report. NW. 33025.
1986-04-10. Soil_Investigation
_PCE

SOILS INVESTIGATION TO DETERMINE THE EXTENT OF PCE CONTAMINATION AT THE GENERAL SWITCH SITE

Prepared by

Fred C. Hart Associates, Inc.
296 Washington Avenue Extension
Albany, New York 12203

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1.0 Introduction

Fred C. Hart Associates, Inc. (HART) was retained by the General Switch Corporation (GSC) to conduct a soils investigation at the GSC site in Middletown, New York. This investigation was conducted to further examine on-site soils with respect to tetrachloroethylene (PCE) contamination and local geologic conditions. Specifically, the program was designed to estimate the lateral and vertical extent of PCE contamination in the soil at previously identified areas of significant contamination, and to provide additional information on the depth to undisturbed glacial till in these areas.

1.1 Scope of Work

A total of 20 soil borings were drilled in the areas previously identified as having significant PCE contamination in the soil. Split spoon samples were obtained from each boring and logged with respect to geologic conditions. In addition, samples from each spoon were retained for field and laboratory chemical analysis for PCE.

1.2 Contents of the Report

This report is divided into four sections. The first section presents introductory material pertaining to the purpose and scope of this investigation. The second section provides a brief summary of previous soil investigative activities at the site. Section three provides the detailed information on the purpose, procedures, and results of this investigation. The fourth section presents conclusions based on the results of this investigation. Test boring logs and laboratory analytical data are included as Appendices A and B, respectively.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS

2.1 HART Phase I Investigation

HART conducted a Phase I soil investigation at the GSC site in August and September, 1984. As part of this investigation an OVA/M-Pacto Probe survey was conducted and test pits were excavated. The results of this investigation indicated one isolated area of surficial PCE contamination in the soil at the GSC site. Test pit locations and analytical results are shown in Figure 2-1.

2.2 HART Soil Sampling Program

As a follow-up to the Phase I investigation, HART conducted a soil sampling program at the GSC site on April 8 and 10, 1985. This investigation was conducted in compliance with the Consent Order Agreement between the New York State Department of Environmental Conservation (NYSDEC) and GSC. This investigation was designed to further examine the shallow soils at the GSC site. As part of this investigation, an OVA/M-Pacto Probe survey was conducted and test pits were excavated. The results of this investigation indicated two areas of significant PCE contamination in the soil in addition to the area previously identified in the HART Phase I investigation. Test pit locations and analytical results are shown in Figure 2-2.

2.3 NYSDEC Investigation

The NYSDEC conducted a soil investigation at the GSC site in December, 1983 and March, 1984. As part of this investigation, soil was sampled at depths of from 0 to 2 feet around the GSC site. The results of this investigation indicated isolated areas of shallow PCE contamination in the soil at the GSC site.

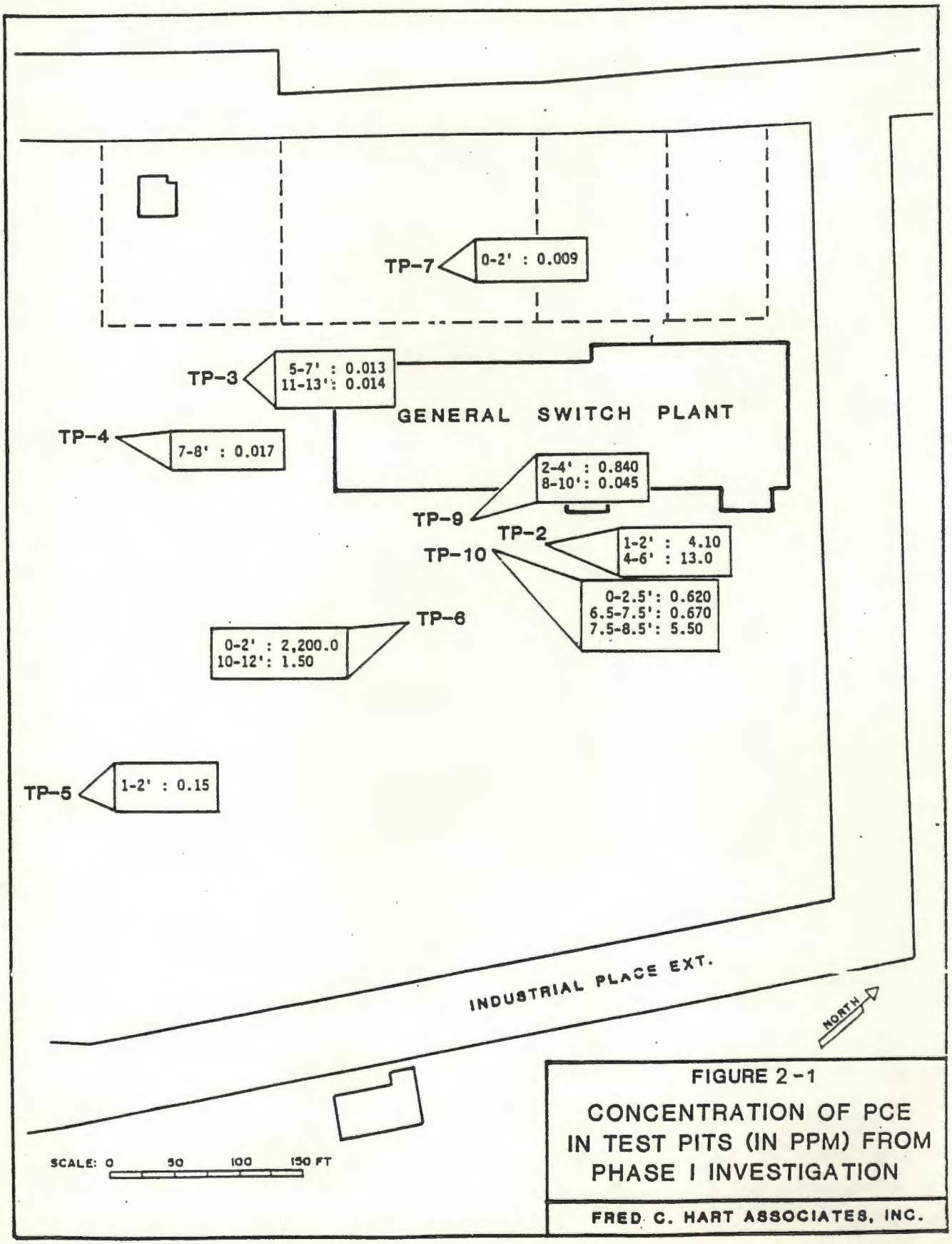

FIGURE 2-1

CONCENTRATION OF PCE IN TEST PITS (IN PPM) FROM PHASE I INVESTIGATION

FRED C. HART ASSOCIATES, INC.

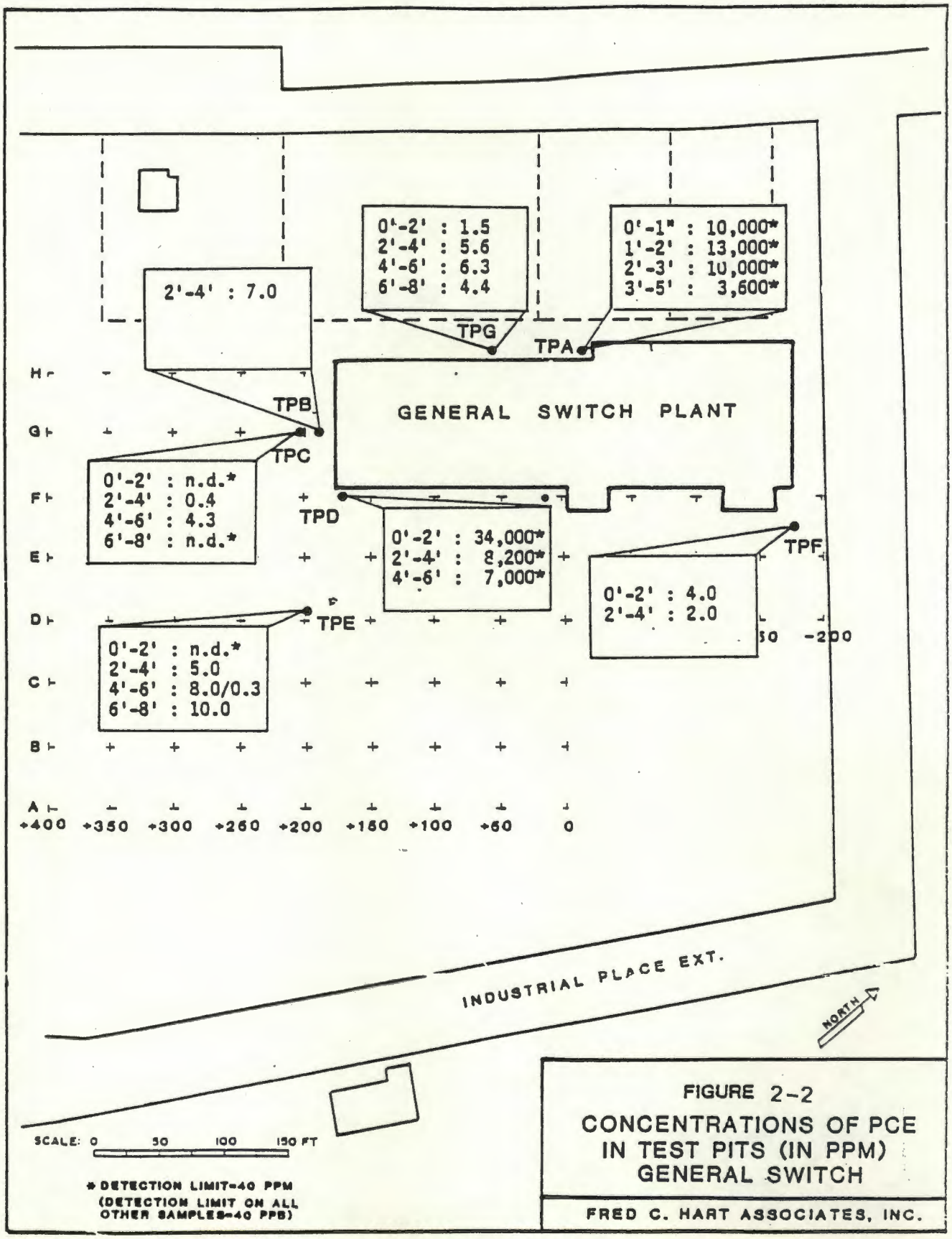

FIGURE 2-2

CONCENTRATIONS OF PCE IN TEST PITS (IN PPM) GENERAL SWITCH

FRED C. HART ASSOCIATES, INC.

3.0 SUMMARY OF INVESTIGATIVE ACTIVITIES

3.1 Introduction

This chapter presents the purpose, procedures, and results of the investigative activities conducted as part of this investigation. The section is divided into two parts. The first is a discussion of procedures and results with respect to site geology. The second addresses the procedures and results of the investigation pertaining to chemical (PCE) analyses.

3.2 Soil Borings Program

3.2.1 Purpose

The purpose of the soil borings program was to provide additional information on the site specific geologic conditions at the GSC facility, and to obtain samples of the soil at varying depths for chemical analyses.

3.2.2 Procedures

A total of 20 soil borings were completed as part of this investigation. Test Borings T-1 through T-14 were completed by Hardin-Huber Soil Testing Company of Crofton, Maryland. Due to access problems encountered using the Hardin-Huber rig, Test Borings T-15 through T-20 were completed by Kendrick Drilling Company of Monroe, New York. The locations of all test borings are shown in Figure 3-1.

The test borings were located based on the results of previous HART investigations indicating significant concentrations of PCE in these areas (Figures 2-1 and 2-2). A grid pattern locating the test borings was established at each of the three areas designated for investigation. This grid was dependent somewhat on rig accessibility.

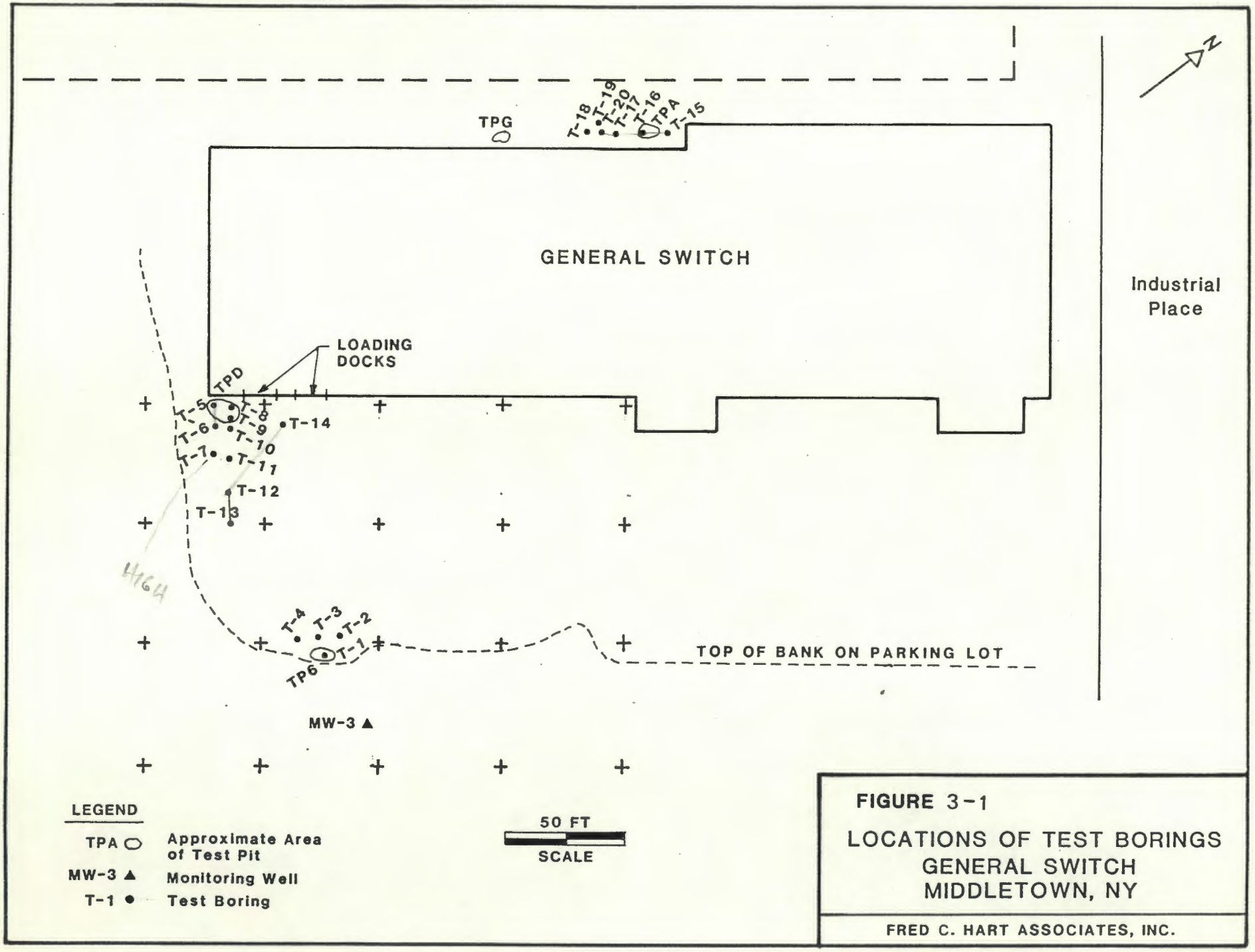

FIGURE 3-1

LOCATIONS OF TEST BORINGS
GENERAL SWITCH
MIDDLETOWN, NY

FRED C. HART ASSOCIATES, INC.

The Hardin-Huber test borings (T-1 through T-14) were completed using a hollow-stem auger rig. Split spoon samples were collected at the discretion of the HART geologist, generally at two-foot intervals. The borings were advanced into the undisturbed glacial till or until split spoon refusal was encountered.

Samples were collected with a two-foot split-spoon sampler and blow counts were recorded at six-inch intervals. A standard 140-pound drop hammer was used to drive the split spoons. The Kendrick test borings (T-15 through T-20) were completed with a mini-rig mounted on tracks equipped with a miniature derrick. The borings were advanced by percussion using a 130-pound drop hammer to drive the split spoon. This method allowed for continuous sampling of the soil (except in T-15). An attempt was made to drive the spoon the full 24 inches at each sampling interval, but due to the resistance of the fill material, this was not always possible.

The contents of each spoon were carefully described and logged. Portions of each sample were placed in a VOA vial for chemical analyses. An Organic Vapor Analyzer (OVA) was used to survey the split-spoon samples and the ambient air around the rigs during drilling operations.

3.2.3 Results

The test boring logs compiled during this investigation are given in Appendix A. A discussion of the geologic conditions encountered during this investigation is presented below.

Test Borings T-1 through T-4 were completed in the vicinity of TP6 (Figure 2-1) near the southeastern edge of the plant parking lot. A brown fill consisting of gravelly clay with sand and silt was found in this area to a depth of approximately 10 feet. Immediately underlying this material was

light brown glacial till consisting of gravelly clay with sand. Deeper test borings completed at 15 to 17 feet indicated a change to a more orange-brown color and a higher percentage of sand. Black to gray shale, which may be indicative of bedrock or boulder, was also found at this depth.

Test Borings T-5 through T-14 were completed in the vicinity of TPD (Figure 2-2) near the loading dock at the southeastern corner of the plant building. These borings generally reflect geologic conditions encountered in T-1 through T-4, except that split-spoon samples taken between 7 and 10 feet indicated a gray till or pale soil horizon overlying the light brown gravelly clay till. This one to two foot layer is predominantly clay to sandy clay with local gravel.

Test Borings T-15 through T-20 were completed in the vicinity of TPA (Figure 2-2), on the northwest side of the building adjacent to Highland Avenue. Due to the limitations inherent in the use of the mini-rig, the maximum depth achieved in this area was approximately 13 feet in TB-17. These test borings apparently penetrated only fill material. The undisturbed glacial till was not encountered.

The fill material, while consisting mainly of glacially derived material, was probably deposited during the construction of the building. The fill consisted of brown, gravelly clay with sand and silt. A gray shale, probably a boulder, was encountered at 13.3 feet in test boring T-17.

3.3 Photovac and Laboratory Chemical Analyses

3.3.1 Purpose

The purpose of the Photovac and laboratory chemical analyses was to provide information regarding the lateral and vertical extent to PCE contamination in the soils at the three areas addressed in this investigation.

3.3.2 Procedures

This part of the investigation was conducted in two phases, a field analysis using the Photovac and a laboratory analysis which was used as a basis for correlating the Photovac results to actual PCE concentrations in the soil. As such, duplicate samples were retained in VOA vials from the split spoon samples, where possible. An attempt was made to ensure that equal volumes of soil were placed in the VOA vials so that a reasonable comparison of PCE contamination between samples could be made. The VOA vials were stored upside down on ice prior to the Photovac analysis, and prior to and during shipment for laboratory analysis.

The Photovac analysis was conducted using a Photovac Model 10S50 portable gas chromatograph (GC). The Photovac GC utilizes photoionization at ambient temperatures. A Model SE30 column with a packing material of silicon gum and a length of four feet was used.

As part of the field analytical procedure, the Photovac was calibrated with a PCE standard. The standard was used for qualitative analysis only. A 100 ul injection of the standard was introduced into the Photovac to obtain the retention time for PCE. For the purposes of this investigation, any sample peak with a retention time like that of the standard was assumed to be PCE. The PCE peak derived from the standard was arbitrarily labelled 1 ppm according to the peak size. All other PCE peaks obtained during the Photovac

analysis were assigned concentrations based on, and with respect to, the initial standard peak size.

Each sample was prepared for analysis by the addition of 25 ml of distilled water to the VOA vials. The samples were then heated for 20 minutes in a water bath of 40 ^{o}C to drive the volatiles into the headspace of the vial. A 100 ul injection was then drawn from the headspace of the vial with an airtight syringe and introduced into the Photovac.

Based on the results of the Photovac analysis, duplicate samples were identified for laboratory analysis. A total of four samples were chosen and sent to Adirondack Environmental Services, Inc. in Rensselaer, New York. The laboratory analysis was conducted to provide quantitative data for the selected duplicate samples. This information was used as a basis for developing a correlation between the actual PCE concentration in the soil and the Photovac data. In this way a reasonable estimation of actual PCE concentrations at all locations where Photovac data was obtained could be made. The four samples identified for laboratory analysis were chosen to cover a range of of PCE concentrations in the headspace from approximately 20 to 1800 ppm.

3.3.3 Results

Table 3-1 presents the results of the Photovac and laboratory analyses. The laboratory report is included as Appendix B.

Before a meaningful discussion of the data can be presented, a correlation between the laboratory data and the Photovac data must be established. As can be seen in Table 3-1, the four samples chosen for laboratory analysis were taken from T-3 at 10 to 12 feet, T-5 at 5 to 7 feet, T-7 at 5 to 7 feet, and T-8 at 5 to 7 feet. The Photovac concentrations for

TABLE 3-1

Photovac and Laboratory PCE Concentrations

Test Boring	Depth (ft.)	Photovac (ppm)	Laboratory (ppm)
T-1	2.5- 4.0	27	
T-1	5.0- 7.0	45	
T-1	10.0-11.0	48	
T-2	0.0- 1.0		
T-2	2.5- 4.5	100-125	
T-2	5.0- 7.0	50-70	
T-2	10.0-12.0	4	
T-2	15.0-17.0	2	
T-3	0.0- 1.0		
T-3	2.5- 4.5	104	
T-3	5.0- 7.0	50-70	
T-3	10.0-12.0	21	3.08
T-3	15.0-17.0	31	
T-4	2.5- 4.5	81	
T-4	5.0- 7.0	179	
T-4	10.0-12.0	18-23	
T-4	15.0-17.0	13	
T-5	0.0- 2.0		
T-5	2.5- 4.5	121	
T-5	5.0- 7.0	72	4.68
T-5	15.0-17.0	38	
T-6	0.0- 2.0	*	
T-6	2.5- 4.5	32	
T-6	5.0- 7.0	100-125	
T-6	10.0-12.0	19	
T-6	15.0-17.0	148	
T-7	0.0- 2.0	*	
T-7	2.5- 4.5	*	
T-7	5.0- 7.0	1692	92.2
T-7	10.0-12.0	19	
T-7	14.0-15.0	83	
T-8	0.0- 2.0		
T-8	2.5- 4.5	*	
T-8	5.0- 7.0	1871	132.4
T-8	8.5-10.5	>500	
T-9	0.0- 2.0		
T-9	2.5- 4.5	*	
T-9	5.0- 7.0	*	
T-9	10.0-12.0	>500	

TABLE 3-1 (continued)

Photovac and Laboratory PCE Concentrations

Test Boring	Depth (ft.)	Photovac (ppm)	Laboratory (ppm)
T-10	0.0- 2.0	*	
T-10	2.5- 4.5	>1000	
T-10	5.0- 7.0	*	
T-10	10.0-10.5		
T-11	0.0- 2.0	*	
T-11	2.5- 4.5	*	
T-11	5.0- 7.0	*	
T-11	7.0- 9.0		
T-12	0.0- 1.0	>203	
T-12	2.5- 4.5	40	
T-12	5.0- 7.0	8	
T-12	9.0-11.0	2	
T-13	0.0- 2.0		
T-13	2.5- 4.5	38	
T-13	5.0- 7.0	45	
T-13	10.0-12.0	1	
T-13	15.0-17.0	24	
T-14	2.5- 4.5		
T-14	5.0- 7.0	150-200	
T-14	10.0-12.0	40	
T-15	0.0- 2.0	1524	
T-15	5.0- 7.0		
T-15	7.0- 9.0		
T-16	2.0- 4.0	1640	
T-16	6.0- 8.0	*	
T-16	8.0- 9.2	*	
T-17	0.0- 2.0	*	
T-17	4.0- 6.0	*	
T-17	8.0-10.0	>1000	
T-17	10.0-12.0	*	
T-17	12.0-13.3	121	
T-18	0.0- 2.0	2	
T-18	4.0- 6.0	3	
T-18	8.0- 9.0	4	
T-19	0.0- 2.0	<1	
T-19	2.0- 4.0	44	
T-19	4.0- 6.0	1	
T-20	0.0- 2.0	*	
T-20	2.0- 4.0	2098	
T-20	8.0-10.0	>1000	

* OVA scan showed greater than 1000 ppm of total volatile organics.

these samples were 21, 72, 1692, and 1871 ppm, respectively. The corresponding laboratory concentrations were 3.08, 4.68, 92.2, and 132.4 ppm, respectively. The results indicate that the concentrations of PCE in the headspace as identified through the Photovac analysis are approximately one order of magnitude greater than the actual concentration of PCE in the soil. Based on this correlation a conservative relationship between the Photovac analysis and the laboratory analysis can be established as follows:

Photovac Analysis (ppm)		Corresponding PCE Concentration in the Soil (ppm)
>1000	<-- significant contamination -->	>100
100-1000	<-- moderate contamination -->	10-100
1-10	<-- low contamination -->	<1

10-100?

NOTE: Not all samples collected were analyzed with the Photovac. If the OVA scan of the split spoon indicated a high concentration of total volatile organics (greater than 1000 ppm) it was assumed that the sample was highly contaminated and a Photovac analysis was not performed. Based on the OVA results from this study and laboratory analytical results from previous studies, PCE concentrations in the soil around TPA and TPD are known to be higher than 200 ppm. The following discussion addresses only the Photovac results which, based on the laboratory correlation, showed concentrations of 200 ppm or less.

With the above relationship in mind, the following is a discussion of the findings of the chemical analyses of this soils investigation.

Soil samples taken from the area around TP6, which included Test Borings T-1 through T-4, showed PCE concentrations in the range of less than 1 to approximately 20 ppm.

With respect to contamination in the vertical direction, the higher concentrations were found at depths of 2 to 7 feet., as indicated in Test Borings T-2, T-3, and T-4. PCE contamination below a depth of 10 feet and extending to a depth of 17 feet was in the range of 1 to 5 ppm for all samples analyzed in this area.

With respect to the lateral extent of PCE contamination in this area, all four test borings generally showed the same degree of contamination. It appears that PCE contamination at concentrations of less than 20 ppm extends laterally beyond the area investigated with Test Borings T-1 through T-4.

Soil samples taken from the area around TPD, which included Test Borings T-5 through T-14, showed PCE contamination in the range of less than 1 ppm to approximately 200 ppm.

With respect to contamination in the vertical direction in this area, the higher concentrations were found at depths of 0 to 12 feet, with the highest concentrations generally at depths of less than 10 feet. Concentrations in samples taken at depths of 12 to 17 feet were in the range of approximately 5 to 15 ppm.

With respect to the lateral extent of PCE contamination in this area, the highest concentrations were found in Test Borings T-7, T-8, T-9, T-10 and T-11, at levels of up to approximately 200 ppm with the Photovac and greater than 1000 ppm with the OVA. The lowest concentrations were found in Test Borings T-5, T-6, T-12, T-13 and T-14, in a range of less than 1 ppm to approximately 20 ppm. It appears that these test borings roughly define the lateral extent of PCE contamination in this area.

Soil samples taken from the area around TPA, which included Test Borings T-15 through T-20, showed PCE contamination in a range of less than 1 ppm to approximately 200 ppm.

With respect to contamination in the vertical direction in this area, the analytical data generated is less conclusive than in the preceding two areas. Due to the liminations of the mini-rig, as previously discussed, we were unable to extend our borings through the heavily contaminated fill material into the undisturbed glacial till. It appears that there is significant contamination in the vertical direction in this area to at least a depth of 10 to 12 feet.

With respect to the lateral extent of PCE contamination in this area, the highest concentrations were found in Test Borings T-15, T-16, T-17, and T-20, at levels of up to approximately 200 ppm with the Photovac and greater than 1000 ppm with the OVA. However, Test Boring T-19 had a maximum concentration of approximately 5 ppm and all three concentrations in T-18 were less than 1 ppm. It appears that Test Boring T-19 roughly defines the lateral extent of PCE contamination parallel to the building in this area.

4.0 CONCLUSIONS

Based on the results of this and previous soil investigations conducted at the GSC site, the following conclusions may be drawn:

1. There is a layer of undisturbed glacial till at a depth of approximately 10 to 12 feet in the two areas investigated in the parking lot in the vicinity of TP6 and TPD. This layer is at least 5 feet thick based on borings taken to 17 feet in these areas. This till layer was not encountered in the area investigated around TPA to a depth of approximately 13 feet. The permeability of this till layer is on the order of 10^{-7} cm/sec., based on the results of two triaxial tests performed in a previous study on relatively undisturbed samples of this material.

2. It appears that this till layer is acting as a barrier to vertical migration of PCE contamination from the contaminated fill in the two areas investigated in the parking lot. The vertical extent of PCE contamination in these two areas is to a depth of 10 to 12 feet. Below this depth contamination is less than 5 ppm and in most cases less than 1 ppm.

3. The vertical extent of contamination around TPA was not defined. There appears to be significant contamination to a depth of at least 10 to 12 feet in this area. It is likely that the glacial till layer identified in previous borings extends underneath this area of contamination. If that is the case, it would also act as a barrier to vertical migration of PCE contamination in this area.

4. The lateral extent of PCE contamination in the area around TPD is roughly defined by Test Borings T-5, T-6, T-12, T-13, and T-14.

5. The lateral extent of contamination in the area around TPA is roughly defined by Test Boring T-19 and the GSC property line adjacent to this area.

6. The lateral extent of contamination in the area around TP6 was not defined. Maximum concentrations of PCE in this area ranged from approximately 10 to 20 ppm.

APPENDIX A

Test Boring Logs

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-1
PROJECT General Switch	LOCATION Middletown, N.Y.
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig w/ H.S.A.
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPE OF BIT	DATE START 3-4-86 / DATE FINISH 3-4-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS SS - Split Spoon; HSA - Hollow Stem Auger; T.D. - Total Depth	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
			HSA					
		S-1	SS	0.4	2·3 4·1	Med. brn FILL - gravel, silt & clay		
	5		HSA					
		S-2	SS	0.7	4·6 7·7	The SAME		
			HSA					
	10	S-3	SS	0.4	3·4 50/11	Lt. brn. TILL (?) - GRAVELLY-CLAY		
						T.D. — 10.5 ft		
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-2
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig with H.S.A
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-4-86 / DATE FINISH 3-4-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/FT	DEPTH FT	SAMPLE No.	TYPE	RECOVERY FT.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS		24 51/3"			
			HSA					
		S-2	SS	1.2'	9-14 9.8	Med. brn. FILL - gravelly clay; silt and sand;		
	5		HSA					
		S-3	SS	0.4'	6-7 8-7	SAME		
			HSA					
	10	S-4	SS	0.7	11-28 21-16	Lt. brn. TILL (?) - gravelly clay; moist		
			HSA					
	15	S-5	SS	2.0	9-26 43-22	1.2 - Lt./orange/brn. CLAYEY SAND & GRAVEL; wet 0.8 Blk-gray SHALE/CLAY (Boulder?); Damp to dry		
	20					17ft Total Depth		
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-3
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPF OF BIT	DATE START 3-4-86 / DATE FINISH 3-4-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	0.6	37	Brn. FILL; SAND, CLAY & GRAVEL		
			HSA		51/3"			
		S-2	SS	1.2	7-7	Brn. FILL; CLAYEY-GRAVEL & SAND; dry, damp.		
			HSA		12-19			
	5	S-3	SS	0.8	7-8	SAME; damp		
			HSA		7-6			
	10	S-4	SS	1.7	5-18	Lt. brn. TILL (?) GRAVELLY-CLAY & SANDY-CLAY; moist to damp.	Duplicate	
			HSA		18-14			
	15	S-5	SS	1.1	19-10	SAME		
					11-15			
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-4
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K Sheppard
SIZE & TYPE OF BIT	DATE START 3-4-86 / DATE FINISH 3-4-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY in.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
			HSA					
		S-1	SS	1.2	6-7 7-9	Brn. FILL; CLAYEY-GRAVEL, with SAND & SILT		
	5		HSA					
		S-2	SS	0.9	3-6 6-7	SAME		
			HSA					
	10	S-3	SS	1.2	2-10 43-22	Lt. brn. TILL GRAVELLY-CLAY; WITH SAND; damp.		
			HSA					
	15	S-4	SS	1.2	21-32 19-37	Orange-brn. CLAYEY-SAND & blk. to gry. Shale (Shale=boulder?)		
						T.D. = 17'		
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-5
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber.	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-4-86 / DATE FINISH 3-4-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split-Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
			HSA					
		S-1	SS	0.8	4·8 7·10	Brn. FILL; Gravelly-CLAY; Sand; Silt; damp to moist		
	5		HSA					
		S-2	SS	1.0	13 14 6-6	Brn. FILL; CLAYEY-SAND, with gravel; moist	Duplicate	
			HSA					
	10	S-3	SS	0.9	30 5 1/2"	Lt. Brn. TILL ? (FILL?); sandy, gravelly CLAY		
							Unable to drill augers past 10.5 ft.	
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
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NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-6
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber.	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split-Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	0.7	4-13 14-7	Brn. FILL; GRAVELLY - CLAY; WITH Sand & Silt.		
			HSA					
		S-2	SS	1.3	3-6 4-13	SAME		
	5		HSA					
		S-3	SS	0.5	19-16 12-8	SAME		
			HSA					
	10	S-4	SS	1.5	5-10 14-23	Lt. brn. TILL; abundant CLAY; SILTY CLAY; With GRAVEL; Some with sand; damp; moist		
			HSA					
	15	S-5	SS	0.9	12-37 16-14	Lt. brn. TILL; abundant CLAY & GRAVEL; Some sand; Wet		
						T.D. 17ft.		
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-7
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig w/ HSA
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS
	0	S-1	SS	1.5	7-8 / 10-8	Brn. FILL: CLAYEY-GRAVEL w/ SAND & SILT; damp-moist	
			HSA				
		S-2	SS	0.2	7-8 / 4-4	The SAME	Poor Recovery
	5		HSA				
		S-3	SS	0.9	8-19 / 13-16	The SAME; damp	-Duplicate
			HSA				
	10	S-4	SS	0.9	8-11 / 10-9	Lt. (orange) brn TILL; SANDY-CLAY, w/ Gravel; abndnt silt, dry to damp	
			HSA				
	15	S-5	SS	0.7	14-5½"	Brn TILL; SANDY-GRAVEL (Shale); w/ to some clay, silt; wet	-Auger Refusal at 14 ft. -near bedrock?
	20						
	25						

GRAPHIC LOG

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-8
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split-Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS
		S-1	SS	0.6	1-2 1-1	Brn. FILL; CLAYEY-GRAVEL with sand, silt; wet	
			HSA				
		S-2	SS	0.25	1-2 2-1	SAME	
	5		HSA				
		S-3	SS	0.7	4-7 6-6	SAME	Duplicate
			HSA				
		S-4	SS	1.7	11-13 14-9	Lt. brn. TILL; CLAY; with gravel; some silt, sand, damp to moist	8.5' Auger refusal no reading on OVA, but distinct odor 8.5': 60 ppm OVA Split-Spoon; (8.5 ft to 10.5 ft) 8 ppm OVA
	10						
	15						
	20						
	25						

GRAPHIC LOG

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-9
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #140 / FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	0.7	1-2 / 1-2	Brn. TILL; Sandy, CLAYEY-GRAVEL with Silt; wet		
			HSA					
		S-2	SS	0.2	1-2 / 2-2	SAME; distinct odor; (no OVA change)		
	5		HSA					
		S-3	SS	0.9	2-4 / 5-9	SAME; distinct odor		
			HSA					
	10	S-4	SS	1.4	2-7 / 5-8	Lt. Brn. TILL; GRAVELLY-CLAY; with Silt, Some sand; damp to dry 1 ppm OVA		
			HSA					
		S-5	SS	0.2	51/5"	brn. GRAVEL; Poor Recovery No Sample obtained	13.5' auger refusal	
	15							
	20							
	23							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-10
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Harain Huber	DRILLING EQUIPMENT Mobile Rig with HSA
GEOLOGIST J. Brown	DRILLER K. Sheppard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split-Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	0.3	5-8 13-15	Brn. FILL; CLAYEY, SANDY-GRAVEL		
			HSA					
		S-2	SS	1.2	7-9 11-13	SAME; distinct odor 30 ppm OVA		
	5		HSA					
		S-3	SS	1.4	11-12 18-12	SAME; distinct odor; ~10 ppm OVA		
			H S A					
	10	S-4	SS	0.4	51/6"	0.2 Gry-blk. CLAY; w/ roots 0.2 Lt. brn. CLAY w/ sand, silt tr.f. gravel } TILL No odor, No OVA reading	10' auger refusal	
						T.D. 10.5 ft.		
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-11
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin Huber	DRILLING EQUIPMENT Mobile rig w/ HSA
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS
		S-1	SS	0.8	5-11 11-12	Brn FILL: CLAYEY-SAND & GRAVEL; some silt, moist	OVA: "1 ppm"
			HSA				
		S-2	SS	0.9	9-5-6-5	The SAME	OVA: 25 ppm
			HSA				
	5	S-3	SS	1.1	8-16-19-21	The SAME; damp	OVA: 4 ppm " "
		S-4	SS	—	4-8-10-7	Blk-gry TILL: CLAY w/ roots; some-fr. gravel, some silt, dry to damp	- Auger Refusal at 7 ft.: 70 ppm - OVA probe out of augers at 7 ft.
	10						"T.D." - 9 ft.
	15						
	20						
	25						

GRAPHIC LOG

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. P.037i	BORING NO. T-12
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile Rig w/ H.S.A.
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPE OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split-Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE Blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
	0	S-1	SS	0.9	10 · 5½	Brn. FILL - abndnt SAND, CLAY & GRAVEL; damp	distinct odor	
			HSA					
		S-2	SS	0.3	11 · 14 15 · 18	The SAME	No odor	
	5		HSA					
		S-3	SS	1.5	9 · 18 13 · 19	Brn FILL - GRAVELLY-CLAY: w/ sand, silt		
			HSA					
	10	S-4	SS	1.3	20 · 3 4 · 9	Grn-gry TILL: abndnt SANDY-CLAY w/ GRAVEL, some silt, v. moist to wet: "gumbo" texture	Auger Refusal at 9 ft. "T.D." - 11 ft.	
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-13
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin – Huber	DRILLING EQUIPMENT Mobile rig w/ HSA
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPF OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	1.1	12·11 / 14·15	Brn FILL: CLAYEY-SAND & GRAVEL; dry to damp	no noticeable odor	
			HSA					
		S-2	SS	0.5	12·11 / 11·17	The SAME; damp.		
	5		HSA					
		S-3	SS	1.1	5·7 / 6·4	The SAME; damp to moist		
			HSA					
	10	S-4	SS	1.2	2·3 / 17·18	0.8 Grn-Gry TILL: GRAVELLY-CLAY moist 0.4 Orange-brn TILL: SILTY-CLAY w/ Gravel, damp		
			HSA					
	15	S-5	SS	1.3	10·19 / 27·23	Orange-brn TILL: CLAYEY-GRAVEL abndnt Sand; w/ silt, wet	T.D.: 17 ft ~54 ft away from plant bldg.	
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-14
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Hardin-Huber	DRILLING EQUIPMENT Mobile rig w/ HSA
GEOLOGIST J. Brown	DRILLER K. Shepard
SIZE & TYPF OF BIT	DATE START 3-5-86 / DATE FINISH 3-5-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING: DESCRIPTION	REMARKS	GRAPHIC LOG
			HSA					
		S-1	SS	1.2	18-20 21-23	Brn FILL: CLAYEY-SAND & GRAVEL, w/ silt; damp to dry		
	5		HSA					
		S-2	SS	0.7	7-9 7-4	The SAME		
			HSA					
	10	S-3	SS	0.6	11-50/6"	Orange-brn TILL; Gravelly SILTY-CLAY w/ sand damp to moist	T.D. = 11 ft (split spoon and Auger Refusal)	
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-15
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Kendrick	DRILLING EQUIPMENT Mini-Rig and Derrick
GEOLOGIST J. Brown	DRILLER Emmett
SIZE & TYPE OF BIT	DATE START 3-6-86 / DATE FINISH 3-6-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #130 / FALL ~30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS Per. - Percussion hole expansion; See T-1 for other remarks	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS
	0	S-1	SS	0.9	1·17 12·18	Brn FILL: CLAY, some Gravel	Upper 0.1 ft w/ small metal frags. OVA: ~ 7 ppm
			Per.				
	5	S-2	SS	1.5	14·25 40·70	Lt. brn to choc. brn 'FILL': GRAVELLY-CLAY, w/ silt, damp	(TILL material)
		S-3	SS	1.4	25·41 40·70	Brn. 'FILL' (TILL) - GRAVELLY CLAYEY-SAND; abndnt clay & sand	- Distinct odor at top of SS (OVA: 3 ppm)
	10	S-4	SS	—	100/5"	The SAME	Refusal at 9.5 ft.
	15						
	20						
	25						

GRAPHIC LOG

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-16
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Kendrick	DRILLING EQUIPMENT Mini-rig and derrick
GEOLOGIST J. Brown	DRILLER Emmett
SIZE & TYPE OF BIT	DATE START 3-6-86 / DATE FINISH 3-6-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #130 / FALL ~30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	0.5	1 1 / 2 2	Brn & Blk FILL: abndnt CLAY & GRAVEL	abndnt small metal frags.; 0.1 ft	
		S-2	SS	1.0	5 13 / 10 7	Brn FILL: CLAYEY-SAND & GRAVEL, wet	distinct odor OVA: 20 ppm	
	5	S-3	SS	1.5	15 16 / 15 20	The SAME	OVA: 7 ppm	
		S-4	SS	0.7	23 24 / 26 27	Lt. brn, grn-gry "FILL" (TILL?): GRAVELLY-CLAY, some sand	OVA: 2 ppm	
		S-5	SS	0.9	36 56 / 100/3"	Brn "FILL" (TILL?): CLAYEY-SAND, w/ gravel	faint odor	
	10						T.D./Refusal: 9.2 ft	
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i	BORING NO. T-17
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Kendrick	DRILLING EQUIPMENT Mini rig and derrick
GEOLOGIST J. Brown	DRILLER Emmett
SIZE & TYPF OF BIT	DATE START 3-6-86 / DATE FINISH 3-6-86
CASING — / HAMMER WT. — / FALL —	SAMPLER Split Spoon / HAMMER WT #130 / FALL ~30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS See T-1	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS
		S-1	SS	1.2	1 5 / 11 13	Brn FILL - GRAVELLY-CLAY, w/ sand wet	0.2 ft of Metal frags. at surface OVA: 6 ppm
		S-2	SS	0.8	9 7 / 10 15	Lt. brn FILL - SANDY-CLAY w/ gravel, wet to moist	distinct odor OVA: 6 ppm
	5	S-3	SS	1.0	31 20 / 19 21	Lt. (choc.) brn FILL - CLAYEY-SAND w/ gravel; loc. gry clay	OVA: 3 ppm
		S-4	SS	1.2	18 20 / 20 23	The SAME; abndnt gravel	OVA: 9 ppm
		S-5	SS	0.7	34 36 / 10 8	The SAME AS ABOVE	- distinct odor
	10	S-6	SS	1.5	28 18 / 20 22	Lt. brn TILL?; GRAVELLY-CLAY w/ sand; damp to dry	- distinct odor
		S-7	SS	1.2	55 32 / 100/4"	1.0 Brn. TILL?; SAND, w/ clay & gravel	- no odor
	15					0.2 Gry SHALE (BOULDER?)	T. D/Refusal: 13.3 ft.
	20						
	25						

GRAPHIC LOG

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-18
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Kendrick	DRILLING EQUIPMENT Mini rig and derrick
GEOLOGIST J. Brown	DRILLER Emmett
SIZE & TYPE OF BIT	DATE START 3-6-86 / DATE FINISH 3-6-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #130 FALL ~30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS	

LOG OF BORING

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	1.6	1.5 6.10	0.3 Dk. gry CLAY (TOPSOIL) 1.3 Brn FILL - GRAVELLY-CLAY	No odor	
		S-2	SS	1.3	9.10 12.10	Brn FILL: CLAYEY-SAND w/ gravel moist	No odor	
	5	S-3	SS	1.2	25.22 29.34	The SAME; abndnt gravel		
		S-4	SS	0.9	16.16 17.19	0.4 The SAME 0.5 Lt. brn TILL? laminated CLAY & GRAVELLY-SAND		
		S-5	SS	1.0	24.32 100/.5"	Brn TILL?: CLAYEY-SAND, w/ gravel	No odor T.D./Refusal: 9 ft	
	10							
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A037i | BORING NO. T-19

PROJECT General Switch | LOCATION Middletown, NY

DRILLING CONTRACTOR Kendrick | DRILLING EQUIPMENT Mini rig and derrick

GEOLOGIST J. Brown | DRILLER Emmett

SIZE & TYPE OF BIT | DATE START 3-6-86 | DATE FINISH 3-6-86

CASING — | HAMMER WT. — | FALL —

SAMPLER Split Spoon | HAMMER WT #130 | FALL ≈30"

WELL CASING | SCREEN MAKE & TYPE | LENGTH | SLOT

ELEVATION OF | GROUND SURFACE | WELL CASING | SCREEN | WATER | DATE

REMARKS

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	1.5	1·3 6·7	0.6 Gry CLAY (TOP SOIL) 0.9 Orange brn CLAYEY-SAND w/ gravel		
		S-2	SS	1.4	16·37 52·47	The SAME		
	5	S-3	SS	1.1	59·62 59 100/3"	The SAME	Refusal / T.D. ≈6 ft	
	10							
	15							
	20							
	25							

FRED C. HART ASSOCIATES, INC.
530 FIFTH AVENUE
NEW YORK, NEW YORK 10036

JOB NO. A0371	BORING NO. T-20
PROJECT General Switch	LOCATION Middletown, NY
DRILLING CONTRACTOR Kendrick	DRILLING EQUIPMENT Mini-rig and derrick
GEOLOGIST J. Brown	DRILLER Emmett
SIZE & TYPE OF BIT	DATE START 3-6-86 / DATE FINISH 3-6-86
CASING — HAMMER WT. — FALL —	SAMPLER Split Spoon HAMMER WT #140 FALL @ 30"
WELL CASING	SCREEN MAKE & TYPE / LENGTH / SLOT
ELEVATION OF GROUND SURFACE	WELL CASING / SCREEN / WATER / DATE
REMARKS	

CASING BLOWS/ft	DEPTH ft	SAMPLE No.	TYPE	RECOVERY ft.	PENETRATION RESISTANCE blows/6"	LOG OF BORING — DESCRIPTION	REMARKS	GRAPHIC LOG
		S-1	SS	1.4	1-3 / 10-14	0.3 Gry CLAY (TOP SOIL) w/ metal frags 1.1 Orange-brn FILL - SAND w/ CLAY & GRAVEL	distinct odor OVA: 20ppm	
		S-2	SS	1.1	9-15 / 43-40	Brn FILL - SANDY-CLAY w/ Gravel (loc. GRAVEL, CLAY layers)	distinct odor OVA: 10 ppm	
	5	S-3	SS	1.0	42-33 / 34-35	The SAME (No loc. layers)	distinct odor OVA: 15 ppm	
		S-4	SS	1.1	21-22 / 30-22	Brn FILL (TILL?) CLAYEY-SAND w/ Gravel	Faint odor	
		S-5	SS	1.1	21-36 / 34 100/5"	0.7 The SAME 0.4 Brn TILL?: GRAVELLY-CLAY, some sand, damp	T.D./Refusal; 10 ft	
	10							
	15							
	20							
	25							

APPENDIX B

Laboratory Analyses

Adirondack Environmental Services, Inc.
P.O. Box 265
298 Riverside Avenue
Rensselaer, NY 12144
(518) 434-4546

LABORATORY REPORT

Client: Fred C. Hart Associate, Inc.
296 Washington Avenue Extension
Albany, NY 12203

Attention: Mr. Brian Jacot

No. Samples analyzed 4

Date Received: 3/13/86 Sample Taken By: A. Levy

Matrix: Soil

Date Sampled: _____ Location: _____

Composite or Grab: _____

Methods are in accordance with STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, and METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, (EPA), unless otherwise noted or attached.

PARAMETER(S)	Your sample ID / AES NUMBER	T-5 / 860313H01	T-8 / 860313H02	T-3 / 860313H03	T-7 / 860313H04		UNITS(1)	LABORATORY NOTE BOOK REFERENCE
Tetrachloro-ethylene		4680	132,400	3080	92,200		ug/kg	TF-B-34

(1)Units are expressed in mg/l unless otherwise stated.

NA = Not Applicable
ND = Not Detectable
< = less than
> = greater than

Approved by: Paul Batuski

Date: 3/20/86

Specializing in Hazardous Waste and Petroleum Product Analyses