Report. hw. 336025.
1985-07-11, Soil_
Sampling-Report

SOIL SAMPLING PROGRAM
GENERAL SWITCH SITE

JULY 85

Prepared by:

Fred C. Hart Associates, Inc.
530 Fifth Avenue
New York, NY 10036

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CHAPTER I

INTRODUCTION

Fred C. Hart Associates, Inc. (HART) was retained by the General Switch Corporation (General Switch) to conduct a Soil Sampling Program at the General Switch plant in Middletown, New York. In compliance with the Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and General Switch, and with the verbal approval of EPA, the investigation was designed to examine the shallow soils around the plant. This report contains the results of the field investigation that was carried out between April 8, 1985 and April 10, 1985.

A. Purpose of Phase I Hydrogeologic Investigation

The objective of the proposed soils investigation was to provide additional data regarding tetrachloroethylene (PCE) and trichloroethylene (TCE) concentrations in soils near and adjacent to the General Switch plant.

B. Scope of Work

HART conducted an OVA/M-Pacto probe survey and excavated seven test pits to gather additional information on the extent of PCE and TCE contamination at the site. The location of the test pits was determined by previous investigative work at the site. Soil samples were collected from the test pits and analyzed to determine the vertical and horizontal extent of PCE and TCE contamination.

C. Contents of Report

This report has been divided into four chapters. The first chapter contains introductory material pertaining to the purpose and scope of the investigation. The second chapter provides a summary of previous soil sampling and test pit activities at the site. An account of the field investigative methods and results is found in the third chapter. The fourth chapter contains the conclusions generated by the investigation. All of the test pit logs and laboratory data have been placed at the end of the report in the Appendices.

CHAPTER II

SUMMARY OF PREVIOUS SOILS INVESTIGATIONS

A. HART Hydrogeologic Investigation

HART initially conducted a Hydrogeologic Investigation at the General Switch site during the months of August and September, 1984. The results of the past investigation indicated that there were some isolated areas in the surficial soils with above background levels of PCE at the site.

During the previous OVA/M-pacto probe survey, three areas of above background volatile organic readings were found in the parking lot. Two were on the northwestern side of the parking lot in the general vicinity of the loading dock and one was on the northeastern side of the lot.

Ten test pits were also excavated during the previous investigation. In general, the test pit samples from outside of the parking lot contained low levels of PCE (0.009 ppm to 0.15 ppm). With the exception of one sample from the northwestern edge of the parking lot containing 2200 ppm PCE, the levels of PCE in the parking lot were generally below 5 ppm (Figure II-1). Therefore the test pit results, like the results of the OVA/M-pacto probe survey, indicate that the areas of PCE contamination tend to be isolated.

B. NYSDEC Investigation

In December 1983, NYSDEC sampled soil at depths from 0 to 2.5 feet below the ground surface at a site just south of the plant building. The results of the chemical analyses showed relatively low concentrations of PCE at the top and bottom of the hole and higher concentrations (100 ppm) at depths of one to two feet. A second round of soil samples was taken from within a 100 foot radius of the plant in March, 1984. The sample indicating the highest level of PCE (1,000 ppm) was found on the northwest side of the plant. Two other samples from the southwestern corner of the plant contained 95 and 400 ppm PCE, while the other soil samples contained less than 10 ppm.

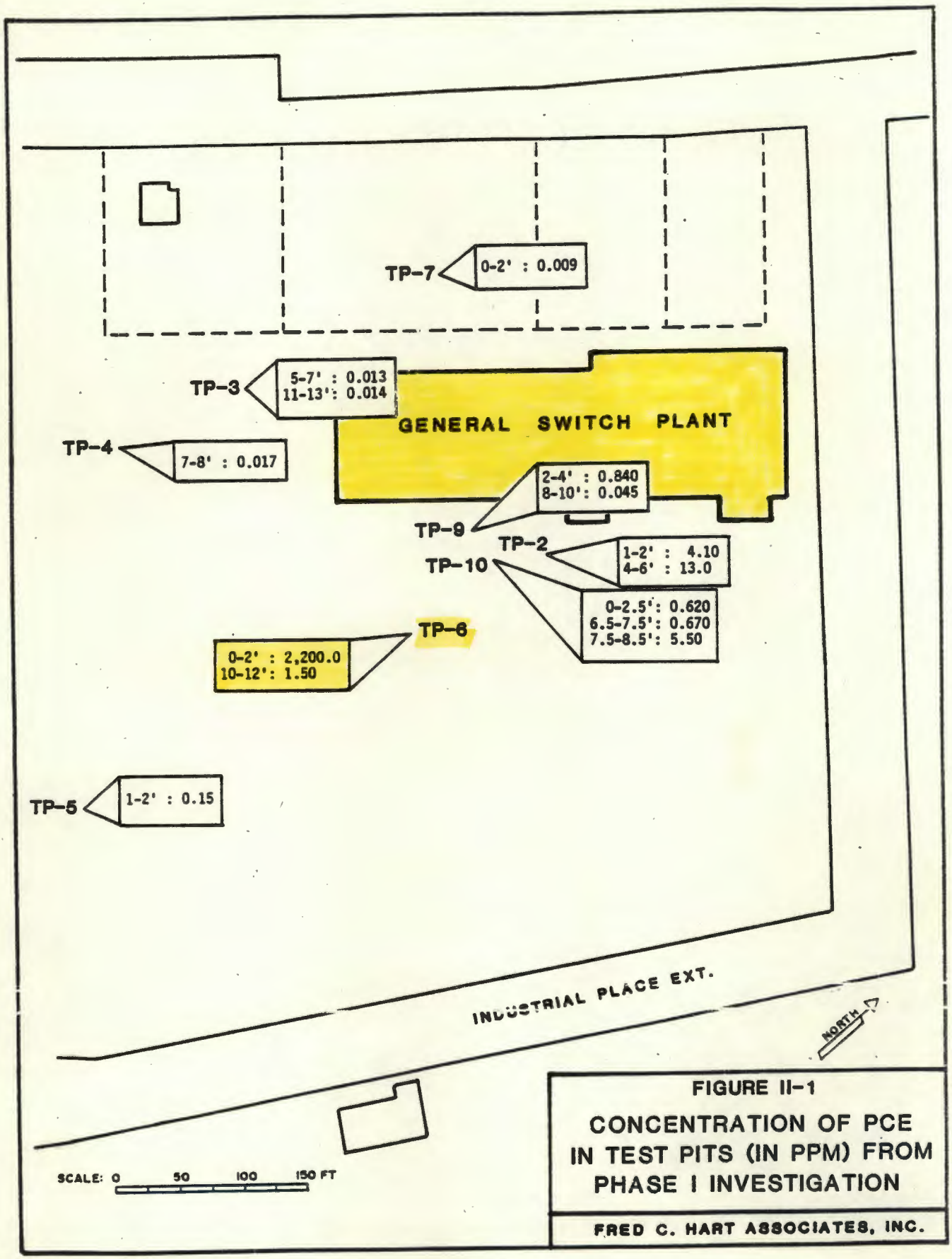

FIGURE II-1

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

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CHAPTER III

SUMMARY OF FIELD INVESTIGATIVE ACTIVITIES

A. Introduction

This chapter contains the purpose, procedures and results of all field investigative activities as well as the chemical data generated by these activities. The activities completed were:

1. OVA/M-Pacto Probe Survey
2. Test Pits
3. Soil Sampling and Chemical Analyses

B. OVA/M-Pacto Probe Survey

1. Purpose

The OVA/M-Pacto Probe Survey was conducted at the General Switch facility to determine if significant concentrations of PCE or TCE were present in soil pore spaces at or below the ground surface. The survey was designed to cover specific areas identified by NYSDEC in the Consent Order and by EPA during the January 1, 1985 meeting. The areas of interest included the area on the northwest side of the plant, the area on the southwest side of the plant, and parts of the parking lot.

2. Procedures

In order to establish centralized reference points from which to correlate the data generated by the OVA/M Pacto Probe Survey, a grid system was staked out and tied into the Phase I grid. With the use of a Brunton compass, a "base-line" was established and intervals of 25 feet were measured along this line. Perpendicular lines at each 25 foot interval were used to complete the grid for the survey (Figure III-1). The intersections between the northeast trending lines and the northwest trending lines were marked

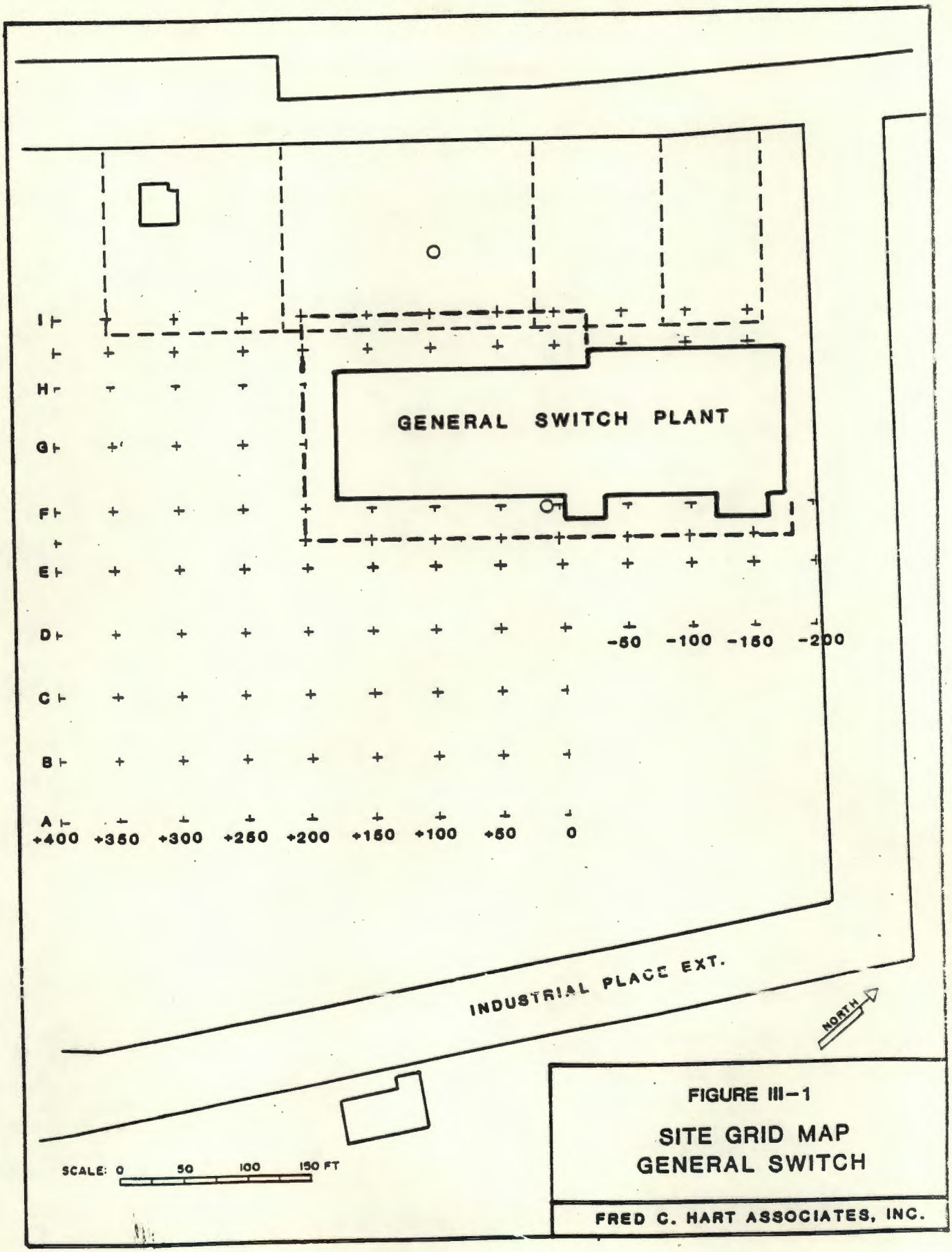

FIGURE III-1

SITE GRID MAP
GENERAL SWITCH

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with flags and each flag was identified with the appropriate letter and number.

Once the new reference grid was established, the OVA/M-Pacto probe survey was carried out. The survey covered the area outlined in Figure III-1. At twelve and a half foot intervals along the grid, a 3/4" diameter probe with a drop hammer was driven approximately 1 to 2 ft into the ground. Immediately after the probe was withdrawn, the air was sampled and analyzed through the inlet port of Century Systems Model 128 Organic Vapor Analyzer (OVA). The OVA was operated in survey mode to provide a qualitative indication of total volatile organic hydrocarbons trapped in the interstitial air space between soil particles. The instrument response was calibrated to a methane standard and the data collected was reported in ppm volatile organic hydrocarbons.

3. Results

The results of the OVA/M-Pacto Probe Survey are summarized in Figure III-2. The data suggests that there is only one area with low levels of volatile organic contamination on the northwestern side of the plant. Readings of 0 ppm total volatile organics were recorded at all other grid stations. The survey was conducted on a fairly cold and windy day which made it difficult to collect accurate volatile organic readings. However, a decision was made to go ahead with the test pit phase since there was sufficient data from previous investigations to select appropriate locations for the test pits.

B. Test Pits

1. Purpose

A total of seven test pits were excavated to provide both geological and analytical data about shallow subsurface conditions at the General Switch site. Soil samples were collected from each pit for laboratory analyses of PCE and TCE concentrations. In additions, test pits were logged to record data about OVA scans, soils and geology.

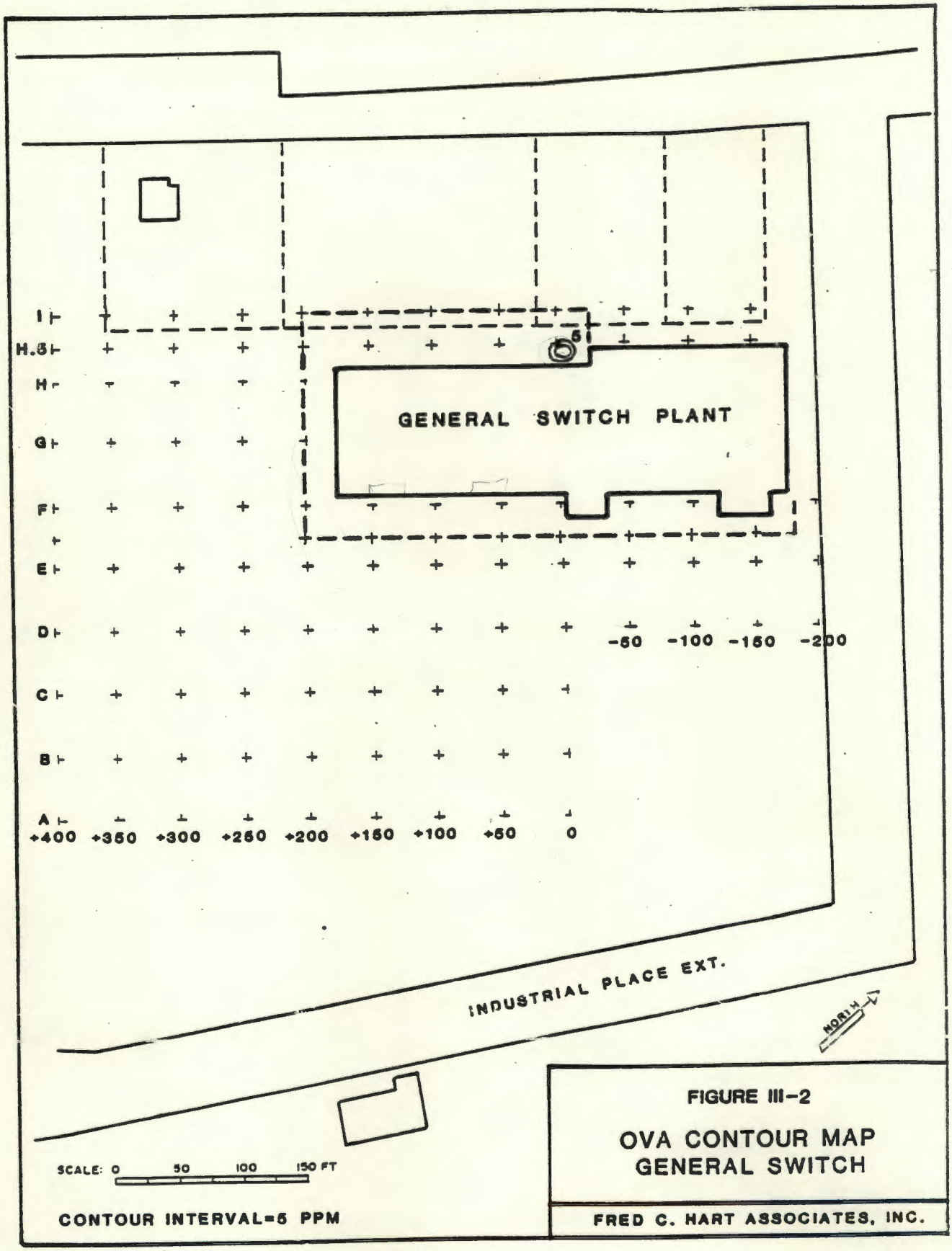

FIGURE III-2

OVA CONTOUR MAP
GENERAL SWITCH

FRED C. HART ASSOCIATES, INC.

2. Procedure

A tractor-mounted backhoe and operator were provided by Drew Evanyke and Son of Goshen, New York for the test pits. The operator excavated 6 to 8 foot pits at seven sites (Figure III-3). The sites were chosen on the basis of data gathered in the preceeding soils investigations. Three of the test pits were located near the General Switch building in the areas of high OVA/M-Pacto probe readings reported in the Hydrogeological Investigation Report. In addition, three test pits were located on or near the location where samples #84-081-01 and #84-081-05 were collected by NYSDEC on March 3, 1984 (Figure III-3).

Before the backhoe operation began, an equipment decontamination (decon) and storage site was established. This site was used to prepare and clean trowels and equipment for sampling and as a storage area for the cooler and extra equipment. In this case, the trowels were the only equipment that needed cleaning. The procedure involved washing the trowels in detergent and rinsing them first in tap water, then distilled water and finally, acetone. After air-drying, the trowels were wrapped in aluminum foil to keep them clean in storage. All of the necessary sampling equipment was assembled at the decon site and then taken to the test pit. For safety, an OVA was used to assess air quality above and within each test pit prior to sampling.

Once the test pit was excavated, a geologist went down into the hole and took composite soil samples. A fiber tape was lowered from the top of the pit and samples were taken from within two-foot intervals on one wall of the pit and composited in the sample bottle. One trowel was used to fill each VOA vial and soil sample bottle collected from each interval. All the bottles and VOA vials were labeled with the date, the interval sampled and the test pit number. Once the entire pit was sampled, the geology of the pit was logged. All the bottles and vials were placed in a cooler, on ice. VOA headspace screenings and analyses were performed 48 hours after the samples were collected. The chemical data from the headspace analyses is included in the section on soil samples and chemical analyses. All the pits were backfilled after sampling and test pit logs were completed.

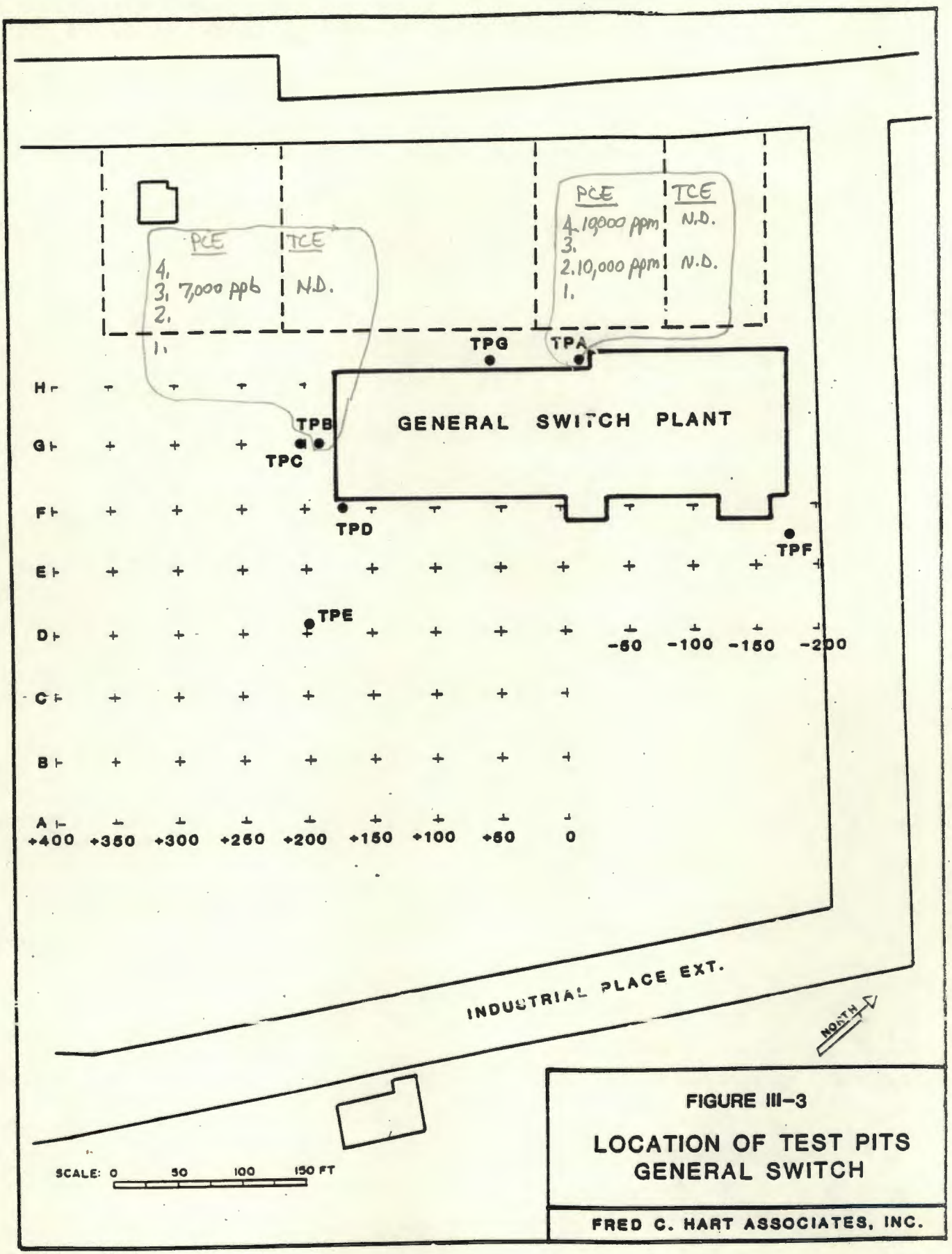

FIGURE III-3

LOCATION OF TEST PITS
GENERAL SWITCH

FRED C. HART ASSOCIATES, INC.

3. Results

The test pit logs completed for all seven test pits are contained in Appendix A. The geologic units encountered during excavation of the test pits were the same as those previously encountered at the site. The fill tended to be dry and gray-brown in color and ranged from 3 to 8 feet in thickness. The underlying till was orange-brown in color and predominantly silt and clay-rich. There were occasional fine to medium sandy pockets, and abundant cobbles and boulders scattered throughout the till. An attempt was made to excavate to the depth of the contact between the fill and the till in each pit. However, because the fill was dry, the sides of several of the pits were unstable and the pits were terminated in the fill.

Several test pits were excavated in areas that had not previously been studied (TPA, TPG and TPB). The logs from these pits (Appendix A) show that at least 8 feet of fill overlie glacial till on the northwest side of plant. The fill is more permeable than the till and water is present in the fill along a perched zone 3-4 feet from the ground surface. Fill below this zone was dry. It appears that the building foundation is acting as a dam and water is collecting in the perched zone. The depth of the perched zone corresponds to the depth of an old water line encountered during excavation. The top 3 or 4 feet of fill that were excavated to install the water line are probably more permeable than the lower section of fill and a perched zone exists at the contact.

C. Soil Sampling and Chemical Analyses

1. Purpose

Soil samples were collected and analyzed in order to gather additional data on the aerial and vertical extent of PCE and TCE contamination in the study area. Samples were selected for laboratory analysis based on an OVA qualitative prescreening procedure conducted in the field.

2. Procedures

All of the soil sample bottles and VOA vials were prepared and supplied by Princeton Testing Laboratories, Princeton, New Jersey. As previously described, one sample bottle and one VOA vial was taken for each sampling interval in the test pits. The samples were placed on ice and Organic Vapor Analyzer (OVA) prescreens were performed on all the samples within forty-eight hours of collection.

The OVA has two modes of operation, a survey mode and a gas chromatograph (GC) mode. The prescreening procedure utilizes the OVA in survey mode to identify soil samples containing volatile organic hydrocarbons. The limits of detection on the OVA range from 0.1 ppm to 1000 ppm. The VOA vials were prepared for analysis by placing them in a constant temperature bath at 40-50°C to drive the volatiles into the air space (headspace) remaining in the vial. An 100 ul injection was taken from the headspace in each vial and injected into the OVA.

Once the precreens were finished, selected samples containing more than 100 ppm volatile organic hydrocarbons were analyzed on the OVA in GC mode. These analyses provided positive confirmation of the presence of PCE in the soil. A sample of pure PCE was initially analyzed on the gas chromatograph to determine an elution time for the PCE standard under the operating conditions. Then, the soil samples were run through the column and the elution times of the compounds present were recorded. The presence of a peak with an elution time similar to that of the PCE standard was assumed to indicate the presence of PCE in the sample. All OVA/GC analyses were performed using a T-8 column, enclosed in a portable isothermal pack (PIP). The PIP has a hollow core which may be filled with ice or hot water. By keeping the column at a constant temperature, the PIP provides for better separation of the components in the gas sample. A strip chart recorder was hooked up to the OVA to record each chromatogram. Ideally, each component in a gas sample can be identified by its characteristic elution times in a given chromatographic column.

Based on the OVA prescreens, samples were chosen for quantitative laboratory analyses. The samples were chosen to cover as much of the study area as possible, especially in areas where high readings on the OVA were found. Nineteen samples, two replicates, and a field blank were analyzed for PCE and TCE. In addition, three samples were sent to the laboratory for volatile organic priority pollutant scans. All the samples were packed on ice and shipped in a sealed cooler to Princeton Testing Laboratories.

3. Results

OVA and Gas Chromatograph Analyses. The results of OVA prescreens of the test pit samples are shown in Table III-1. The highest levels of volatile organic hydrocarbons were found in TPA and TPD. A peak with an elution time similar to that of the PCE standard was identified in samples from both these pits (Table III-1). Test Pit D was located by the edge of the building near the present loading dock. The source of this contamination may be spills or leaks from tank trucks. Test Pit A was located near the side door of the plant on the northwestern side of the building. The origin of contamination in this area is unknown. With the exception of Test Pit G, levels of volatile organic hydrocarbons were generally below 25 ppm in the rest of the test pits.

The results of OVA/GC analyses on the test pit samples were only qualitative and identification of possible PCE or TCE peaks was noted in Table III-1. Several samples also contained compounds with retention times other than that of PCE; no positive identification of these compounds was possible.

Laboratory Analyses. The results of the PCE and TCE analyses performed by Princeton Testing Laboratories are shown in Table III-2. Several of the soil samples contained such high levels of PCE that, in order to prevent equipment breakdown, smaller than normal portions of each sample were analyzed. When a laboratory uses smaller portions of a sample in the analytical procedure, the sensitivity of the gas chromatograph is decreased and the concentration at which PCE can be detected is increased. When the laboratory initially analyzed the samples, a fairly high detection level of

TABLE III-1

OVA PRESCREEN OF TEST PIT SAMPLES
(Volatile Organic Hydrocarbon Values in PPM)

Sample No.	Depth	OVA Reading
TPA-4[a]	0-1"	77
TPA-3	0-2'	300
TPA-2	2-3'	200
TPA-1[b]	3-5'	300
TPB-4	0-2'	2.6
TPB-3	2-4'	5
TPB-2	4-6'	1
TPB-1A	6-8'	1.2
TPB-1B	6-8'	10
TPC-1	0-2'	2.8
TPC-2[a]	2-4'	100
TPC-3	4-6'	8.2
TPC-4	6-8'	3.2
TPD-4	0-2'	240
TPD-3	2-4'	250
TPD-2	4-6'	200
TPD-1[a,b] (replicate)	4-6'	340
TPE-4	0-2'	0.75
TPE-3	2-4'	22
TPE-2	4-6'	25
TPE-2 (replicate)	4-6'	110
TPE-1	6-8'	25
TPF-1[a]	0-2'	60
TPF-2	2-4'	18
TPG-1	0-2'	10
TPG-2	2-4'	76
TPG-3	4-6'	94
TPG-4[a]	6-8'	120

[a] indicates positive identification of PCE peak when sample run in GC mode on OVA.

[b] indicates possible identification of TCE peak when sample run in GC mode on OVA.

TABLE III-2

PRINCETON TESTING ANALYSES
TEST PIT SAMPLES
(VALUES IN PPM)

Sample No.	Tetrachloroethylene 40 ppm D.L.	Tetrachloroethylene 40 ppb D.L.	Trichloroethylene 40 ppm D.L.	Trichloroethylene 40 ppb D.L.
TPA-4 (0-1")	10,000	-	N.D.	-
TPA-3 (0-2')	13,000	-	N.D.	-
TPA-2 (2-3')	10,000	-	N.D.	-
TPA-1 (3-5')	3,600	-	N.D.	-
TPB-3 (2-4')	N.D.	-	N.D.	N.D.
TPC-1 (0-2')	N.D.	-	N.D.	-
TPC-2 (2-4')	N.D.	0.4 ppm	N.D.	N.D.
TPC-3 (4-6')	N.D.	4.3 ppm	N.D.	N.D.
TPC-4 (6-8')	N.D.	-	N.D.	-
TPD-4 (0-2')	34,000	-	N.D.	-
TPD-3 (2-4')	8,200	-	N.D.	-
TPD-2 (4-6')	7,000	-	N.D.	-
TPD-1 (6-8')	7,000	-	N.D.	-
TPE-4 (0-2')	N.D.	-	N.D.	-
TPE-3 (2-4')	N.D.	5.0	N.D.	0.1
TPE-2 (4-6')	N.D.	8.0	N.D.	0.2
TPE-2 (4-6')	N.D.	0.3	N.D.	N.D.
TPE-1 (6-8')	N.D.	10.0	N.D.	0.5
TPF-1 (0-2')	N.D.	4.0	N.D.	0.35
TPF-2 (2-4')	N.D.	2.0	N.D.	N.D.
TPG-1 (0-2')	N.D.	1.5	N.D.	N.D.
TPG-2 (2-4')	N.D.	5.6	N.D.	N.D.
TPG-3 (4-6')	N.D.	6.3	N.D.	N.D.
TPG-4 (6-8')	N.D.	4.4	N.D.	0.3

D.L. indicates Detection Limits at which samples were run.

N.D. indicates non-detectable concentrations.

40 ppm was used. In many samples the level of detection was so high or the portion of sample used was so small that low concentrations of PCE or TCE in the samples were not measured. Consequently, thirteen samples were reanalyzed at a lower detection limit of 40 ppb. Low levels of PCE were present in all of the samples that were reanalyzed (Table III-2).

The lab data confirms that Test Pits A and D are by far the most contaminated pits. The concentration of PCE in those pits are consistently several orders of magnitude higher than levels in other test pits. The concentrations of PCE in the remainder of the test pits are all below 10 ppm (Table III-2). As in previous investigations, the data suggests that there are some isolated areas of very high concentrations of PCE (Figure III-4).

Low levels of TCE were found in Test Pits E, F and G (Figure III-5). The concentrations of TCE were all below 0.5 ppm (Table III-2). The results of the priority pollutant volatile scan indicated the presence of benzene and toluene in TPA-1, TPA-3 and TPD-3 as well (Table III-3).

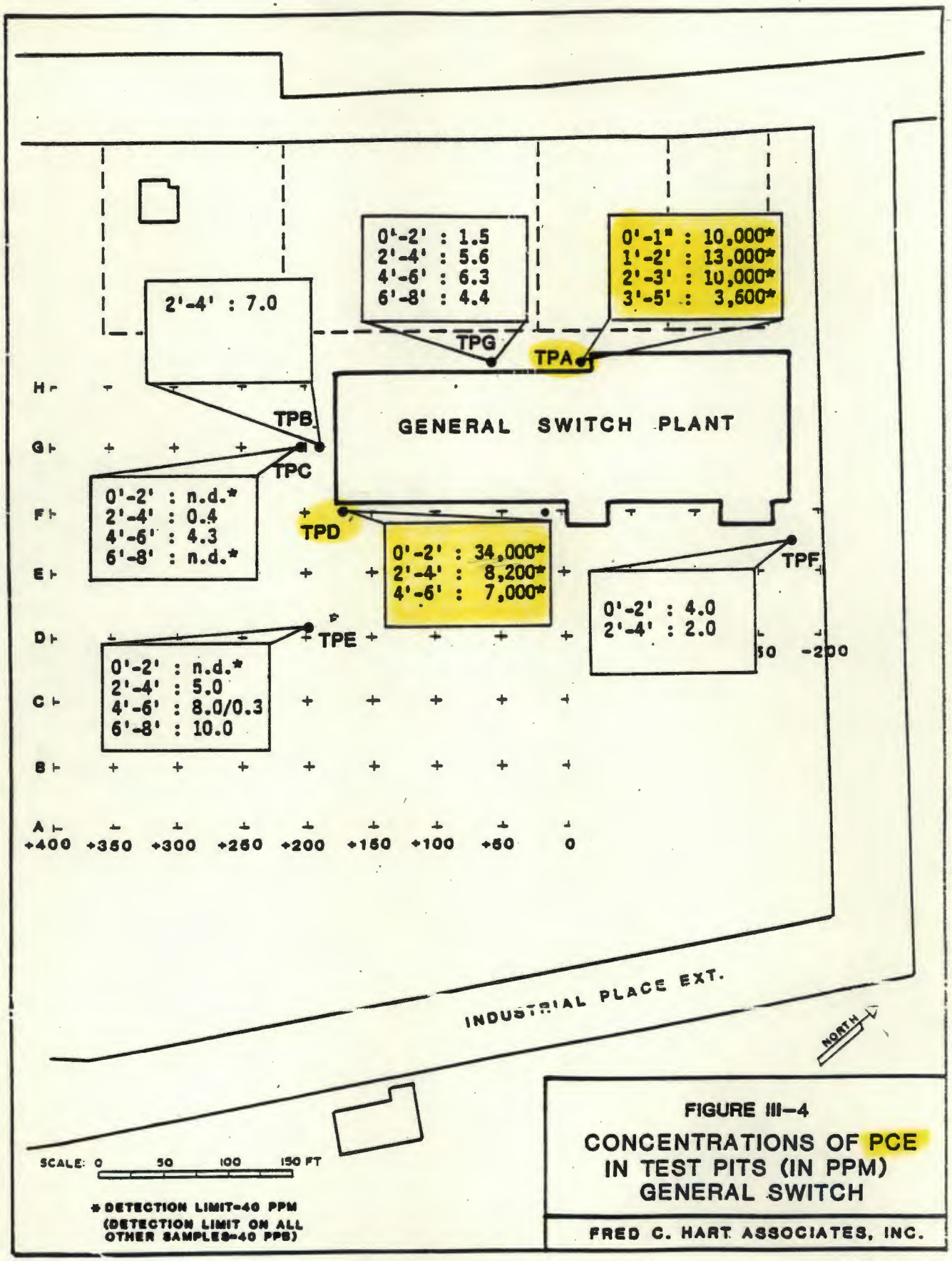

FIGURE III–4

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

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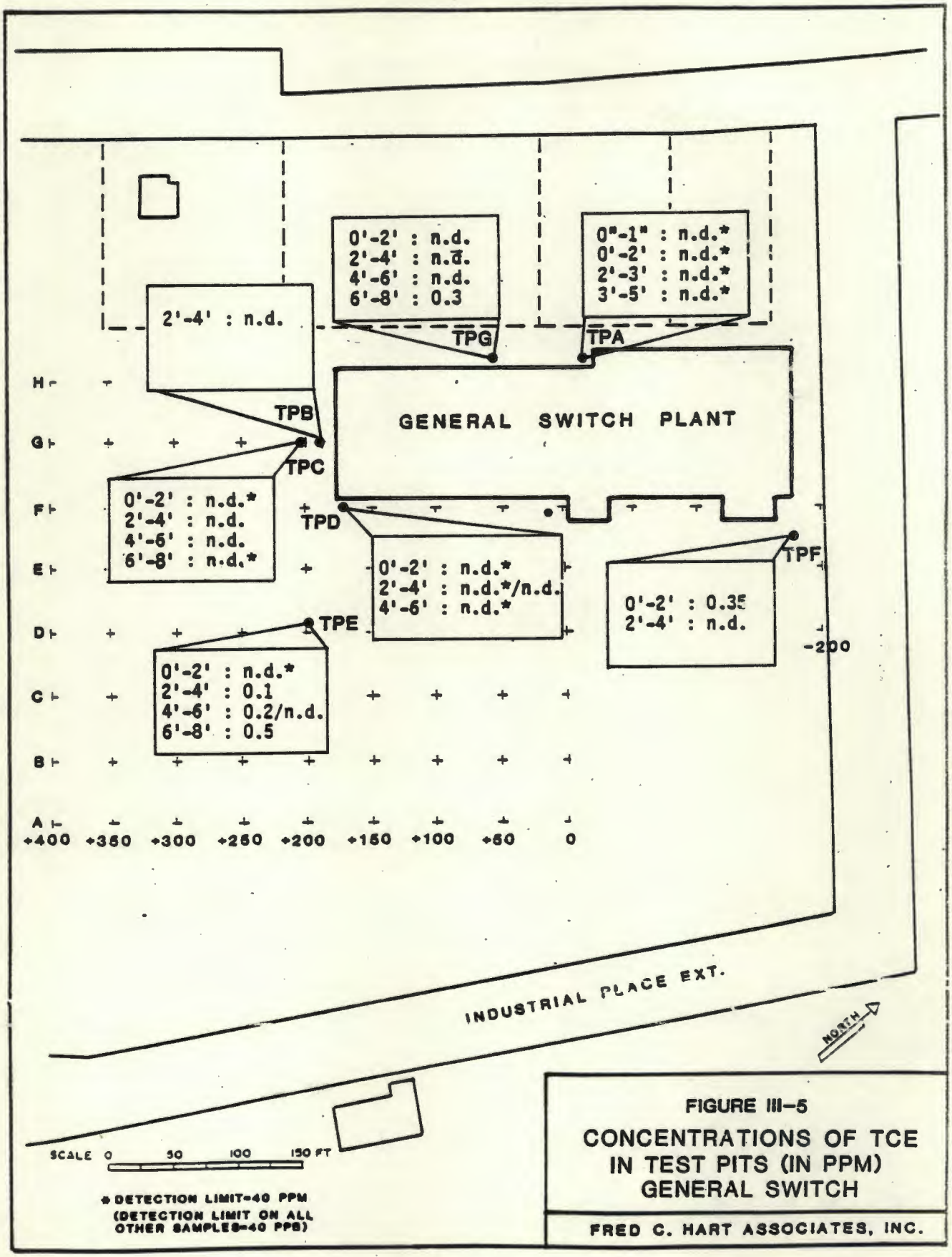

FIGURE III-5

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

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TABLE III-3

VOLATILE ORGANIC PRIORITY POLLUTANT SCAN
(VALUES IN PPM)

	Limits of Detection	TPA-1	TPA-3	TPD-3
Benzene	20	62	28	130
Tetrachloroethylene	40	3,600	13,000	8,200
Toluene	20	ND	130	180

CHAPTER IV

CONCLUSIONS

The analytical data collected during the soil sampling program confirmed the existence of two isolated areas with high levels of PCE contamination. One area is located near the present loading dock and the source of contamination may have been the tank trucks that, in the past, filled the 500 gallon PCE tank at the plant. The other area which showed high levels of PCE contamination was outside the door on the northwestern side of the building. The concentrations of PCE in the remainder of the test pits were all below 10 ppm.

APPENDICES

APPENDIX A

TEST PIT LOGS

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037F

PROJECT NAME: General Switch	TEST PIT NO. A
LOCATION: Middletown, NY	COORDINATES: behind backdoor facing empty lot on highland (H.5, -1.2)
DATE: 4-09-85	GROUND SURFACE ELEVATION:
	EQUIPMENT OPERATOR: Drew
	INSPECTOR: Truettner / Moraham

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0 TPA-4		1-4" of soil mixed with metal shavings
1 TPA-3	Gray brown FILL consisting of some silt, some sand, little cobbles	ambient air in pit ~200 ppm (10-200 ppm)
2		water entering hole from discrete level at 3'
3 TPA-2		980 ppm
4 TPA-1		
5		
6		
7 ?		
8		
9	PIT terminated @ 8.5'	
10		
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037 F

PROJECT NAME: General Switch	TEST PIT NO. B
LOCATION: Middletown, NJ	COORDINATES: G-175
DATE: 4-09-85	GROUND SURFACE ELEVATION:
	EQUIPMENT OPERATOR: Drew
	INSPECTOR: Thurther / Horahan

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0		
1 TPB-4	Brown FILL consisting of coarse topsoil	Scan with OVA showed no contamination
2		
3 TPB-3		
4		
5 TPB-2		
6		
7 TPB-1		
8	Orange-brown TILL consisting of some silt, some clay, little sand, little boulders.	Sandy pockets in till carrying water.
9 ?		
10	Pit terminated at 10 ft.	
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037F

PROJECT NAME: General Switch,	TEST PIT NO. C
LOCATION: Middletown, NY	COORDINATES: G, 200
DATE: 4-09-85	GROUND SURFACE ELEVATION:
	EQUIPMENT OPERATOR: Drew
	INSPECTOR: Truethner / Monahan

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0		
	8-10" brown TOPSOIL	
1 TPC-1	orange-brown TILL consisting of some silt, some clay, little sand, little boulders	OVA scan indicated no contamination
2		
3 TPC-2		
4		
5 TPC-3		
6		
7 TPC-4		
8	Pit terminated at 8'	
9		
10		
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037F

PROJECT NAME: General Switch	TEST PIT NO. D
LOCATION: Middletown, NJ	COORDINATES: F, 175
DATE: 4-10-85	GROUND SURFACE ELEVATION:
	EQUIPMENT OPERATOR: Scott
	INSPECTOR: Tuettner / Barker

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0	gray-brown FILL consisting of some sand, some silt, little cobbles.	OVA showed readings of up to 800 ppm
1 TPD-4		
2		
3 TPD-3		
4		400 ppm
5 TPD-1 TPD-2(R)		200 ppm
6		
7		
8		
9		
10	Pit completed to 9.5', but sides collapsed into 6'. Saw fill contact at ~8.5-9', but hole collapsed before we could confirm it.	
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037F

PROJECT NAME: General Switch	TEST PIT NO. E
LOCATION: Middletown, NY	COORDINATES: D.25, 220 (next old TP-B)
DATE: 4-10-85	GROUND SURFACE ELEVATION:
	EQUIPMENT OPERATOR: Scott
	INSPECTOR: Truethner / Barker

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0		
1 TPE-4	gray-orange FILL consisting of some sand and silt, little cobbles.	OVA scan indicated no contamination
2		
3 TPE-3		
4		
5 TPE-2 TPE-2(R)		
6		
7 TPE-1	brown FILL consisting of some sand and silt.	probable older layer
8		
9	Pit terminated at 8' from top of bank (about 2' BGL)	
10		
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. A037F

PROJECT NAME: General Switch	TEST PIT NO. F
LOCATION: Middletown, NJ	COORDINATES: E.5, -175
DATE: 4-10-85 / GROUND SURFACE ELEVATION:	EQUIPMENT OPERATOR: Scott
	INSPECTOR: Truettner / Barker

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0	FILL consisting of gravel, large cobbles and parking lot surface.	OVA scan indicated no contamination
1 TPF-1		
2		
3 TPF-2	orange-brown TILL consisting of clay and silt, little cobbles	
4		
5	pit terminated at 5' BGL	
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

LOG OF TEST PIT

FRED C. HART ASSOCIATES, INC.

PROJECT NO. AD37F

PROJECT NAME: General Switch	TEST PIT NO. G
LOCATION: Middletown, NY	COORDINATES: H.5, +65
DATE: 4-10-85 / GROUND SURFACE ELEVATION:	EQUIPMENT OPERATOR: Scott
	INSPECTOR: Truettner/Barker

DEPTH (FT.)	DESCRIPTION OF MATERIALS	REMARKS
0	Gray-brown FILL consisting of some sand, some silt, little cobles, trace clay.	OVA scan indicated no contamination
1 TPG-1		
2		found water line at 4', also noticed water coming into hole from this interval - appears to be perched water.
3 TPG-2		
4		
5 TPG-3		
6		
7 TPG-4		
8	Pit terminated at 8' Bgl	
9		
10		
11		
12		
13		
14		
15		

APPENDIX B

PRINCETON TESTING LABORATORY ANALYSES

princeton testing laboratory

RECEIVED JUN 21 1985

DATE: 6-20-85

JOB NO. 37934

AUTHORIZATION: verbal

SAMPLE:

TO:

Fred C. Hart Associates
530 Fifth Ave
New York NY 10036

ATT: Laura Treuttner

REPORT OF ANALYSIS

Sample ID	Trichloroethylene (TCE) ug/kg (ppb)	Tetrachloroethylene (PCE)
TPE-2	200	8,000
TPF-2	ND	2,000
TPF-1	350	4,000
TPG-1	ND	15,000
TPB-3	ND	7,000 ✓
TPE-3	100	5,000
TPG-3	ND	6,300
TPC-2	ND	400 → 0.4 ppm
TPC-3	ND	4,300 → 4.3 ppm
Replicate-2	ND	300
TPE-1	500	10,000
TPG-4	300	4,400
TPG-2	ND	5,600
Detection limit	40	40

ND=not detected

Jon Gabry,PhD
Asst.Organic Lab Manage

na

princeton testing laboratory

DATE: 4-29-85

JOB NO. 37934

AUTHORIZATION: verbal

SAMPLE: soil

TO:

Fred C. Hart
530 Fifth Ave
New York NY 10036

ATT: L. Truettner

REPORT OF ANALYSIS

(PCE)

	Tetrachloroethylene mg/kg → ppm
TPA-2	10,000
TPA-4	10,000
TPB-3	ND
TPG-1	ND
TPC-3	ND
TPE-4	ND
TPE-2	ND
Replicate -2	ND
TPE-1	ND
TPD-1	7,000
TPG-2	ND
TPC-2	ND
TPE-3	ND
TPC-4	ND
TPF-1	ND
TPD-4	34,000
Replicate-4	7,000
TPG-3	ND
Field Blank	ND
TPG-4	ND
TPC-1	ND
Detection limit	40

Gene Dennison, PhD, CIH
Technical Director

JG:na

princeton testing laboratory

DATE: 4-29-85

JOB NO. 37934

AUTHORIZATION: verbal

SAMPLE: soil

TO:

Fred C. Hart
530 Fifth Ave
New York NY 10036

ATT: L. Truettner

REPORT OF ANALYSIS

(TCE)

	Trichloroethylene mg/kg (ppm)
TPA-2	ND
TPA-4	ND
TPB-3	ND
TPG-1	ND
TPC-3	ND
TPE-4	ND
TPE-2	ND
Replicate-2	ND
TPE-1	ND
TPD-1	ND
TPG-2	ND
TPC-2	ND
TPE-3	ND
TPC-4	ND
TPF-1	ND
TPD-4	ND
Replicate-1	ND
TPG-3	ND
Field blank	ND
TPG-4	ND
TPC-1	ND
Detection limit	40

Gene Dennison, PhD, CIH
Technical Director

JG:na

Princeton testing laboratory
P.O. Box 3106, Princeton, N.J. 08540
Princeton Service Center
U.S. Route 1
609-452-9050

RECEIVED MAY 2 1985

Analyst

Date 4-26-85

MATRIX CODE PE/MW

QUALITY CONTROL REPORT

A. MATRIX SPIKE ANALYSIS

COMPOUND (Including Surrogates)			CONCENTRATION (			
Sample ID	COMPOUND NAME	METHOD	Sample Result (SR)	Spiked Sample Result (SSR)	Spike Added (SA)	% Recovery*
TPC-2	Tetrachloroethylene	EPA 601	ND	121	121	100
TPF-1	Trichloroethylene		ND	118	111	106

*% Recovery = $\frac{(SSR - SR)}{(SA)}$ X 100

Matrix Codes:
Soil SO
Sludge SL
Drinking water DW
Air Air

princeton testing laboratory

DATE: 4-26-85

JOB NO. 37934

AUTHORIZATION: verbal

SAMPLE: soil

TO: Fred C. Hart
530 Fifth Ave
New York NY 10036

ATT: L. Truettner

REPORT OF ANALYSIS

VOLATILE ORGANICS

	Detection Limit	TPA 1	TPA 3	TPD 3
		mg/kg		
Acrolein	.004	ND	ND	ND
Acrylonitrile	.004	ND	ND	ND
Benzene	20	62	28	130
Bis(chloromethyl) ether	---	---	---	---
Bromoform	20	ND	ND	ND
Carbon Tetrachloride	40	ND	ND	ND
Chlorobenzene	20	ND	ND	ND
Chlorodibromomethane	40	ND	ND	ND
Chloroethane	40	ND	ND	ND
2-Chloroethylvinyl ether	100	ND	ND	ND
Chloroform	40	ND	ND	ND
Dichlorobromomethane	40	ND	ND	ND
Dichlorodifluoromethane	100	ND	ND	ND
1,1-Dichloroethane	20	ND	ND	ND
1,2-Dichloroethane	20	ND	ND	ND
1,1-Dichloroethylene	20	ND	ND	ND
1,2-Dichloropropane	20	ND	ND	ND
1,3-Dichloropropylene	100	ND	ND	ND
Ethylbenzene	20	ND	ND	ND
Methyl bromide	200	ND	ND	ND
Methyl chloride	400	ND	ND	ND
Methylene Chloride	100	ND	ND	ND
1,1,2,2-Tetrachloroethane	200	ND	ND	ND
Tetrachloroethylene	40	3600	13,000	8200
Toluene	20	ND	130	180
1,2-Trans-dichloroethylene	20	ND	ND	ND
1,1,1-Trichloroethane	40	ND	ND	ND
1,1,2-Trichloroethane	100	ND	ND	ND
Trichloroethylene	40	ND	ND	ND
Trichlorofluoromethane	100	ND	ND	ND
Vinyl Chloride	40	ND	ND	ND

Gene Dennison,PhD,CIH
Technical Director

GD:na

Testing laboratory
Box 3108, Princeton, N.J. 08540
Princeton Service Center
U.S. Route 1
609-452-9050

Analyst : JG
Date : 4-26-85
Matrix Code PE/MW

QUALITY CONTROL REPORT

B. DUPLICATE ANALYSIS

COMPOUND (Including Surrogates)		CONCENTRATION (mg/kg)		
Sample ID	COMPOUND NAME METHOD	Run 1 (D_1)	Run 2 (D_2)	Relative Percent Difference (RPD)*
TPA 1	Tetrachloroethylene	3600	2400	40
TPA 3	Tetrachloroethylene	13,000	7300	55
Replicate 1	Tetrachloroethylene	7340	7052	4

$$*RPD = \frac{(D_1 - D_2)}{\left[\frac{(D_1 + D_2)}{2}\right]} \times 100$$

Matrix Codes:
Soil SO
Sludge SL
Drinking Water DW
Air Air