possible direction of flow of the intermittent stream is north (laterally) into the perched water table in the fill area penetrated by MW1 and MW2, which in turn would appear to discharge to the main water table. In either case, the temporary "outcropping" of the groundwater gives data on the water quality of the groundwater as it is impacted by the south landfill, as does the water quality of MW6 and 7 screened into this perched water table within the filled area.

The second perched water table is that intersected by MW1 and MW2. As noted, it appears to be continuous with the water surfacing in the hollow and as such it is affected by water quality impacts from both the south landfill and the major waste disposal area of the north landfill. Without at least one more well completed into this water table, it is not possible to determine its direction of flow. In particular, it is not possible to determine if it leaves the site to the west still "perched" or discharges to the main water table within the site.

With only three wells, MW3, 4, and 5, as measurement points, the directions of flow in the main aquifer under the site are clear in broad outline, but lacking in detail (see Section 3.6).

MW5 is downgradient of the south landfill and screened in the main water table. If the main water table is strongly influenced by the contours of the upper surface of the bedrock, much of the main water table under the south landfill will bypass MW5, however. The main water table there would flow generally northeast and then north, into the area upgradient of MW4. The absence of any serious contamination in MW4 suggests that it is very unlikely that contamination in the main water table under the south landfill will be of concern.

Flow in the main water table under the north landfill is directly toward the river as might be expected. This is borne out by the fact that the water quality in monitoring wells MW3, MW4, and MW5 is comparable to that in the background well (MW8) which has apparently naturally high barium, iron, lead, nickel, and zinc. However, MW3 also shows traces of naphthalene and 2-methylnaphthalene which is apparently a reflection of the impact of the north landfill area on groundwater quality.

Essentially, then, the route of migration of most concern from the site is in the groundwater, and flow is to the north to the Schroon River.

The contamination of the onsite soils and the lack of control on access to the site does permit exposure by direct contact. Given the sparse population of the area, a relatively continuous vegetative cover and a humid climate, wind blown dust does not appear to be a significant problem.

5.2 CONTAMINANT PERSISTENCE

As discussed in Section 4, the WB&P site contains several areas of potential source contamination from which environmental samples have been collected and analyzed to determine the contaminant persistence. By combining this information presented in Section 4 with the physical characteristics of the site, the following discussions of contaminant persistence are presented.

5.2.1 North and South Landfills

Based on observations from trench excavations, both the north and south landfills have received, for the most part, similar types of refuse material (e.g., bailing wire, paper, wood, drums, plastic shreddings, and rags) from the mill's operation. The north landfill has also been shown to contain ash and a tar-like substance.

North Landfill

As shown on Table 4-1, Cataug samples 2 and 3 and Auger sample 4, which are associated with the north landfill area, show metals concentrations which are for the most part greater than background conditions. The presence of these metals may be due in part to the sample matrix which contains an amount of tar-like substance and ash. Both the tar-like substance and ash samples are shown to have similar metal types, several of which (copper, lead, and nickel) have concentrations greater than background. In addition, the soils associated with the former pond area of the north landfill have a lower permeability because of the sediments of the previously existing pond, which consist of silt with organic material. These materials appear to have created the perched water table and also have adsorbed metals as suggested in Section 3.5. No toxic organic compounds were detected in MW1 or MW2, which were completed in the water table within the fill area; however, the drinking water standard for iron is exceeded.

Priority pollutant organic compounds found in soil and selected solid samples of the north landfill are for the most part associated with the black-stained soil behind the barn. At this location, as shown by Cataug sample 3, low concentrations on the order of parts per billion of several base/neutral PAHs were detected. Two of these compounds were also detected in the tar-like sample and Cataug 3 sample. Both samples show similar tentatively identified compounds, particularly in the volatile organic fractions.

Given the information that fuel oil from the mill's operation may have been discarded in the landfill (see Section 1.2.2), comparison of the organic components of Cataug sample 3 with the mill tank sample suggest a possible matching of contaminant types. Four of five base/neutral compounds were detected in both samples. These compounds were naphthalene, phenanthrene, pyrene, and 2-methylnaphthalene. The volatile organic compounds consisting of xylenes, toluene, and ethylbenzene found in the mill tank sample were not found in the Cataug sample which would be expected because of the time the material in the Cataug sample has been exposed to the elements and the amount of weathering that has occurred. However, there is a similarity between the tentatively identified compounds found in both samples.

In addition to the above organic compounds detected in the north landfill area, a very low concentration of PCB-1254 (360 ug/kg [0.360 ppm]) was detected in Auger sample 4. A soil sample collected from behind the barn in 1979 showed no PCBs detected (see Section 1.2.3).

MW3 and MW4 are located on the north landfill area but do not intercept the perched water table. MW3 was set within the first 10 feet of the main aquifer in which metal concentrations are similar to background conditions (MW8). MW4 was constructed with 70 feet of screen to penetrate the entire depth of the main aquifer (approximately 60 feet). The composition of metals found in MW4 more closely reflects that found in the adjacent downgradient residence wells (see Table 4-3) and to some extent the Schroon River samples, rather than that observed in the background well. No priority pollutant organic compounds were detected in MW4; however, several were detected in MW3, which are discussed in detail in Section 5.3.3.

South Landfill

While trench excavations confirmed the presence of solid refuse at the south landfill as being similar to that found at the north landfill, the focus of the soil investigation for the south landfill area was directed toward the orange-stained area along the western boundary which had been identified as the area receiving discharge from the illegal dumping activity. As discussed in Section 4.2.1, Cataug samples 5, 6, and 7 and the orange-stained selected solid sample were collected from this area, which had been identified a potential source of contamination. A review of the analytical data presented in Table 4-1 indicated that the orange-staining is caused by oxidized iron, as no other analyte detected in the samples would cause such coloration.

A further evaluation of analytical results shows Cataug sample 5, collected from a depression area in the northwest corner of the south landfill at the downgradient portion of the orange-stained area, and the orange-stained selected solid sample, which represents a surface soil sample of the orange-stained area near its origin, have similar metal compositions but at lower concentrations than found in the north landfill soil samples, particularly Cataug sample 3. While no organic compounds were detected in the orange-stained sample, two organic compounds (pyrene and benzo(b)fluoranthene) found in Cataug sample 5 are also found in Cataug sample 3. Furthermore, several of the tentatively identified base/neutral/acid extractable compounds are found to be common to Cataug samples 3 and 5. This would suggest that fuel oil from the mill was also disposed of on the south landfill.

The results of Cataug sample 5 are also comparable, to some extent, to 1983 soil data collected from an area estimated to be approximately the same location. Common constituents found in the 1983 soil sample collected by NYSDEC (see Section 1.2.3) and in Cataug sample 5 include iron, nickel, zinc, and pyrene. The differences were that the 1983 sample was found to contain arsenic, manganese, titanium, mercury, di-n-butyl phthalate and two pesticides, delta-BHC and heptachlor, while Cataug 5 contained lead, copper, chromium, butyl benzyl phthalate and benzo(b)fluoranthane. A soil sample collected in 1979 also by NYSDEC from the same approximate area showed a low concentration of PCB-1254 at 0.03 µg/g (0.03 ppm). No PCB compounds were detected in Cataug sample 5 or any other sample associated with the south landfill.

Analytical results for Cataug samples 6 and 7 show a less diverse group of metals and no detectable organic compounds. These results are similar to Cataug samples 8 and 10 which were collected along the periphery of the south landfill. Cataug sample 8 was collected at the location of the background well (MW8) to test the vadose zone for contamination which could influence the background well groundwater quality. No contamination was evident. Cataug sample 10 was collected downgradient of Cataug sample 5 to test for potential migration. At these locations as well as at Cataug sample 6 and 7 locations, trench excavation showed natural soil conditions to exist below grade, without the solid refuse material associated with the landfilling activity, whereas at the location of Cataug sample 5, solid refuse was encountered during trench excavation.

With respect to the groundwater conditions, MW6 and MW7 were screened in the perched water table to intercept groundwater of the west and east portions of the south landfill. At MW6, located approximately 140 feet to the southwest of MW7, lead, chromium, and iron exceed drinking water standards. At MW7 a generally lower total concentration of metals than those found in MW6 is observed, although iron, cadmium, and manganese exceed drinking water standards.

MW5 was also located downgradient of the south landfill, specifically placed to intercept groundwater flow from the orange-stained area. However, this well was set 10 feet into the site's main aquifer and not screened to intercept discharge from the perched water table. Metal concentrations observed in this well reflect those found in the background well (MW8). So the south landfill appears not to impact the main aquifer.

No organic compounds were detected in either MW5, 6, 7, or 8 with the exception of a very low concentration (1.1 µg/L) of methoxychlor in the background well (MW8), which is well below drinking water standards (see Table 4-2). The presence of this compound cannot be related to any other soil or water sample collected from onsite or offsite locations.

In summary, although active landfilling associated with the operation of the mill was discontinued in 1978, both landfill areas currently show several metals in the soils above background conditions and soils containing low but detectable concentrations of various organic compounds (PAHs and phthalate esters). The metal concentrations found in the soils and selected site solids discussed above are within common ranges for the eastern United States (see Section 4.2.1). These concentrations do not indicate gross metal contamination. However, the elevated levels of metals in the groundwater, primarily associated with the south landfill, do exceed published drinking water standards, although groundwater entering the site is also found to exceed the drinking water standard for iron. In the same way, the presence of low concentrations of organic compounds in the samples do not indicate gross levels of contamination which would be expected to occur from the illegal dumping activity but do verify the historical disposal of hydrocarbon material, possibly from the mill's operation, as well as material containing very low levels of PCBs. For comparison, no PCB compounds were detected in the mill tank sample.

5.2.2 Hollow and Intermittent Stream Area

Review of the analytical results for soil and water samples collected from the intermittent stream and hollow indicates a diversity of metal and organic compounds at various concentrations are present in these areas. The intermittent stream sample contains the most diverse composition of metals found in all soil and selected solid samples collected. In addition, this sample shows the highest concentrations of arsenic, lead, nickel, and is the only sample found to contain detectable levels of selenium. Whereas Auger sample 1 does not contain mercury or selenium, it does have the highest concentrations of chromium, zinc, and iron found in soil and selected solid samples. The high concentrations of lead and selenium found in the intermittent stream sample exceed the common concentrations range observed in eastern United States soils. However, the metal concentrations in Auger sample 1 are within the common ranges.

With respect to the organic content of each sample, Auger sample 1 was found to contain phenanthrene and benzo(a)pyrene. Both of these compounds are also present in the intermittent stream sample which, in addition, has a composition of compounds that closely reflect the organic components found in Cataug sample 3 as well as containing three compounds found in the mill tank sample. However, the tentatively identified compounds observed in the intermittent stream sample do not agree well with Cataug sample 3 or the mill tank sample, whereas the tentatively identified compounds observed in Auger sample 1 show an agreement with those observed in Cataug sample 3 and the mill tank.

Surface water samples, identified as Area C west and east in Table 4-2, are distinctly different. The water sample from Area C west has concentrations of metals which exceed drinking water standards for cadmium, chromium, iron, and lead. The Area C east sample shows lower concentrations with only iron found to exceed the drinking water standard. The Area C west sample also shows the presence of three base/neutral compounds and one acid extractable compound, whereas Area C east only has one of the base/neutral compounds found in the Area C west sample. No PCB compounds were found in either surface water sample. However, in 1979 a sample from a location "behind the barn," assumed to be from the hollow, was found to have a PCB concentration of 3 ug/g (ppm).

As discussed in Section 3.3 and 3.6, the hollow and intermittent stream areas receive surface drainage from portions of both the north and south landfills as well as groundwater discharge from the south landfill. Further discussions of the distinctions observed by the chemical analyses are presented in Section 5.3.

5.3 CONTAMINANT MIGRATION

Although metals concentrations have generally been within common ranges found in eastern U.S. soils, both landfill areas and the hollow/intermittent stream areas were also found to contain metals in the soils and groundwater above background conditions as well as low concentrations of various organic compounds. While the presence of the solid refuse on both landfill areas contributes to the detectable contaminants, the black-stained soil area of the north landfill area and the orange-stained soil area on the south landfill, are unique features which differentiate the two landfill areas. The apparent inconsistent chemical characteristics of samples from within the hollow and intermittent stream area suggests that this area is affected by contaminant migration from both landfills.

This section further examines these areas with respect to the potential migration pathways suggested in Section 5.1 to determine the source and path of contamination associated with the WB&P site. The south landfill will be discussed first in Section 5.3.1, followed by the hollow and intermittent stream areas (see Section 5.3.2), and lastly the north landfill (see Section 5.3.3).

5.3.1 South Landfill

The most visible contaminant migration pathway of the south landfill is the orange-staining observed along the western boundary. Soil samples collected along this course, as discussed in Section 5.2, do not show a progressive concentration gradient from an apparent origin, to the surface depression located downslope of the stained area from which Cataug sample 5 was collected. However, the comparative metal compositions of Cataug Sample 5 and the orange-stain, representative of surface soil, support the observation that the staining is a surficial transport pathway. The absence of organic contaminants and the presence of elevated iron concentrations suggest the staining to be attributable to oxidation of the iron from the degradation of buried metal materials, possibly cans or drums containing refuse such as baling wire from the mill's operation, present in the upgradient source. The topography of the immediate area prevents surface runoff from leaving the site so that it either evaporates or sinks into the perched water table and subsequently discharges into the hollow, via the spring.

As discussed in Section 5.1, the groundwater component of the south landfill is characterized by a perched water table existing above the site's main aquifer. The quality of the groundwater entering the site as seen in MW8 contains a variety of metals some of which approach drinking water standards, while the iron content exceeds its standard.

The water quality in MW6 and MW7 clearly reflects those impacts that the south landfill has on groundwater quality. MW6 shows increases in barium, chromium, copper, iron, lead, nickel, and zinc over the background well, which may reflect impacts from the suspected buried metal at the south edge of the landfill. MW7 shows no obvious evidence of any contamination above background with the exception of the 0.023 mg/L of cadmium, which exceeds drinking water standards (0.010 mg/L).

To summarize, the potential migration pathways as suggested in Section 5.1 are supported by the observed contaminants in the samples analyzed. The material deposited in the south landfill contributes to elevating metal concentrations in the near surface groundwater unit to exceed several drinking water standards, as discussed in Section 5.2. The absence of detectable organic contaminants found in either MW6 or MW7 suggest the material buried in the south landfill, most likely does not contain materials other than solid refuse (e.g., rags, woods, baling wire, etc.) associated with the mill's operations.

The historical data collected in 1979 and 1983 indicate the release of low concentrations of organic compounds such as PCBs, pesticides, and hydrocarbons (PAHs). While similar PCBs and pesticide compounds were not found in detectable quantities during this investigation, very low concentrations of PAHs were found, which supports the historical data that the west portion of the south landfill did at some time receive materials other than solid refuse associated with the mill's operation. Evidence of ongoing migration of this material from the south landfill is not indicated by the data collected during this study. Although as is discussed above, if the material entered the perched aquifer unit at the time of disposal (e.g., a illegal dumping event), it most likely would have been discharged into the hollow as this is the apparent direction of movement of the metal contaminants found by this study. The transport and fate of contaminants in the hollow are discussed below in Section 5.3.2.

5.3.2 Hollow and Intermittent Stream Area

As discussed in Section 5.2, a variety of metals and organic compounds (phathalate esthers and PAHs) at relatively high concentrations were detected in this area. The hollow receives surface drainage from the south landfill area and from the north landfill area (see Section 3.3 and 3.6). Surface drainage into the hollow is evident by the presence of benzoic acid and 4-methylphenol detected only in the Area C west surface water sample. Although both compounds were found at very low concentrations, the latter compound is a cresol-type substance and may be attributable to the abandoned railroad from the use of creosote to preserve rail ties. The presence of the benzoic acid is also most likely attributable to the use of a wood preservative from the rail ties; this compound is an antifungal agent.

Analyses of the soil of the area suggests a more complex association with the two landfills. As discussed in Section 5.2.2, some similarity exists between the intermittent stream sample, Auger sample 1, collected from within the hollow, and Cataug sample 3. Cataug sample 3 was taken in the black-stained area of the north landfill. Based on field observations and the immediate topography of the area, surficial migration of the material would be toward the hollow. However, most of the PAHs detected in Cataug sample 3, Auger sample 1, and the intermittent stream sample are not very mobile compounds (Fetter 1988). Surficial transport from the hollow to the intermittent stream is most likely to occur only during periods of heavy precipitation during which an intermittent stream flows along the hollow. Alternatively, the intermittent stream sample may be indicative of independent releases of a similar type material as that found at Cataug sample 3, which is itself chemically comparable to the type of material found in the mill tank sample.

The hollow is known to have received PCBs, as evidenced by the 1979 sample in which PCB-1260 was found. This Aroclor fraction is different than that found in the 1979 soil sample collected from the orange-stained area of the south landfill in which PCB-1254 was found.

In any event, contaminant migration pathways from the hollow and intermittent stream area are limited to direct onsite contact with surface soil and water or discharge to groundwater. Surficial migration beyond the intermittent stream area is prevented by the abandoned railroad siding to the west and the natural topography to the north and south. As discussed in Section 3.6, the surface water in the hollow probably is continuous with the perched water table in the north landfill. MW2, located within the perched water table of the north landfill and downgradient of the hollow, shows the groundwater quality to be low in metals and exhibits no detectable hazardous organic compounds. This would imply that the contaminants found in the hollow as well as those associated with the north landfill, as discussed in the following section, are adsorbed in the soil of the immediate area.

To summarize, the hollow and intermittent stream area is unique in that contaminant migration is received via surface and groundwater drainage from both landfill areas in addition to possible independent direct disposal as supported by both current and historical data. The contaminants found by this study show levels above drinking water standards and concentrations of lead and selenium above the common ranges for soil in the eastern United States, as well as low concentrations of organic compounds, primarily PAHs not typically found in soils. The presence of these organic compounds supports the historical allegations that the site received hydrocarbon products either during mill operations or during post-closure dumping. However, gross contamination in the area, which would be expected as a result of migration from illegal dumping activity occurring in the south landfill, was not apparent.

5.3.3 North Landfill

The north landfill is characterized surficially by an area of black-stained soil and hydrogeologically by the perched water table in the filled area. The black-stained soil was identified in the previous section as the source from which surface transport of materials into the hollow area could have occurred. As discussed in Section 5.2, the organic contaminants associated with this stained area are comparable to the chemical constituents found in the mill tank sample collected from the mill's fuel storage building.

Other than this surficial transport, there is no evidence of downgradient migration of these organic contaminants into the perched water table, as evidenced by Cataug sample 2, Auger sample 4, and the ash sample (collected from a subsurface deposit of ash material at a location downgradient of Cataug sample 3). These samples collectively describe the contaminant characteristics at the perimeter of the perched water table.

Auger sample 4 is near background concentrations although was found to contain a very low concentration of PCB-1254 and bis(2-ethylhexyl)-phthalate. While the phthalate is possible due to the presence of plastic waste in the landfill, the PCB was only found at this location in the north landfill area and was not upgradient, thus implying the location was subject to a discrete release of a PCB. Offsite migration is unlikely, since PCB compounds are relatively immobile (Fetter 1988).

Groundwater from MW1 and MW2 exhibits low concentrations of metals, particularly in MW2, which is located between Cataug sample 2 and Auger sample 4. Metals such as chromium, copper, mercury, and nickel are all present in the two soil samples but absent in the groundwater sample. Other metals, such as lead and zinc, found in the soil samples at concentrations greater than background, are found in the groundwater in MW2 at concentrations less than those in the background well (MW8). Red (iron oxide) staining was observed at the water table elevation in MW1 and 6 feet above the groundwater elevation in MW2. This staining is most likely attributable to the oxidation of iron and steel disposed of in the north landfill. The iron content detected in the groundwater from both wells exceeds the drinking water standard.

Although some soil metal concentrations in these samples are elevated above background, all concentrations found at the north landfill area are within common metal concentration ranges for soils in the eastern United States. The quality of the perched groundwater in the north landfill area does not indicate offsite transport of large amounts of metal and, with the exception of iron, complies with drinking water standards. Information is available to characterize the main site aquifer unit beneath the perched water table of the north landfill and the adjacent hollow areas as it discharges off site toward MW3 to the north, as illustrated in Figure 3-10.

MW3 and MW4, which are located on the north landfill, intercept the main aquifer unit and are generally downgradient of groundwater flows from the south landfill, the hollow, and intermittent stream area, where elevated levels of metals were found. As discussed in Section 5.2, metal concentrations in MW3 are comparable to those found in the background well (MW8), whereas MW4, which is screened the entire depth of the main aquifer unit above bedrock and reflects the lower metal concentrations found in the Schroon River and the adjacent downgradient drinking water wells. However, orange-stained sands were observed at the water table level to 6 feet above in both wells (see Appendix A). The presence of this coloration in the site's main aquifer unit is most likely a result of the oxidation of metal components disposed of on site. While no organic compounds were found in the perched groundwater, MW3 was found to contain PAH compounds. The organic compounds detected in MW3 include naphthalene, fluorene, and 2-methylnapthalene. The tentatively identified compounds detected in this sample include two ethylbenzene isomers, seven naphthalene isomers, two decane compounds, 1,1,-biphenyl, and two unidentified hydrocarbon compounds. Given the directional movement of groundwater entering MW3, as illustrated by the contours in Figure 3-10, the most probable source of these contaminants appears to be the stained area behind the barn.

The mill tank sample collected from the building immediately off site to the east was found to contain naphthalene, fluorene, 2-methylnaphthalene, ethylbenzene, and several other organic compounds. Furthermore, the detected tentatively identified compounds were found to consist of several decane compounds in addition to various other identified and unidentified compounds. Naphthalene, fluorene, 2-methylnaphthalene and ethylbenzene are mobile as groundwater contaminants (Fetter 1988). The contaminants found in MW3 reflect, in more diluted concentrations, these more mobile compounds from the mill sample; therefore, the mill is judged to be indirectly the source of contamination at MW3 by the dumping of similar material behind the barn on the north landfill area.

Contaminant migration from the site in general is toward the north, northwest. Data provided by MW3 and MW4 characterize the underlying main site aquifer unit whose waters leave the site, and discharge into the river downgradient of the site. While detectable but low levels of PAH components were detected in MW3, examination of drinking water sources downstream of this location (see Table 4-3) and samples of river water and sediment collected at a location below the site do not indicate any contamination associated with the site or any other source.

6. RISK ASSESSMENT

6.1 SELECTION OF CONTAMINANTS OF CONCERN

A number of inorganic and organic substances which could potentially be contaminants of concern were detected in soil and water samples from the site (see Tables 4-1 and 4-2). Most of the organic substances detected were at concentrations close to or below quantitative detection limits and many also were detected in background samples or in laboratory or field blanks at concentrations similar to those found in site samples. The metallic substances detected are all natural constituents of soils so the concentrations found must be compared to the concentration ranges which occur naturally in soils to distinguish probable site-related contaminants from natural soil constituents. Some organic compounds which are potential contaminants of concern also either occur naturally, or have become widely or even ubiquitously distributed in the environment as a result of human activities and may not be site-specific contaminants. Common environmental concentrations of these compounds must therefore be taken into account when considering selection of these compounds as contaminants of concern.

Metals

The metal concentrations in all of the site soil samples except the one from the intermittent stream area (see Table 4-1) appear to fall within the common range for soils in the eastern United States. The concentrations of lead and selenium in the intermittent stream area sample were above each metal's respective common range. The concentrations of arsenic and nickel also were higher in that sample than in other site soil samples but were within their respective common ranges.

Selenium was found at a low level (7.12 mg/kg). Even assuming an unrealistically high exposure based on ingesting a gram of soil per day for 20 years, the selenium exposure that would result would be at least one hundred thousand times less than the acceptable daily intake of 0.003 mg/kg/day (EPA 1986a); therefore, selenium was not selected as a contaminant of concern. The lead concentrations in duplicate samples from the intermittent stream area were 6.23 and 836 mg/kg (see Table 4-1). The higher value exceeded the upper limit (300 mg/kg) of the range of lead concentrations commonly found in surface soils in the eastern United States. Therefore, lead was selected as a contaminant of concern.

In the groundwater and surface water samples (see Table 4-2), cadmium, chromium, iron, lead, and manganese concentrations exceeded existing or proposed NYSDEC or EPA standards in one or more samples including the background (upgradient) groundwater sample. Cadmium, chromium, and lead, which have health-based primary drinking water standards, will be selected as contaminants of concern. The standards for iron and manganese are secondary standards based on organoleptic criteria (taste, odor, and color) rather than potential adverse health effects. If the groundwater at the site were to be used as a potable water source, these contaminants could be objectionable to the users but they would not pose significant health risks; therefore, iron and manganese were not selected as contaminants of concern.

Organics

Acetone, 2-butanone, carbon disulfide, chloroform, methylene chloride, and 1,1,1-trichloroethane were found in several soil and/or water samples at trace levels, but were also present in laboratory or field blanks or background samples at similar concentrations and, therefore, were not selected as contaminants of concern. Acetone and 2-butanone were found in one soil sample (Auger 1) at somewhat higher levels and acetone was present in the intermittent stream sediment sample at an extimated concentration of 34,000 ug/kg, which was below the quantitative detection limit for that sample. Both of these compounds have relatively low toxicity potential. Furthermore, acetone was used to decontaminate the sampling equipment between samples. The high level of this organic is most likely a residue from this process that was not completely removed from the equipment by subsequent water washes. For these reasons acetone and 2-butanone also were not selected as contaminants of concern.

A number of base/neutral and acid extractable compounds were found in the water and soil samples. The bulk of these compounds fall into two chemical groups--phthalates and PAHs. The phthalates are common plasticizers used in a wide range of flexible plastic products and are permitted by the FDA for use in food packaging (see for example 21 CFR 177.1520, 21 CFR 175.300, and 21 CFR 178.3740). In the site samples phthalates were generally found at close to or below quantitative detection limits and were also present in laboratory and field blanks and background samples. The highest concentration detected was in a soil sample, Auger 4, which contained about 11 mg/kg bis(2-ethylhexyl)phthalate. A worst case exposure scenario involving a child consuming a gram of soil per day would result in an exposure of only 11 µg/day. This is about 30 to 200 times less than the average (300 µg/day) and maximum (2,000 µg/day) daily human exposure to phthalates estimated to occur as a result of phthalates absorbed in foodstuffs from packaging materials (EPA 1981). Since the maximum plausible exposure to phthalates at the site is well below the estimated exposure from foodstuffs, phthalates were not selected as contaminants of concern.

PAHs were detected at low levels in site soils near the tar-like material, in the hollow area, in the intermittent stream area which is likely to receive drainage from the hollow area at times of high water, and in MW3, the site's most downgradient well. The levels found in soils were generally close to or below quantitative detection limits and were in the range that has been reported in the general environment. However, since the analytical data shows that the occurrences of PAHs in both the soil and groundwater at this site were limited to obvious waste disposal areas, they are probably related to site waste disposal activities and, therefore, PAHs were selected as contaminants of concern.

PCBs were detected on the site at 3.0 µg/g [3 ppm] in an area of standing water sampled by NYSDEC in 1979 (the NYSDEC analytical laboratory report identified the sample as a water sample; however, the units used were ug/g, which is normally used for solids, rather than mg/L which is used for water). When that same location was resampled during this investigation, no PCBs were detected; however, a lower concentration of PCBs (360 ug/kg [0.360 ppm]) was found in a soil sample collected from a different location than the 1979 sample. EPA has developed a spill cleanup policy for PCBs (52 FR 10688-10710, April 2, 1987) which calls for remedial action if the PCB concentration in soil in an unrestricted access area such as this site exceeds 10 mg/kg (10 ppm). Since the PCB concentrations found at the site were substantially below that level, PCBs were not selected as a contaminant of concern.

6.2 POTENTIAL PATHWAYS OF HUMAN EXPOSURE

PAHs and lead were found in site surface and/or near surface soils at concentrations of potential concern; lead, cadmium, and chromium were found in groundwater in excess of applicable state and federal standards.

PAHs in general exhibit low volatility and water solubility and high octanol-water and organic carbon partition coefficients. Because of these properties, PAHs bind strongly to soil constituents and are relatively immobile in the environment. This is especially true of those PAHs that have been classified as carcinogens by the EPA's weight of evidence criteria; these are generally the higher molecular weight compounds having four or more fused aromatic rings. Lead also generally exhibits low water solubility and environmental mobility (except under acidic conditions which were not encountered at this site). Lead deposited in surface soils tends to stay in place and does not readily migrate to deeper soils and groundwater.

The primary potential pathways for human exposure to PAHs and lead in site soils, based upon these contaminant and site characteristics, are direct contact with contaminated soils or waste materials and contact with contaminated soil or waste particulates mobilized by wind or water erosion. PAHs were detected primarily in four soil samples from locations in the west part of the hollow area, in the intermittent stream bed area, in a sample of a tar-like substance found about 100 feet southwest of the barn, and in a soil sample collected close to the tar-like material. Two of these samples, Auger 1 and Cataug 3, were composite samples collected from the 0- to 6-feet depth interval. The sample of the tar-like substance was a surface grab sample and the intermittent stream area sample was a grab sample from the top 6 inches of soil. Lead exceeded the normal range only in the sample from the intermittent stream area. The existence of fairly continuous vegetative cover and high soil moisture at the hollow area and intermittent stream locations, and the cohesive properties of the tar-like substance at that location, essentially preclude significant wind erosion and offsite transport of contaminated soil particles by that mechanism. Because of the site topography, significant soil erosion and offsite particle transport by surface runoff is unlikely. The low contaminant concentrations in the potential source areas make the likelihood of any significant offsite exposure occurring by erosional transport mechanisms still more remote. The potential pathways of human exposure to site soil contaminants, therefore, appear to be limited to direct contact of individuals with contaminants on site.

The groundwater at the site has been classified GA by NYSDEC (Esterbrook 1988), suitable for use as drinking water. However, based on available information, E & E is not aware of any drinking water wells on site or immediately adjacent to the site. Cadmium, chromium, and lead were present in site groundwater samples at concentrations above applicable state and federal drinking water standards. However, the data indicate that at least a portion of the chromium and lead concentrations may not have originated on site but instead may have come onto the site from an upgradient source or sources (see Table 4-2 for concentrations in MW8, the upgradient well, and MW3 and MW4, the downgradient wells). This makes it difficult to assess the extent, if any, to which site-derived contaminants may be transported off site in the groundwater (see Section 5.3.3).

A further complicating factor is the possibility that metal concentrations observed in the groundwater could be partially associated with suspended solids in the samples. EPA and NYSDEC sample collection procedures call for preserving and analyzing groundwater samples without filtering them to remove suspended solids. The values obtained by this procedure, therefore, include both soluble metals and any metals associated with suspended solids. This is an important distinction from a contaminant transport perspective since soluble metals are much more mobile in the subsurface than metals associated with suspended particulates, which tend to become trapped and immobilized in the soil pore spaces.

Having noted these uncertainties about the metal concentrations found in the groundwater and about the extent to which site-derived contaminants may be moving off site via groundwater transport, the potential for human exposure occurring by the groundwater transport pathway will be evaluated using the conservative assumptions that the contaminants of concern may be soluble and mobile and may be moving off site at concentrations similar to those observed in the groundwater on site.

Hydrogeological investigations at the site indicate that the groundwater generally flows to the north-northwest under most of the site and most likely discharges entirely to the Schroon River within 200 feet of the site. The Schroon River was sampled both upstream and downstream of the site. Cadmium, chromium, and lead, the groundwater and surface water contaminants of concern, were not detected in either sample. This would be expected since site-derived groundwater discharging to the river is greatly diluted by the volume of the river flow. Since the groundwater contaminants of concern were not detected in the Schroon River, they did not approach or exceed state or federal drinking water standards in the river water, and would be very unlikely to exceed them in the future considering the dilution of groundwater by river water which normally occurs.

Drinking water standards and criteria are the most stringent water standards pertinent to human health. Waters that meet or surpass these standards for particular substances would not pose any risk of adverse human health effects from exposure to those substances as a result of any other contact or usage. Since the groundwater contaminants of concern found on site have not resulted, and are extremely unlikely to result, in concentrations exceeding drinking water standards in the Schroon River, transport of these contaminants via groundwater flow to the river does not appear to pose any significant risk to human health.

Another potential pathway of exposure to site groundwater contaminants is by transport of contaminants via the groundwater to any drinking water wells that may be located downgradient from the site. Based on available information there are no such wells located between the site and the Schroon River. There are, however, four private residential drinking water supply wells south of the river, between about a quarter mile and a half mile west of the site along Route 418. These wells are in the downstream direction from the site; however, they are west (downgradient) of the apparent discharge of groundwater to the river. Water from these downgradient wells was sampled on at least three occasions, twice by NYSDEC and once by E & E as part of this investigation. The first round of NYSDEC samples were collected in June 1987 and were analyzed for a wide range of priority pollutant organic substances. The only compound detected in the first round of samples was bis(2-ethylhexyl)phthalate which was found in three of the four wells. These wells were resampled about seven weeks later in order to confirm the phthalate results; however, no phthalates were found in any of the second round samples. No phthalates or other hazardous organics were found above laboratory blank concentrations in the samples from these wells collected and analyzed by E & E in January 1988. Phthalates are common plasticizers and detectable concentrations can leach into water that has been standing in PVC pipes. If PVC pipes are used in these residences and the water was not allowed to run long enough to purge all the standing water from the pipes before the first round of NYSDEC samples were collected, phthalates could have been introduced to those samples in this manner. Phthalates are also present in variable amounts in the disposable gloves used as protective equipment by individuals collecting and analysing samples. Therefore disposable gloves may be another potential source of the phthalates in these samples.

NYSDEC samples from the possibly downgradient residential wells were not analyzed for metals. The E & E samples were analyzed for metals; cadmium, chromium, and lead, the site groundwater contaminants of concern, were not detected in any of the samples. Based on these results it appears that site groundwater contaminants are not presently impacting the water quality in the nearby residential wells and, in view of the discharge of the site groundwater to the Schroon River between the site and these wells, it is unlikely that site-derived contaminants would reach these wells in the future.

In light of the foregoing, it appears that any site-derived contaminants of concern that may be leaving the site via groundwater had not reached any potential human receptors and will not reach them in the future at concentrations that could pose any significant risk to human health. Furthermore, it appears that the only potential pathway of human exposure to site contaminants that is of any concern is direct contact of individuals on site with the surface and near surface soil contaminants: lead and PAHs. Toxicological profiles for lead and PAHs are provided in Appendix G.

The best future use of the site will determine the nature and extent of potential human exposure to site contaminants. Since this parcel lies within the boundaries of the Adirondack Park Preserve, possible future uses could be uses connected with the preserve. If the parcel is left undeveloped, following any corrective actions that may be deemed appropriate, it could become part of the park available for recreational uses such as hunting, fishing, hiking, and camping, or as a tourist vista overlooking the Schroon River, which is listed as potential wild and scenic river. Another potential use that might be considered in view of the site's history is as a location for a park preserve support service base, such as a maintenance building, an information office, or some other administrative facility. Another potential use of the site that has been discussed is for a sewage treatment plant for the Town of Warrensburg. Either of the latter two potential uses would involve individuals working on the site and potentially being exposed to site surface contaminants. Either type of facility would likely require a source of potable water. The site groundwater does not appear to be a suitable source because of the contaminants found; however, the public water supply system for the Town of Warrensburg terminates at the eastern boundary of the site so potable water should be obtainable from that source. Greater potential human exposure to site contaminants would be associated with the support service or sewage treatment plant uses than with the recreational uses; therefore, the support service/sewage treatment plant usage scenarios will be evaluated.

Children and adolescents are sensitive subpopulations with respect to lead exposure, to the extent that even a single day's exposure can potentially cause adverse health effects in these groups (EPA 1984). Since lead was one of the surface soil contaminants of concern, potential exposure of children and adolescents to lead will also be evaluated.

6.3 RISK EVALUATION PROCEDURES

For risk assessment purposes, chemicals are divided into two categories: carcinogens and noncarcinogens. Risk evaluation procedures for most carcinogens are based on the concept that any exposure to a carcinogen presents a finite risk of cancer to man. The term "carcinogen" means any chemical for which there is sufficient evidence that exposure may result in continuing uncontrolled cell division (cancer) in humans and/or animals. Risk evaluation procedures for noncarcinogens are based on the concept that there is a threshold exposure level below which adverse health effects do not occur. "Noncarcinogen" is taken to mean any chemical for which the carcinogenic evidence is negative or insufficient. These definitions are not static. Rather, additional evidence may be published at any time which shifts the weight of evidence, so that a noncarcinogen may be reclassified as a carcinogen or vice versa.

In this report, chemicals have been classified as carcinogens or noncarcinogens based on EPA weight-of-evidence criteria contained in carcinogenicity evaluation guidelines (51 FR 33992-34012, September 24, 1986). Table 6-1 summarizes the five EPA weight-of-evidence categories.

According to these guidelines, sufficient evidence exists for chemicals in the first two groups--A or B (B_1 or B_2)--to be considered human carcinogens or probable human carcinogens, and these chemicals should therefore be subjected to carcinogenic risk estimation procedures which assume no threshold levels. Depending upon the quality of the data, group C chemicals may also be subjected to these procedures. The remaining chemicals--in groups D and E--are defined as noncarcinogens and should be subjected to traditional threshold-based toxicological risk estimation procedures.

In contrast to noncarcinogenic effects, for which thresholds are thought to occur, scientists have been unable to experimentally

Table 6-1

FIVE EPA WEIGHT-OF-EVIDENCE
CATEGORIES FOR CHEMICAL CARCINOGENICITY

Group	Description
A	Human Carcinogen - sufficient evidence from epidemiological studies
B	Probable Human Carcinogen -
B_1	• At least limited evidence of carcinogenicity to humans
B_2	• Usually a combination of sufficient evidence for animals and inadequate data for humans
C	Possible Human Carcinogen - limited evidence of carcinogenicity in animals in the absence of human data
D	Not Classified - inadequate animal evidence of carcinogenicity
E	No Evidence of Carcinogenicity for Humans - no evidence of carcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies

Source: EPA 1986b.

demonstrate a threshold for carcinogenic effects. This has led to the assumption by federal regulatory agencies that, since a threshold dose for carcinogens cannot be demonstrated, any exposure to a carcinogen theoretically represents some finite risk of cancer. Depending on the potency of a specific carcinogen, such a risk could be vanishingly small.

Scientists have developed several mathematical models to estimate low-dose carcinogenic risks from observed high-dose risks. Consistent with current theories of carcinogenesis, EPA has selected the linearized multistage model based on prudent public health policy (51 FR 33992-34012, September 24, 1986). In addition to the linearized multistage model, EPA uses the upper 95% confidence limit for doses or concentrations in animal or human studies to estimate low-dose carcinogenic potency factors (CPFs). Using these procedures, underestimation of the actual potency or risk to humans is unlikely.

Lifetime excess cancer risk can be calculated by:

$$Risk = \Sigma \, LADD_j \times CPF_j$$

where $LADD_j$ is the exposure route specific lifetime average daily dose and CPF_j is the exposure-route-specific carcinogenic potency factor. For the three major routes of exposure:

$$Risk = LADD_o CPF_o + LADD_d CPF_o + LADD_i CPF_i$$

where the subscript "o" stands for the oral route, the subscript "d" stands for the dermal route, and the subscript "i" stands for the inhalation route.

Noncarcinogenic effects (e.g., skin irritation, birth defects, immunological effects, organ damage, etc.) are generally thought to occur only above a minimum dose or threshold. Consequently, risk assessments for chemicals designated as noncarcinogens attempt to derive route-specific reference doses (RfDs) for chronic exposure in humans based on a no observed effect level (NOEL) or a no observed adverse effect level (NOAEL). Because NOELs and NOAELs are usually determined by laboratory experiments in animals conducted at high doses, calculation of the RfDs requires the use of uncertainty factors to compensate for data limitations and the lack of precision in extrapolating from high doses in animals to lower doses in humans. Five commonly used uncertainty factors are summarized in Table 6-2 (EPA 1986c).

RfDs are generally calculated using the formula:

$$\text{RfD (in mg/kg/day)} = \frac{\text{NOAEL (in mg/kg/day)}}{\text{Uncertainty Factor}}$$

Table 6-3 summarizes the EPA oral and inhalation carcinogenicity classifications and CPFs and RfDs for lead and PAHs. For the rationales governing the development of these classifications and data, refer to the toxicological profiles in Appendix G.

For chronic exposures, such as those assumed for site workers in this document, RfDs for noncarcinogens are compared to lifetime average daily doses (LADDs). If the LADD exceeds the RfD, a significant risk is assumed to be possible, indicating that reduction in exposure is appropriate at least to the point at which the LADD is no higher than the RfD.

With respect to lead exposure, children and adolescents constitute a high-risk subpopulation, and the RfD for lead is actually based on the maximum acceptable single-day exposure for these groups. To evaluate the potential risk, the maximum plausible single daily dose of lead is estimated and compared to the RfD.

6.4 RISK ASSESSMENT

In order to assess the risk to human health posed by lead and PAHs in soils at the Warrensburg site, it is necessary to estimate the level of exposure that human receptors are likely to experience.

One potential pathway of human exposure to the lead and PAHs present in site soils is through direct contact with these soils by workers at the site. Worker exposure could occur by inhalation of soil particulates suspended in the air, by ingestion of soil (mainly through hand-to-mouth transport), and/or transdermal absorption of contaminants from soil on the skin. The primary worker exposure scenario that will be considered will be for workers permanently assigned to the site. A second worker exposure scenario also considered is for construction

Table 6-2

UNCERTAINTY FACTORS (MARGINS OF SAFETY) USED IN
THE DERIVATION OF REFERENCE DOSES

Uncertainty Factor	Condition of Use
10	A 10-fold uncertainty factor is used with valid experimental results on appropriate durations of exposures of humans.
100	A 100-fold uncertainty factor is used when human data are not available and extrapolation is made from valid results of long-term animal studies.
1,000	A 1,000-fold uncertainty factor is used when human data are not available and extrapolation is made from animal studies of less than chronic exposure.
1-10	An additional uncertainty factor from 1 to 10 when using a lowest observed adverse effect level (LOAEL) instead of a no observed adverse effect level (NOAEL).
Intermediate uncertainty factor	Other uncertainty factors used, according to scientific judgment, when justified.

Source: EPA 1986c.

Table 6-3

KEY TOXICITY PARAMETERS FOR SELECTED CONTAMINANTS OF CONCERN

	Oral Exposure Route			Inhalation Exposure Route		
Contaminant	RfD (mg/kg/day)	CPF $(mg/kg/day)^{-1}$	Carcinogenicity Weight-of-Evidence Category	RfD (mg/kg/day)	CPF $(mg/kg/day)^{-1}$	Carcinogenicity Weight-of-Evidence Category
Lead	1.4×10^{-3}	--	D	4.23×10^{-4}	--	D
Polycyclic aromatic hydrocarbons	--	11.5	--	--	6.11	--

Source: EPA 1986a.

workers engaged in excavation and construction activities for physical facilities constructed in connection with the possible support service or sewage treatment plant uses of the site. A third exposure scenario involves direct contact with site soils by children and adolescents playing or engaged in other recreational activities on the site. This scenario is also the one most likely to pose a risk of potential over-exposure to lead and will be evaluated partly for that reason. There is no information indicating that children or adolescents are particularly sensitive to PAHs (USPHS 1987b), and since a single-day exposure of these groups to PAHs on site would represent less than one one-thousandth of the risk experienced by a worker in the first scenario, single-day exposure of children or adolescents to PAHs will not be evaluated.

Since the nature of postulated construction activities and the parts of the site that might be affected by these activities cannot be foreseen, any contaminant "hot spots" will be assumed to be unaffected by construction activities for the purpose of the risk assessments for workers permanently assigned to the site and for single-day exposure of children. However, the "hot spots" will be assumed to be disturbed for the purpose of evaluating potential risks associated with construction worker exposure.

This risk assessment does not consider more sensitive but less likely potential uses of the site such as residential use which could involve greater exposure to site contaminants. A separate risk assessment should be performed to evaluate the potentially greater exposures that could occur if such usages or activities are considered for the site.

The first two scenarios to be assessed will be for individuals working on site without respiratory protection or protective clothing. Exposure will be assumed to occur by inhalation of soil particles suspended in the air, by ingestion of soil through hand-to-mouth transport, and by dermal absorption of contaminants from soil on the skin. The quantitative assumptions made to evaluate the first two scenarios were intentionally chosen to be conservative and are summarized in Table 6-4.

The following assumptions were based on standard EPA risk assessment assumptions (EPA 1986c): a worker's normal lifetime was assumed to

Table 6-4

SUMMARY OF DATA AND ASSUMPTIONS USED IN THE WORKER EXPOSURE SCENARIOS

Parameter	Permanent Site Worker	Construction Worker	Source
<u>General Assumptions</u>			
Lifetime	70 years	70 years	EPA 1986a
Duration of exposure	5,000 days (a)	250 days (b)	Assumed
Body weight	70 kg	70 kg	EPA 1986a
<u>Ingestion</u>			
Quantity of soil ingested	10 mg/day	100 mg/day	Paustenbach 1987
Fraction of contaminant absorbed	Lead: 0.4	Lead: 0.4	USPHS 1987a
	PAHs: 0.8	PAHs: 0.8	USPHS 1987b
<u>Inhalation</u>			
Breathing rate	1 m^3/hr	1 m^3/hr	ICRP 1984
Exposure period	8 hrs/day	8 hrs/day	Assumed
Inhalable particulates (PM_{10}) suspended in air	0.020 mg/m^3	10 mg/m^3	NYSDEC 1987/ACGIH 1986
Fraction of (PM_{10}) due to site soil	0.1	1.0	Assumed
Fraction of contaminant absorbed	Lead: 0.15	Lead: 0.15	USPHS 1987a
	PAHs: 0.2	PAHs: 0.2	USPHS 1987b
<u>Dermal Absorption</u>			
Amount of soil on skin	100 mg (h)	1,000 mg	Kimbrough *et al.* 1984
Fraction of contaminant absorbed	Lead: 0.001 (d)	Lead: 0.001	USPHS 1987a
	PAHs: 0.03 (e)	PAHs: 0.03	USPHS 1987b

(a) Estimated assuming exposure 5 days/week, 50 weeks/year for 20 years.
(b) Estimated assuming exposure 5 days/week, 50 weeks/year for 1 year.

be 70 years and a body weight of 70 kg was selected, which corresponds to an average adult male. As a worst case, a permanent site worker was assumed to be exposed 8 hours per day, 5 days per week, 50 weeks per year for 20 years (which is about one-half a working lifetime) for a total of 5,000 days. Construction workers were assumed to be exposed for, at most, 5 days per week, 50 weeks per year for one year. The quantity of soil ingested by a permanent site worker was estimated to be 10 mg/day based on Paustenbach (1987). A construction worker was assumed to ingest 10 times that amount, or 100 mg/day, due to their greater probable contact with the soil during excavation and construction activities. A breathing rate of 1 m^3/hr was assumed which is a typical value for an adult male engaged in moderate exercise. For permanent site workers, the concentration of inhalable particulates (PM_{10}) suspended in the air was taken to be 0.020 mg/m^3 which was the annual average concentration during 1986 for the Adirondack (northern) region of New York (NYSDEC 1987b). Since the site is a moderate size and most of it is covered by vegetation which would minimize suspension of soil particles by wind erosion, it is unlikely that on average more than 10% of the inhalable particles would be derived from contaminated site soils. The fraction of the respirable airborne particulates derived from site soils was, therefore, assumed to be 0.1. For construction workers, the respirable particulate concentration was assumed to be 10 mg/m^3, which is the American Conference of Governmental Industrial Hygienists Threshold Limit Value (ACGIH TLV) for nuisance dust (ACGIH 1986). If dust levels threatened to exceed that level, it was assumed that the contractor would initiate dust suppression measures such as sprinkling the area with water. The fraction of the airborne particulates derived from site soils was estimated to be 1.0 since construction-generated dust concentrations can be expected to be orders of magnitude greater than ambient suspended particulate concentrations in the area (NYSDEC 1987b).

The amount of soil deposited on the skin was estimated to be 100 mg/day for permanent site workers based on studies by Kimbrough et al. (1984) and 10 times that amount for construction workers. The fractions of the contaminants absorbed by each route of exposure were taken from the U.S. Public Health Service (USPHS) toxicological profiles for the contaminants of concern.

Exposure was estimated using both the average and the maximum lead and PAH concentrations found in soils at the site. The average contaminant concentrations were estimated by taking the geometric mean of contaminant concentrations in the site soil samples. These estimates are summarized in Table 6-5.

The risk assessment procedure requires that total LADDs be estimated for each contaminant. The LADD is then compared to the RfD to estimate the potential for excess exposure to noncarcinogens or it is multiplied by the CPF to estimate cancer risk for carcinogens.

For this assessment, the applicable route-specific intakes--INT_i (inhalation intake), INT_o (oral intake), and INT_d (dermal absorption intake)--were calculated for each exposure scenario.

The inhalation intake (INT_i) was calculated as the product of the estimated concentration of the contaminants in soil (C_s) times the concentration of soil in air (PM_{10}) times the fraction of the soil in air derived from the site (Fs) times the breathing rate (BR) times the daily exposure duration (DUR) times the fraction of the contaminants absorbed (AABS):

$$INT_i = (C_s)\ (PM_{10})\ (Fs)\ (BR)\ (DUR)\ (AABS) \qquad \text{(Equation 1)}$$

The dermal intake (INT_d) was calculated as the product of the concentration of contaminants in soil (C_s) times the concentration of soil on skin (SKIN) times the fraction absorbed (DABS):

$$INT_d = (C_s)\ (SKIN)\ (DABS) \qquad \text{(Equation 2)}$$

The oral intake (INT_o) was estimated by the concentration of contaminants in soil (C_s) times the amount of soil ingested (ING) times the fraction absorbed orally (OABS):

$$INT_o = (C_s)\ (ING)\ (OABS) \qquad \text{(Equation 3)}$$

Table 6-5

ESTIMATED AVERAGE AND MAXIMUM OBSERVED
CONCENTRATIONS OF CONTAMINANTS OF CONCERN IN SOILS

Contaminant	Estimated Average* Concentrations (mg/kg)	Maximum Observed Concentrations (mg/kg)
Lead	11.1**	836
Polycyclic Aromatic Hydrocarbons	0.439	2.25***

*Geometric mean of concentrations observed on site.

**When lead was not detected, the quantitative detection limit was used since a value of zero cannot be used in a geometric mean calculation.

***Since PAHs will be evaluated as carcinogens, only PAHs classified as carcinogens were included (see Appendix G, Toxicological Profile for PAHs). When detected at less than the minimum quantitation limit (< value), PAHs were assumed to be present at the quantitative detection limit. When PAHs were not detected (ND) a value of one-tenth of the quantitative detection limit was used since a value of zero cannot be used in a geometric mean calculation. One-tenth of the quantitative detection limit is the minimum amount of a compound expected to be qualitatively identifiable.

Source: Ecology and Environment, Inc. 1988.

In these calculations, contaminant concentrations must be expressed in units of g/g (contaminant/soil). For example, if the contaminant concentrations are in units of mg/kg, all concentrations must be multiplied by 10^{-6} to convert them to g/g.

The corresponding route-specific LADDs--$LADD_i$, $LADD_o$, and $LADD_d$--were then calculated by multiplying the route-specific intakes by the duration of exposure (DAYS), divided by the product of the body weight (BW) for the exposed individual and the length of a lifetime (DAYSL).

$$LADD_{i,o,d} = \frac{(DAYS)\ (INT_{i,o,d})}{(DAYSL)\ (BW)} \qquad \text{(Equation 4)}$$

In accordance with established procedures, EPA-estimated upper 95% confidence limit CPFs derived from animal data were used to estimate lifetime increased cancer risks from PAH exposure. These risks were calculated by summing the products of route-specific CPFs and route-specific LADDs:

$$Risk = CPF_i\ LADD_i + CPF_o\ LADD_d + CPF_o\ LADD_o \qquad \text{(Equation 5)}$$

Similarly, for lead, a Hazard Index reflective of the total relative exposure was obtained by summing the relative exposures for each route:

$$\text{Hazard Index} = \frac{LADD_i}{RfD_i} + \frac{LADD_d}{RfD_o} + \frac{LADD_o}{RfD_o} \qquad \text{(Equation 6)}$$

The Hazard Index is the LADD expressed as a multiple of the RfD. If the Hazard Index exceeds one, then the total estimated LADD is greater than the RfD. In such cases, measures to reduce the potential exposure in order to bring the Hazard Index down to one or less should be considered. The further below one the Hazard Index is reduced, the greater the margin of safety achieved. Similarly, if the estimated cancer risk exceeds the level considered acceptable by the responsible regulatory agency, measures should be considered to reduce the potential exposure and the associated risk to acceptable levels. Table 6-6 provides a summary of factors used to calculate the Hazard Index for permanent site workers exposed to the average and maximum surface soil concentrations of lead found on site. Table 6-7 provides a summary of factors used to calculate the cancer risk from potential exposure to average and maximum surface soil concentrations of PAHs.

Potential exposure of construction workers to site contaminants would likely entail a higher level of exposure than the permanent site worker scenarios due mainly to excavation activities and the use of heavy equipment on site which could disturb the contaminants and raise the concentration of site soil particles suspended in the air as dust. On the other hand, the duration of such exposure would be unlikely to exceed 30 days for construction of a park service facility, or 250 days for construction of a sewage treatment plant. Both periods are much less than the 5,000-day exposure assumed for permanent site workers. The estimated risks to construction workers from contact with lead and PAHs in the site soils are summarized in Tables 6-8 and 6-9 respectively.

The third exposure scenario to be assessed is the potential exposure of children and adolescents on site for recreational or incidental reasons to the lead concentrations found in surface soils. A single day's exposure to lead may pose significant risks for these two sensitive subpopulations, and consequently the oral RfD for lead is based on a single daily dose (DD) to children rather than a LADD. Since the exposure being evaluated occurs during a single day, DDs are estimated for both representative and maximum exposure conditions.

In children, the potential exposure by ingestion of site soils is many times greater than potential inhalation or dermal exposure and, therefore, ingestion quantitatively dominates the risk assessment calculations over inhalation and dermal absorption for exposures to nonvolatile contaminants in soils, including lead. Consequently, only an oral daily dose (DD_o) will be estimated. The oral daily dose is calculated by multiplying the concentration of lead in soil (C_s) by the absorption factor (A) and the daily intake of soil (INT) and dividing this project by the body weight (BW):

Table 6-6

SUMMARY OF ESTIMATED RISKS TO PERMANENT
SITE WORKERS EXPOSED TO
LEAD IN SOILS, SELECTED SOLIDS*, AND SITE SEDIMENTS

Type of Exposure	Soil Concentration C_s (g/g)	INT (mg/day)	LADD (mg/kg-day)	RfD (mg/kg-day)	Hazard Index $\left(\frac{LADD}{RfD}\right)$
Inhalation Route					
Typical	1.11×10^{-5}	7.10×10^{-8}	1.99×10^{-10}	4.34×10^{-4}	4.58×10^{-7}
Maximum	8.36×10^{-4}	5.35×10^{-6}	1.50×10^{-8}	4.3×10^{-4}	3.45×10^{-5}
Dermal Route					
Typical	1.11×10^{-5}	1.11×10^{-6}	3.10×10^{-9}	1.40×10^{-3}	2.22×10^{-6}
Maximum	8.36×10^{-4}	8.36×10^{-5}	2.24×10^{-7}	1.40×10^{-3}	1.67×10^{-4}
Oral Route					
Typical	1.11×10^{-5}	1.66×10^{-5}	4.65×10^{-8}	1.40×10^{-3}	3.32×10^{-5}
Maximum	8.36×10^{-4}	1.25×10^{-3}	3.51×10^{-6}	1.40×10^{-3}	2.50×10^{-3}
Total Hazard Index**					
Typical					3.59×10^{-5}
Maximum					2.71×10^{-3}

*The mill tank was not included because it is not on site and it was sampled and analyzed primarily for chemical comparison with site samples.

$$^{**}\frac{LADD_i}{RfD_i} + \frac{LADD_d}{RfD_o} + \frac{LADD_o}{RfD_o}$$

Source: Ecology and Environment, Inc. 1988.

Table 6-7

SUMMARY OF ESTIMATED RISKS TO PERMANENT SITE
WORKERS EXPOSED TO PAHS IN SOILS, SELECTED SOLIDS*, AND SITE SEDIMENTS

Type of Exposure	Soil Concentration C_s (g/g)	INT (mg/day)	LADD (mg/kg-day)	CPF $(mg/kg\text{-}day)^{-1}$	Estimated Risk
Inhalation Route					
Typical	4.39×10^{-7}	1.40×10^{-9}	3.94×10^{-12}	$6.11 \times 10^{+0}$	2.40×10^{-11}
Maximum	2.25×10^{-6}	7.20×10^{-9}	2.01×10^{-11}	$6.11 \times 10^{+0}$	1.23×10^{-10}
Dermal Route					
Typical	4.39×10^{-7}	1.32×10^{-6}	3.68×10^{-9}	$1.15 \times 10^{+1}$	4.23×10^{-8}
Maximum	2.25×10^{-6}	6.75×10^{-6}	1.89×10^{-8}	$1.15 \times 10^{+1}$	2.17×10^{-7}
Oral Route					
Typical	4.39×10^{-7}	3.51×10^{-6}	9.82×10^{-9}	$1.15 \times 10^{+1}$	1.13×10^{-7}
Maximum	2.25×10^{-6}	1.80×10^{-5}	5.03×10^{-8}	$1.15 \times 10^{+1}$	5.79×10^{-7}
Total Estimated Risk**					
Typical					1.55×10^{-7}
Maximum					7.96×10^{-7}

*The mill tank was not included because it is not on site and it was sampled and analyzed primarily for chemical comparison with site samples.

**($Risk_i + Risk_d + Risk_o$)

Source: Ecology and Environment, Inc. 1988.

Table 6-8

SUMMARY OF ESTIMATED RISKS TO CONSTRUCTION WORKERS EXPOSED TO LEAD IN SOILS, SELECTED SOLIDS*, AND SITE SEDIMENTS

Type of Exposure	Soil Concentration C_s (g/g)	INT (mg/day)	LADD (mg/kg-day)	RfD (mg/kg-day)	Hazard Index $\left(\frac{LADD}{RfD}\right)$
Inhalation Route					
Typical	1.11×10^{-5}	1.33×10^{-4}	1.86×10^{-8}	4.34×10^{-4}	4.29×10^{-5}
Maximum	8.36×10^{-4}	1.00×10^{-2}	1.40×10^{-6}	4.34×10^{-4}	3.23×10^{-3}
Dermal Route					
Typical	1.11×10^{-5}	1.11×10^{-5}	1.55×10^{-9}	1.40×10^{-3}	1.11×10^{-6}
Maximum	8.36×10^{-4}	8.36×10^{-4}	1.17×10^{-7}	1.40×10^{-3}	8.35×10^{-5}
Oral Route					
Typical	1.11×10^{-5}	4.44×10^{-4}	6.21×10^{-8}	1.40×10^{-3}	4.43×10^{-5}
Maximum	8.36×10^{-4}	3.34×10^{-2}	4.67×10^{-6}	1.40×10^{-3}	3.34×10^{-3}
Total Hazard Index**					
Typical					8.83×10^{-5}
Maximum					6.65×10^{-3}

*The mill tank was not included because it is not on site and it was sampled and analyzed primarily for chemical comparison with site samples.

$$**\frac{LADD_I}{RfD_I} + \frac{LADD_d}{RfD_o} + \frac{LADD_o}{RfD_o}$$

Source: Ecology and Environment, Inc. 1988.

Table 6-9

SUMMARY OF ESTIMATED RISKS TO CONSTRUCTION WORKERS
EXPOSED TO PAHS IN SOILS, SELECTED SOLIDS*, AND SITE SEDIMENTS

Type of Exposure	Soil Concentration C_s (g/g)	INT (mg/day)	LADD (mg/kg-day)	CPF $(mg/kg\text{-}day)^{-1}$	Estimated Risk
Inhalation Route					
Typical	4.39×10^{-7}	7.02×10^{-6}	9.82×10^{-10}	$6.11 \times 10^{+0}$	6.00×10^{-9}
Maximum	2.25×10^{-6}	3.60×10^{-5}	5.03×10^{-9}	$6.11 \times 10^{+0}$	3.07×10^{-8}
Dermal Route					
Typical	4.39×10^{-7}	1.32×10^{-5}	1.84×10^{-9}	$1.15 \times 10^{+1}$	2.12×10^{-8}
Maximum	2.25×10^{-6}	6.75×10^{-5}	9.44×10^{-9}	$1.15 \times 10^{+1}$	1.09×10^{-7}
Oral Route					
Typical	4.39×10^{-7}	3.51×10^{-5}	4.91×10^{-9}	$1.15 \times 10^{+1}$	5.65×10^{-8}
Maximum	2.25×10^{-6}	1.80×10^{-4}	2.52×10^{-8}	$1.15 \times 10^{+1}$	2.89×10^{-7}
Total Estimated Risk**					
Typical					8.37×10^{-8}
Maximum					4.29×10^{-7}

*The mill tank was not included because it is not on site and it was sampled and analyzed primarily for chemical comparison with site samples.

**$(Risk_i + Risk_d + Risk_o)$

Source: Ecology and Environment, Inc. 1988.

$$DD_o = \frac{(C_s)\ (A)\ (INT)}{BW} \qquad \text{(Equation 7)}$$

The absorption factor will be assumed to be 30% (USPHS 1987a). The typical daily intake of soil for a 2- to 6-year-old child is estimated to be 100 mg (LaGoy 1987; Paustenbach 1987), while the maximum plausible intake is estimated to be 1,000 mg (EPA 1986a). An average body weight of 16 kg for an average member (4 years old) of the 2- to 6-year-old age group will be used (ICRP 1984).

Similar calculations can be made for adolescents from 6 to 18 years of age by adjusting the estimated intake and body weight assumptions. In this case intake is assumed to be, but not to exceed, 100 mg, and the average body weight is estimated to be 40 kg. The site-wide geometric mean lead concentration of 1.11×10^{-5} g/g (11.1 mg/kg) will be used to calculate the typical exposure, and the maximum concentration of 8.36×10^{-4} g/g (836 mg/kg) used to calculate the maximum exposure. These calculated exposure levels are then evaluated by comparing them to the maximum acceptable daily intake for a child which, in the case of lead, is equal to the RfD.

The hazard indices (DD_o/RfD_o) for single-day exposures of children and adolescents to lead are summarized in Table 6-10.

6.5 POTENTIAL ENVIRONMENTAL EFFECTS

The presence of contaminants in site soils and surface and groundwater has no doubt had some incremental impacts on the environmental quality on and near the site; however, those impacts do not appear to have resulted in any significant environmental impairment.

Based on available information there are no critical habitats or sensitive environments in the immediate vicinity of the site which could be impacted by site contaminants. There are two small low-lying wet areas on site that were formed when a pond that once occupied the area was largely filled as a result of landfilling activities. However, these wet areas do not support the range of species normally associated with natural wetland areas.

Table 6-10

SUMMARY OF ESTIMATED RISKS TO CHILDREN AND ADOLESCENTS FROM SINGLE DAY EXPOSURE TO LEAD IN SOILS, SELECTED SOLIDS*, AND SITE SEDIMENTS

Exposure Scenario	Soil Lead Concentration C_s (g/g)	DD_o (mg/kg-day)	RfD_o (mg/kg-day)	Hazard Index**
Children (2 to 6 Years)				
Typical	1.11×10^{-5}	2.08×10^{-5}	1.40×10^{-3}	1.49×10^{-2}
Maximum Plausible	8.36×10^{-4}	1.57×10^{-2}	1.40×10^{-3}	$1.12 \times 10^{+1}$
Adolescents (6 to 18 Years)				
Typical	1.11×10^{-5}	8.32×10^{-6}	1.40×10^{-3}	5.95×10^{-3}
Maximum Plausible	8.36×10^{-4}	6.27×10^{-4}	1.40×10^{-3}	4.48×10^{-1}

*The mill tank was not included because it is not on site and it was sampled and analyzed primarily for chemical comparison with site samples.

**$\frac{DD_o}{RfD_o}$

Source: Ecology and Environment, Inc. 1988.

Contact with soil and surface water contaminants could potentially have an adverse health impact on wildlife on site; however, the contaminant concentrations are generally low and the areas involved are limited. The quantitative risk assessment for humans indicated that adverse health effects from contact with site contaminants were unlikely. Interspecies toxicological comparisons are imprecise because of differences in exposure patterns, species sensitivities, and life spans; however, on balance, a significant impact on wildlife health due to contact with site contaminants also seems unlikely.

The Schroon River in the vicinity of the site is a Class C stream--suitable for fishing and all other uses except as a drinking water source or for primary contact recreation. This classification is due largely to the discharge of combined sewer overflows to the river upstream from the site. As shown in Table 4-2, none of the groundwater contaminants of concern (cadmium, chromium, and lead) were detected in the river and, therefore, no measurable impact on the river fishery would be expected.

6.6 CONCLUSIONS

The greatest potential health risk at the WB&P site appears to be associated with the exposure of children and adolescents on site for recreational or other purposes to lead in the soils. These estimated potential exposures ranged from less than one one-hundredth of the maximum acceptable single-day exposure for adolescents exposed to average lead concentrations on site, to about 11 times the acceptable exposure for young children exposed to the maximum observed lead concentration. To reduce the estimated maximum plausible exposure of children to acceptable levels, the maximum lead concentration in site soils would have to be reduced to below 75 mg/kg. In order to put this in perspective, it should be noted that naturally occurring lead concentrations in surface soils of the eastern United States have a geometric mean of 14 mg/kg and range from <10 to 300 mg/kg. Urban surface soils often have lead concentrations above 100 mg/kg as a result of lead deposition from vehicular exhausts.

Any consideration of corrective measures based on the potential exposure of children to contaminated soils on site should also take into account the future use of the site, the likelihood of such exposure actually occurring, and the size of the population potentially at risk.

Evaluation of the permanent site worker and construction worker exposure scenarios indicate that estimated exposures to the maximum observed lead concentration in surface soils would be about 370 and 150 times less than the RfD, respectively. The risk of an overexposure to lead occurring by these scenarios is therefore extremely small.

The cancer risks associated with permanent site worker exposure to the average and maximum concentrations of carcinogenic PAHs in site soils were estimated to be 1.55×10^{-7} (about one in ten million) and 7.96×10^{-7} (about eight in ten million), respectively. The cancer risks to construction workers on site for 250 days and exposed each of those days to the average or maximum PAH concentrations found in soil samples were estimated to be 8.37×10^{-8} (less than one in 10 million) and 4.29×10^{-7} (about 4 in 10 million) respectively. These values fall below the low end of the range of risks (1×10^{-4} or one in ten thousand to 1×10^{-6} or one in one million) typically considered acceptable by EPA when assessing Superfund sites (EPA 1986a). Determining whether the estimated risks are acceptable at this site, however, is a risk management decision that rests with the responsible agency and takes into consideration additional site specific factors such as the size of the population at risk and the feasibility and cost of remedial alternatives.

Potential exposure of adults engaged in recreational activities on site would most likely involve a much shorter exposure duration than the 250 days per year assumed for site workers and would, therefore, result in a considerably smaller exposure and lower associated risks.

Based on the support service, sewage treatment plant, and recreational use scenarios considered and the risk assessment methods used for potential adult users of the site, no remedial action would be required at this site to keep adult exposure to site contaminants within ranges that would generally be considered acceptable by regulatory agencies.

The risk of any significant environmental impacts attributable to site contaminants appears to be minimal.

7. SUMMARY AND CONCLUSIONS

7.1 SUMMARY OF FINDINGS

The WB&P site consists of terraced landfill areas (north and south) created by the Warrensburg Board and Paper Corporation of New York, New York, for disposal of solid refuse, such as bailing wire, paper, wood, drums and plastic shredding associated with operation of the WB&P mill located less than 200 feet to the northeast of the site. The north and south landfill areas are separated by an abandoned railroad embankment and a low-lying hollow (including a poorly defined but contained intermittent stream area) in which surface and groundwater drainage collects from both landfills.

It was reported that, prior to the closing of the mill in 1978, the WB&P landfills may also have received xylene, toluene, and formaldehyde as well as coal ash and fuel oil from the operation of the mill and the disposal of a large amount of drummed mill waste (solid refuse) in the south landfill. In addition, in May 1979 NYSDEC was notified that a tank truck was dumping a black liquid at the site. The reporting of this activity triggered the NYSDEC investigative program. Environmental samples collected by NYSDEC in July 1979 and August 1980 indicated the site contained low but detectable quantities of metals, PCBs, and other organic compounds. Subsequent site inspections by NYSDEC and EPA verified site conditions and recognized the contamination potential to surface water and groundwater. These concerns resulted in this investigative study in order to assess the type and location of hazardous materials at the site and their migration potential, and to provide the basis for selecting feasible remedial alternatives to eliminate the source materials and to control environmental contamination.

Although xylene, toluene, and formaldehyde were not detected, the solid refuse on both landfill areas as well as subsurface deposits of ash and a tar-like substance (possibly weathered fuel product) found on the north landfill, contain detectable levels of a number of contaminants. Both landfill areas currently have several metals in the soils and groundwater at above background levels and both have site soils containing low but detectable concentrations of PAHs and phthalate esters. The most obvious organic contamination is the black-stained soil on the north landfill area. The black-stained soil is suspected to be a result of dumping during the mill's operation. The composition of organic compounds detected in the black-stained soil was similar to the composition of a sample taken from the immediately offsite mill fuel storage tank building.

At the south landfill, the material deposited contributes to elevated metal concentrations in the shallow perched groundwater which exceed several drinking water standards. The contaminants include cadmium, chromium, and lead. The absence of detectable organic contaminants in the groundwater suggests that the material buried in the south landfill most likely does not contain materials other than solid refuse (e.g., rags, wood, metal drums, cans, bailing wire, etc.) associated with the mill's operation. The buried metal apparently has caused an orange staining of surface soils due to rusting. This conclusion is supported by chemical analyses. Migration of the metal contaminants from the south landfill is most likely within the perched water table, which discharges in a northerly direction into the hollow area via a spring. No gross contamination resulting from the illegal dumping activity was found.

Examination of the hollow with the associated intermittent stream flowing to the west indicates that contaminant migration is received via surface water and groundwater drainage from both landfill areas; direct dumping into the hollow is also supported by both current and historical data and soil and sediment analyses. The contaminants found by this study show exceedences of drinking water standards in surface water for cadmium and lead, concentrations of lead and selenium in soils/sediment above the common ranges in the eastern United States, and low concentrations of organic compounds, primarily PAHs.

The material deposited in the north landfill contributes to the elevation of metal concentrations in soil above background and the presence of low concentrations of organic compounds. The movement of groundwater in the north landfill, hollow, and intermittent stream areas is north in the direction of the Schroon River, to which groundwater from the site discharges. The transport of site contaminants appears to be limited. The organic contaminants and to a lesser extent the metal contaminants are for the most part retained within the soils of the immediate area of the north landfill.

Examination of the groundwater of the perched water table associated with the north landfill reveals a lower concentration of metals than found in the background well, and indicates no organic contaminants. The underlying main aquifer unit shows the presence of organic compounds (PAHs) in the most northern monitoring well, which are suspected to originate from the area of dumping behind the on-site barn. Examination of drinking water sources downstream of the site and samples of Schroon River water and sediment collected below the site suggest no detectable contamination is occurring via the offsite migration of contaminants.

In order to put this information in perspective, the metal concentrations found in the soil samples are within common ranges for the eastern United States with the exception of lead and selenium found in the intermittent stream area. The elevated levels of metals in the groundwater do exceed drinking water standards, although groundwater entering the site is also found to exceed the drinking water standard for iron. The presence of low concentrations of organic compounds in the soil samples do not indicate gross levels of contamination either, but do support the disposal of hydrocarbon type materials, most probably fuel oil from the mill's operation on the site.

The PCB material detected in 1979 was not evident during this study except for a very low concentration in the soil sample farthest north on the site. The location of this soil sample is separate from areas where low concentrations of PCBs were detected in 1979. Since PCB compounds are relatively immobile in soil, and no PCB compounds were detected in water samples, the current as well as historical data suggest the deposition of these materials was random about the site. The source of the

PCBs detected in 1979 may have been due to either disposal during the operation of the mill or dumping which occurred after the mill closed. The disposal of PCB-contaminated dielectric fluids associated with the use of transformers at the mill is one possible source. Since this study focused on the landfill site, extensive sampling was not performed at the mill facility other than to collect a sample of tank bottoms from the mill's fuel storage building. No PCBs were detected in this sample.

The impact of the estimated 288,000 gallons of black liquid reportedly dumped on site over an eight-month period is not evident. Examination of the chemical data does not suggest an identifiably unique or pronounced source of contamination other than those described above. Soil staining noted included an orange coloration suggested by chemical analysis to be the result of the rusting of metal components disposed of in the landfills and black-stained soil behind the berm. This black-stained soil is observed over an area of approximately 100 square feet. This area is much smaller in size than that which would be expected to be created by a discharge of a 3,000-gallon tank truck such as was allegedly observed. For example, 3,000 gallons would cover approximately 2,400 square feet, 2 inches thick. If this event occurred two to three times per week for eight months, most likely there would have been a large very noticeable staining if the black liquid discharged was a heavy viscous type product, e.g., oil-based liquid. In light of these observations and analytical results, the possibility exists that: 1) the discharged liquid did not contain hazardous or toxic materials analyzed for; 2) the discharged liquid contained very dilute concentrations of contaminants which are masked by the material disposed of on the site from the mill's operation and/or which have been degraded with time; or 3) the material discharged did not occur at the frequency reported or in the amounts estimated. A fourth consideration is that the liquid might have been aqueous in nature and highly mobile and may have quickly entered the groundwater, became diluted, and moved off site, discharging into the Schroon River. The estimated rate of groundwater movement off site is 0.75 ft/day and the groundwater discharges into the river only 170 feet away. Assuming this flow rate and total discharge distance of approximately 900 feet from the south landfill area to the river, the last dumping event, which occurred in May 1979, could have discharged into the river by the fall of 1982. This scenario assumes that the liquid material had minimal retardation and flowed with the groundwater.

Based on the presence of PAHs and lead found in site soils and the concentrations of lead, cadmium, and chromium found in groundwater in excess of applicable state and federal primary drinking water standards, these compounds and elements were selected as contaminants of concern for the health risk assessment. With respect to the offsite migration of the contaminants, it appears that any site-derived contaminants of concern that may be leaving the site via groundwater had not reached any potential human receptors and will not reach them in the future at concentrations that could pose any significant risk to human health. The development of site groundwater for drinking water purposes is not likely due to the availability of the municipal water supply system located immediately at the east boundary of the site. Based on these facts, the risk assessment determined that the only potential pathway of human exposure to site contaminants that is of concern is direct contact of individuals on site with the surface soil contaminants: lead and PAHs. Furthermore, based on available information, there are no critical habitats or sensitive natural environments in the immediate vicinity of the site which could be impacted by site contaminants.

The health risk associated with the soil contaminants of concern was evaluated in light of the plausible future uses of the site. Since this site lies within the boundaries of the Adirondack Park Preserve, one possible future use could be a use related to the preserve. If the parcel is left undeveloped following any corrective actions that may be deemed appropriate, it could become part of the state lands available for recreational uses such as hunting, fishing, hiking, and camping; or as a scenic vista overlooking the Schroon River which is listed as a potential scenic and wild river; or it could be developed as a location for a park preserve support service base, such as an maintenance building, an information office, or some other administrative facility. Another alternative use that has been discussed is the use of the site for a sewage treatment plant for the Town of Warrensburg. The last two poential uses will involve construction and soil disturbance.

The risk assessment based on plausible site use scenarios concluded that no remedial action would be required at this site to keep adult exposure to site contaminants within ranges that are generally considered acceptable by regulatory agencies. The most significant health risk at the WB&P site may be the potential exposure to lead in the soils of children and adolescents on site for recreational or other purposes. To reduce the estimated maximum plausible exposure of children to acceptable levels, the maximum lead concentrations in site soils in the intermittent stream area, the southern portion of the north landfill, and black-stained soil would have to be reduced to below 75 mg/kg. (To put this information in perspective, naturally occurring lead concentrations in surface soils of the eastern United States have a geometric mean of 14 mg/kg and range from <10 to 300 mg/kg. Urban surface soils often have lead concentrations above the 100 mg/kg as a result of lead deposition from vehicular exhausts.)

In addition to the exposure concern related to the recreational use of the site by children and adolescents, the site also poses several physical hazards. These hazards consist of surface debris (large piles of wood, metal, and several abandoned automobiles) and discarded refuse contained within the barn structure. The barn appears to be structurally sound but, as it is constructed of wood posts and beams, it will deteriorate without routine upkeep and become a potential physical hazard in the future.

To summarize, the contaminants found on site confirm the use of the site as a receptacle for solid refuse, ash, and hydrocarbon product, most probably fuel oil, from the operation of the adjacent mill. The extent of contamination is not significant with the exception of an elevated lead content in soils along the southern and southeast portions of the north landfill area. Metal contamination which results in several exceedences of drinking water standards of site groundwater does not impact offsite (downgradient) drinking water sources or influence the quality of the Schroon River into which groundwater from the site discharges.

The suggested potential future uses of the site include use as a sewage treatment facility or as part of the Adirondack Park Preserve, for park support services or recreational use. While the first scenario limits the exposure of lead in the site soils to adults, thereby not requiring remedial action, the second use would require the reduction of lead in site soils to acceptable levels for site use by children and adolescents. In addition, both future land uses require the removal of site physical hazards associated with the landfills, the discarded surface debris, and the existing onsite structure.

7.2 RECOMMENDATIONS

The findings of this investigation will provide a basis to allow for the evaluation of future alternative uses of the site. Thus it is recommended that the Feasibility Study (FS) element of this project be completed in order to determine the appropriateness of remedial measures or precautions required in each case for developing the site with respect to the potential future land uses identified.

To date, development and initial screening of remedial alternatives have been compiled. The continuation of the FS will focus on four primary operable units: soil and sediment, onsite facility (including the barn structure and landfill areas), and onsite debris. Secondary operable units to be evaluated are groundwater, surface water, and sediment. A summary of the preliminary remedial action alternatives are as follows:

- Soil and Sediment
    - No Action
    - Treatment
    - Containment
    - Onsite/Offsite Disposal
- Onsite Facility
    - No Action
    - Removal and Disposal
    - Decontamination
- Onsite Debris
    - No Action
    - Onsite/Offsite Disposal

o Surface Water and Groundwater

- No Action
- Containment
- Treatment
- Extraction and Disposal
- Monitoring

These remedial action alternatives will be evaluated with respect to cost, environmental impacts, and public health effects, engineering feasibility, and regulatory compliance to allow for the selection of the preferred remedial action alternatives for the future use of the site. In addition, a second round of groundwater samples and general surface soil samples will be collected and analyzed, as suggested by NYSDEC. These results are intended to provide additional information to support the FS evaluation and characterize other than late fall/winter conditions under which the present study was conducted.

At the completion of the FS evaluation, a preliminary report will be provided to NYSDEC for selection of the preferred alternatives. Once this determination has been made, conceptual designs for the selected alternatives will be prepared to complete the FS component of this project. The required remedial actions can then be initiated.

8. REFERENCES

American Conference of Governmental Industrial Hygienists (ACGIH), 1986, Threshold Limit Values and Biological Exposure Indices for 1986-1987.

Bergey's Manual of Determinative Bacteriology, 1974, 8th Edition, R.E. Buchanan and N.E. Giddons, eds., the Williams and Wilkins Company, Baltimore, Maryland.

Driscoll, F. G., Ph.D., January 6, 1988, personal communication, University of Wisconsin, Madison, Wisconsin.

Ecological Analysts, Inc., 1984, Preliminary Investigation of the Warrensburg Board and Paper Corporation Site, Town of Warrensburg, Warren County, New York: Phase I, Summary Report.

Esterbrook, Frank, 1988, personal communication, NYSDEC Water Quality Assessment Section.

Fetter, C. W., 1988, Applied Hydrogeology, Second Edition, Merrill Publishing Company.

Galow, M., July 26, 1988, personal communication, Lake George-Lake Champlain Regional Planning Board.

ICRP, 1984, Report of the Task Group on Reference Man, ICRP Publication 23, International Commission on Radiological Protection, Pergammon Press.

Kimbrough, R., H. Falk, P. Stehr, and G. Fries, 1984, Health Implications of 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) Contamination of Residential Soil, Journal of Toxicology and Environmental Health 14:47-93.

LaGoy, P., 1987, Estimated Soil Ingestion Rates for Use in Risk Assessment, Risk Analysis 7:355-359.

Mitchell, J. J., 1932, "The Origin, Nature, and Importance of Soil Organic Constituents Having Base Exchange Properties," Journal of American Society of Agronomy 24:256-75.

National Oceanic and Atmospheric Administration (NDAA), 1983, Climatic Atlas of the United States.

New York State Department of Environmental Conservation (NYSDEC), 1986, Division of Solid and Hazardous Waste, Inactive Hazardous Waste Disposal Sites in New York State, Volume 5.

__________, 1987a, Division of Solid and Hazardous Waste, Quarterly Status Report of Inactive Hazardous Waste Disposal Sites.

__________, 1987b, Division of Air Resources, New York State Air Quality Report, Ambient Air Monitoring System for 1986.

__________, 1988, Division of Water, Bureau of Monitoring and Assessment, New York State Water Quality 1988 - Submitted Pursuant to Section 305(b) of the Federal Clean Water Act Amendments of 1977 (PL95-217).

New York State Department of Health (NYSDOH), 1982, Division of Environmental Protection Bureau of Public Water Supply Protection, New York State Atlas of Community Water System Sources.

New York State Office of Parks, Recreation, and Historic Preservation (NYS OPRHP), 1983, New York Statewide Comprehensive Recreation Plan, 1983 Summary.

Paustenbach, D., 1987, Assessing the Potential Environment and Human Health Risks of Contaminated Soil, Comments Toxicology 1:185-220.

Rand McNally, 1987, Commercial Atlas and Marketing Guide, 118th Edition, Rand McNally and Company.

Smith, D., July 26, 1988, personal communication, Adirondack Park Agency.

United States Department of the Interior, 1981, Northeast Regional Office, National Park Services, Nationwide Rivers Inventory, Final List of Rivers.

United States Environmental Protection Agency (EPA), 1981, Exposure and Risk Assessment for Phthalate Esters, Office of Water Regulations and Standards.

__________, 1984, Quantification of Toxicological Effects, Section of the Drinking Water Criteria Document on Lead, Office of Drinking Water.

__________, 1986a, Superfund Public Health Evaluation Manual, Office of Emergency and Remedial Response.

__________, 1986b, Guidelines for Carcinogen Risk Assessment, Federal Register 51:33992-34003.

__________, 1986c, Guidelines for the Health Risk Assessment for Chemical Mixtures, Federal Register 51:34014-34025.

United States Geological Survey, (USGS) 1984, USGS Professional Paper 1270, Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, by Hansford T. Shacklette.

United States Public Health Service (USPHS), 1987a, Toxicological Profile for Lead, Agency for Toxic Substances and Disease Registry.

__________, 1987b, Toxicological Profile for Benzo(a)pyrene, Agency for Toxic Substances and Disease Registry.