Report

Degreaser Pit Investigation, Building C-19
All Fab, Inc. - Paine Field
Everett, Washington

April 25, 1994

Prepared for

Snohomish County Airport
Everett, WA

Prepared by

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LANDAU
ASSOCIATES,
INC.
Environmental and Geotechnical Services

April 25, 1994

Snohomish County Public Works
Design Construction
Marion Building
2829 Rucker
Everett, WA 98201

Attn: Mr. Rollie Maynard

RE: **DEGREASER PIT INVESTIGATION, BUILDING C-19**
ALL FAB, INC. SITE
SNOHOMISH COUNTY AIRPORT (PAINE FIELD)
EVERETT, WASHINGTON

Dear Mr. Maynard:

This report presents the results of a preliminary investigation of the vapor degreaser sump within Building C-19 at the former All Fab, Inc. site located at the Snohomish County Airport (Paine Field) in Everett, Washington. Our services included drilling two shallow holes through the floor of the sump, obtaining soil and water samples, analyzing these samples for constituents of concern, and comparing the results to regulatory criteria.

The results of the shallow soil and water sample analyses disclosed the presence of solvents. In particular, trichloroethene (TCE) was found in the water sample at concentrations substantially above Washington Model Toxics Control Act groundwater cleanup levels.

We appreciate this opportunity to be of service to you. Please contact us if you have any questions about the report.

LANDAU ASSOCIATES, INC.

By:

Dennis R. Stettler, P.E.
Project Manager

DRS/RB/sms
No. 222006.20
04/25/94 J:\SNOHOMIS\ALLFAB.REP

6 copies submitted

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INTRODUCTION

This report presents the results of a preliminary investigation conducted at the former vapor degreaser pit within Building C-19 at the former All Fab Facility, located at the Snohomish County Airport (SCA). The overall purpose of our preliminary evaluation of existing site conditions was to determine if solvents previously used in the vapor degreaser and collected within a concrete lined pit within Building C-19 have leaked into the ground and groundwater below the pit. If the solvents have leaked, it will be necessary to characterize the extent and the impact that the contaminants' spread may have had on soil and groundwater beneath the pit. This preliminary investigation was conducted to provide an initial screen for potential contamination associated with the vapor degreaser pit, and was limited to the evaluation of shallow soil and groundwater quality at two locations directly below the degreaser pit.

The scope of our services for this preliminary task was outlined in our proposal letter dated January 25, 1994 and authorized by Work Authorization No. 7 dated February 3, 1994. Our services were provided for Snohomish County Airport under provisions of Snohomish County Public Works Engineering Consulting Agreement No. 9280, related to on-call services for environmental site assessments dated September 9, 1992.

PROJECT BACKGROUND

The former All Fab facility is located near the southeast side of the Snohomish County Airport as shown on the vicinity map, Figure 1. Landau Associates completed a Phase I environmental site assessment for the former All Fab facility, as summarized in our report to the Snohomish County Airport dated November 18, 1993. A number of areas of potential environmental concern were identified in that report, with the former vapor degreaser pit within Building C-19 at the facility identified as one of the areas of greatest potential concern. A site plan showing the location of the former degreaser pit in Building C-19 and other uses of the building and surrounding area, as described in the Phase 1 Environmental Site Assessment Report (Landau Associates 1993), is presented as Figure 2.

The vapor degreaser within Building C-19 was in operation for a number of years and reportedly used 1,1,1-Trichloroethane (TCA) as a solvent. All Fab representatives indicated that trichloroethene (TCE) and possibly other chlorinated solvents were also used in the past.

The vapor degreaser, TCA storage tanks, and a chiller were reportedly removed from the building on August 30, 1993. The vapor degreaser pit consists of an approximately 15 ft wide by 40 ft long by 8 ft deep concrete-lined pit in the southeast corner of the building. The TCA

storage tank was reportedly located outside the building along the building wall on a concrete pad. No staining was observed in this area (outside the building). The concrete vault is stained along the bottom, sides, and top, indicative of past chemical spillage. A sump located in the concrete pit's southeast corner was used to collect spilled TCA and any groundwater that might seep into the pit. The sump was observed to contain liquid at the time of our September 1993 reconnaissance associated with the Phase I environmental site assessment and during our February 1994 field activities for this task. The waste TCA was reportedly pumped by a portable "sump sucker" and contained in drums until it was disposed of offsite. The sump sucker consisted of a centrifugal pump connected to an approximate 200-gallon capacity tank, both of which were on wheels and capable of being readily moved by a forklift. All Fab representatives indicated that approximately 1,600 gallons of TCA were typically purchased per year for use in this unit, and that in years past (1985-1989), slightly more than 1,600 gallons per year of TCA were purchased. Approximately 110 gallons of used TCA were disposed of per year. The net product loss was attributed by All Fab representatives to evaporation and use. A chiller was reportedly used to minimize TCA evaporation.

Between the time of our September 1993 reconnaissance and our February 1994 field sampling, a new hot wash system was installed in the pit area. This system reportedly uses no solvents. The presence of this equipment limited our access to the bottom of the pit.

EXPLORATION AND SAMPLING ACTIVITIES

Two holes were excavated below the base of the concrete floor of the vapor degreaser pit on February 14, 1994. Four soil samples and two water samples were collected at the locations shown on Figure 3 and listed on Table 1. At each location, two soil samples were collected from depths directly below and about 1 ft below the base of the concrete slab. The primary water sample (Sample No. TP1-W) was collected from the TP-1 location. It represents water that accumulated in the hole over several hours after excavation and is likely composed of a combination of groundwater seepage that seeped in through the sides of the excavation, and seepage that flowed through weep holes in the concrete walls of the pit, over the concrete floor, and into the excavation. The second water sample (Sample No. SU-W) was archived because it was considered to represent the water from a source similar to that of Sample No. TP1-W. Three additional water samples were collected for QC purposes, including a field transfer blank (Sample No. TF-W), a field rinsate blank (Sample No. TR-W), and a field trip blank (Sample No.

TP-W). Detailed information regarding the field exploration and sampling procedures is provided in Appendix A.

SUMMARY OF ANALYTICAL RESULTS

The soil and water samples were analyzed for volatile organics using EPA Method 8240A at the Analytical Resources, Inc. (ARI) laboratory. A summary of the analytical results is provided in Table 2. The ARI data package and a discussion of the data quality evaluation procedures are included in Appendix B.

Soil

The volatile organic results indicate that trichloroethene (TCE) was detected in each soil sample. The soil TCE concentration ranged from 19 to 590 µg/kg, with the highest concentrations detected in the samples collected from TP-1, located near the sump pump area. Soil TCE concentrations at TP-1 increased by over 2.5 times between the sample collected just below the base of the concrete floor slab (220 µg/kg) to the sample collected about 1 ft below the base of the concrete floor slab (590 µg/kg). Low levels (less than 50 µg/kg) of 1,1,1-trichloroethane (TCA) were also detected in both soil samples from TP-1 and in the shallowest soil sample from TP-2. Other volatile compounds, including acetone, 1,1-dichloroethene (DCE), 1,1-dichloroethane (DCA), and cis-1,2-DCE, were detected at low levels (less than 15 µg/kg) at TP-1.

Water

TCE and TCA were detected at elevated concentrations of 15,000 µg/L and 230 µg/L, respectively, in the water collected from the TP-1 excavation. Other volatile compounds detected at relatively low levels (less than 165 µg/L) included acetone, DCE, DCA, trans-1,2-DCE, cis-1,2-DCE, 2-butanone (a synonym for methyl ethyl ketone), 4-methyl-2-pentanone, toluene, and vinyl chloride. (Note that the vinyl chloride concentration is an estimated value that was confirmed by the analyst but with a low spectral match.)

QC Water Samples

No volatile compounds were detected in the QC water samples.

COMPARISON OF SOIL AND WATER RESULTS TO MTCA CLEANUP LEVELS

Detected concentrations for soil and water from the former degreaser sump were compared to the Model Toxics Control Act (MTCA) cleanup levels (WAC 173-340). MTCA provides three methods (Methods A, B and C) for establishing cleanup levels for soil and groundwater.

Method A is intended to be used at sites where the cleanup action is routine and relatively few hazardous substances are present. Method A cleanup levels for soil and groundwater are specified in the tables of WAC 173-340-720 (groundwater),-740 (nonindustrial site soil), and -745 (industrial site soil).

Method B is the standard method for establishing soil and groundwater cleanup levels at nonroutine sites and can be applied at all sites. Method B cleanup levels are based on applicable state and federal laws or on concentrations designated for the protection of human health as calculated using the risk equations specified in WAC 173-340-720 through -750.

Method C cleanup levels apply to sites where compliance with Method A or Method B cleanup levels may be technically impracticable to achieve or where compliance may cause greater environmental harm. Method C cleanup levels for groundwater can only be used with approval of Washington State Department of Ecology (Ecology) under specific circumstances, such as cases where all practicable methods of groundwater treatment have been utilized. Method C for soil may also be applied to certain industrial sites. MTCA specifies criteria that must be met for a site to be considered an "industrial site" in order to apply industrial soil cleanup levels specified in WAC 173-340-745. These criteria concern site and surrounding land use and zoning. Unless these criteria are met, the MTCA soil cleanup levels for industrial sites cannot be used in establishing soil cleanup levels; instead, the more stringent soil cleanup levels specified in WAC 173-340-740 must be used. The industrial category under MTCA include only "heavy" industry. According to the MTCA, only sites within a limited number of large industrial areas will qualify for industrial soil cleanup levels. Based on our knowledge of zoning in the area, Method C cleanup criteria for groundwater and soil would not be applicable to this site. Recent passage of an amendment to the MTCA to broaden application of Method C cleanup levels for soil will not impact selection of soil cleanup levels, because soil cleanup levels for the constituents of concern (TCE and TCA) at this site will be based on protection of groundwater.

Table 3 provides the detected soil and water concentrations and the associated MTCA Method A and B cleanup levels. The most stringent cleanup levels for soil set under Methods A and B are soil cleanup levels that are protective of groundwater. Of the detected compounds,

Method A cleanup levels are only available for TCE, TCA, toluene, and vinyl chloride (toluene and vinyl chloride were only detected in the water sample). Both nonindustrial and industrial Method A soil cleanup levels for TCE and TCA are based on protection of groundwater, and are therefore equal. The Method A cleanup level for toluene in groundwater was based on federal and state specified maximum contaminant levels (MCLs). The Method A cleanup level for vinyl chloride in groundwater is based on Method B, with an adjustment made for analytical limitations. All other detected constituents were only compared to Method B cleanup levels (Ecology July 1993).

The comparison of detected constituents from the site with the MTCA cleanup levels indicated that soil collected from about 1 ft below the concrete floor at TP-1 (Sample No. TP1-0.9) with a TCE concentration of 590 µg/kg was the only soil sample that exceeded the MTCA Method A cleanup level for TCE of 500 µg/kg (for nonindustrial and industrial sites). The water sample collected from TP-1 (Sample No. TP1-W) contained concentrations of TCE, TCA, and vinyl chloride (15,000 µg/L, 230 µg/L, and 5.1 µg/L, respectively) that exceeded the MTCA Method A cleanup levels for groundwater (5 µg/L, 200 µg/L, and 0.2 µg/L, respectively), and a 1,1-DCE concentration of 21 µg/L that exceeded the Method B cleanup level of 0.07 µg/L. Note that the vinyl chloride detection was qualified as an estimated value due to a low spectral match in the analysis; also, because of constraints in the analytical method, the sample detection limit for vinyl chloride analysis in water exceeded the Method A cleanup level. Because this water probably represents perched groundwater that is not currently used as a source of potable water, the primary threat associated with this water is likely related to dermal contact and as a source to underlying aquifers or surface water bodies.

CONCLUSIONS

This preliminary investigation has confirmed that solvents are present in the soil and groundwater underlying the former vapor degreaser pit in Building C-19 of the former All Fab facility. The likely source of these solvents is the former vapor degreaser pit. This conclusion is evidenced by concentrations of TCE in soil and TCE, TCA, and vinyl chloride in shallow groundwater immediately below the vapor degreaser pit that exceed the MTCA Method A cleanup levels, and TCE and 1,1-DCE in the groundwater that exceed the MTCA Method B cleanup level. The results indicate that TCA and 1-1,-DCE are detected in the water sample at relatively low levels, but TCE and vinyl chloride are detected at levels that exceed the MTCA

cleanup level by about 3,000 and 25 times, respectively, and thus at high enough levels to be of concern.

Based on site conditions, it can be surmised that solvent movement from the former vapor degreaser area could have occurred through several pathways:

- Historically, the solvents could have moved directly through the concrete floor or through fractures and joints in the concrete floor. Field observations indicate staining and small fractures in the concrete surface in the area. Concrete, an ineffective barrier to solvent migration, is porous enough that it could provide a pathway for solvents from the pit area into the underlying soil and groundwater, even though the concrete floor appeared to be in relatively good condition.
- Once into the soil, the solvents can move vertically through the till unit directly beneath the concrete slab and into the underlying aquifer. Even though the till unit has a low vertical permeability, downward movement through the till can occur. This movement can be accelerated by the presence of soil fractures or coarser interbeds.
- Perched groundwater is present above the base of the pit, as evidenced by seepage into the pit through the sides. Once the solvents are in contact with the perched groundwater, there is opportunity for the solvents to move laterally through the soil. This movement can be accelerated by the presence of any fractures or coarser interbeds in the till or along any nearby utility corridors.

Because of the limited nature of this investigation, not enough information is available at this time to adequately determine the extent of contamination originating from the former vapor degreaser area. Also, the information obtained represents only data specific to the selected sample locations; other sample locations and depths may show differing contaminant concentrations of the detected constituents or may identify additional constituents. The concentration of TCE in the water sample is elevated enough to warrant further evaluation and analysis for the purpose of making a more definitive determination regarding the extent of solvent migration and identifying any current or future threats to groundwater beneath the site.

USE OF THIS REPORT

This report has been prepared for the exclusive use of SCA for specific application to evaluation of the former All Fab facility. This report is based on observations and information obtained during visits to the site by Landau Associates and is based solely on the condition of the site on the days of the visits, supplemented by information obtained by Landau Associates

and described herein. Landau Associates has performed the services and made the findings in accordance with generally accepted environmental practices in effect in the Snohomish County area at the time the services were performed. This warranty stands in lieu of all other warranties, express or implied.

We appreciate this opportunity to continue to provide services to you on this project. Please call us if you have any questions or if we can be of further assistance.

LANDAU ASSOCIATES, INC.

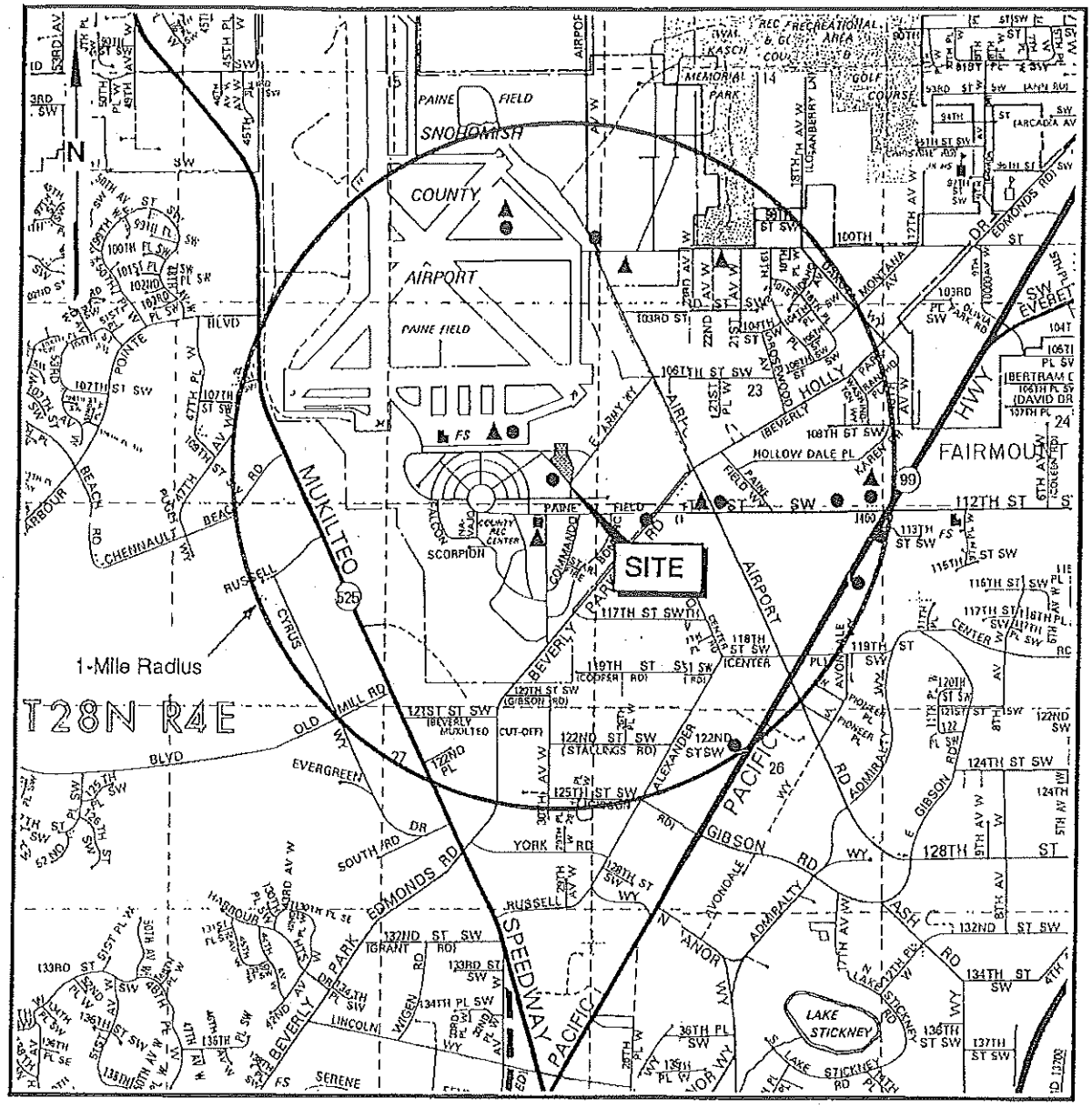
By:

Dennis R. Stettler, P.E.
Project Manager

and

Rebekah Brooks
Project Geologist

DRS/RB/skd
No. 222006.20



KEY

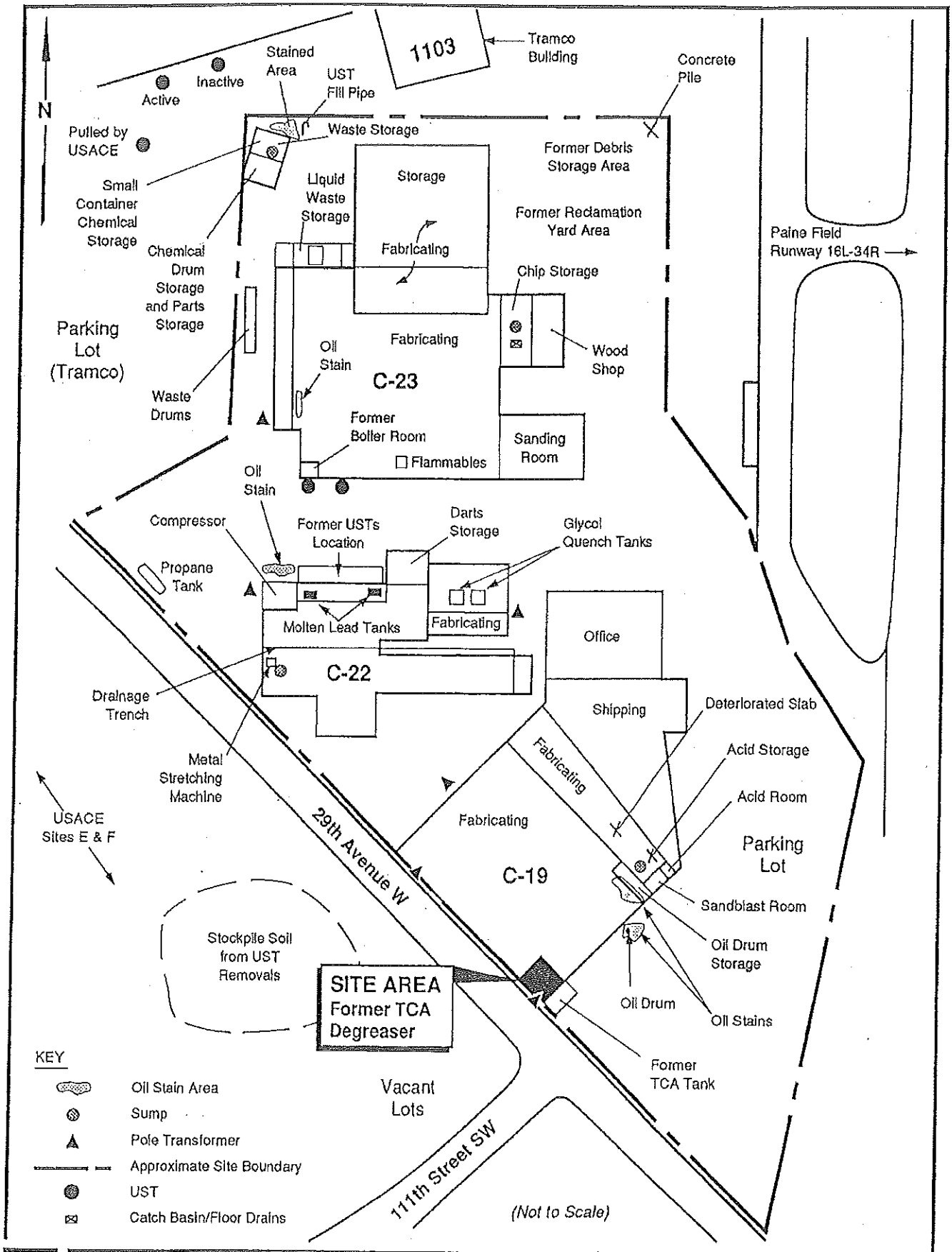
- ● Approximate Location of Leaking UST Site
- ▲ Approximate Location of Site Register Site

0 1/2 1

Scale in Miles

222006.20 All Fab/Degreaser Pit Investigation/Report 4/94

	Vicinity Map	Figure 1



Site Plan

Figure 2

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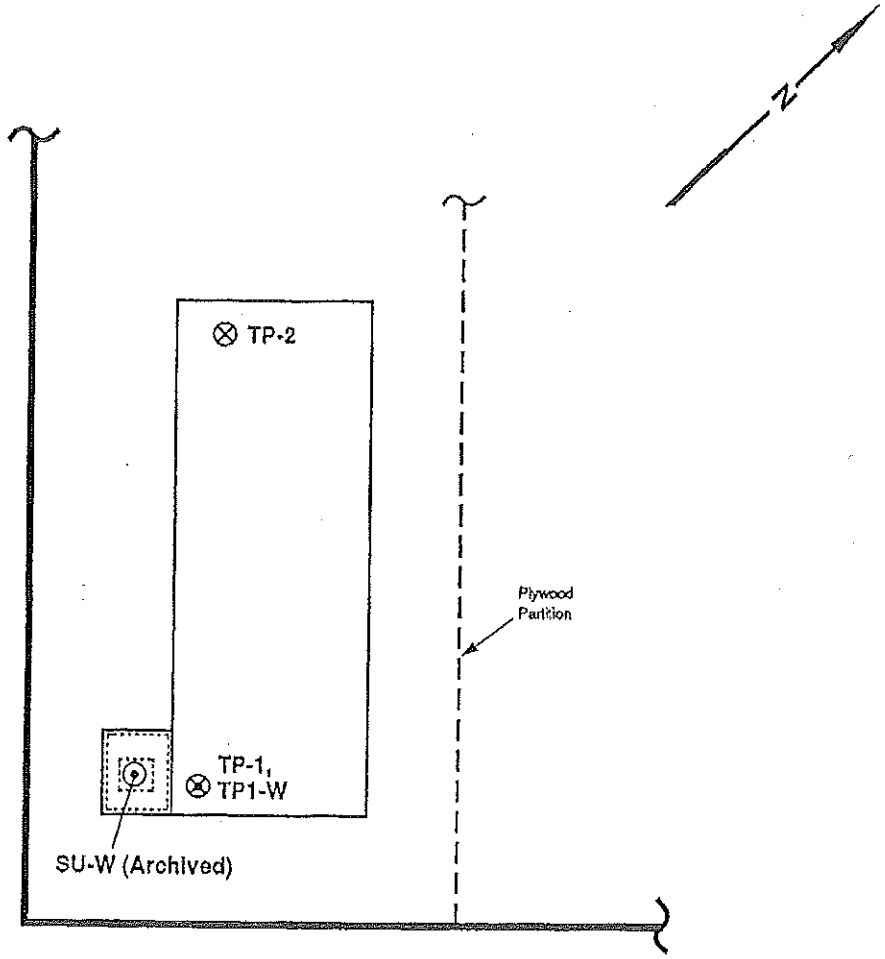

KEY

Building C-19 Wall

Former Degreaser Pit Location within Building C-19

Sump Pump Location

Test Pit Location

Water Sample Location

0 10 20

Scale in Feet

222006.20 All Fab/Degreaser Pit Investigation/Report 4/94

Sample Location Map

Figure 3

TABLE 1
ALL FAB, INC. SITE
BUILDING C-19 - DEGREASER PIT INVESTIGATION
SAMPLE IDENTIFICATION

Sample ID	Depth (a)	ARI No.	Date Collected	Location/Description	Comments
TP1-0.0	0.7-0.9	G404A	02/14/94	Soil from test pit TP-1 located on the south side of degreaser pit area	
TP1-0.9	1.4-1.6	G404B	02/14/94	Soil from test pit TP-1 located on the south side of degreaser pit area	
TP2-0.1	0.8-1.0	G404C	02/14/94	Soil from test pit TP-2 located on the northwest side of degreaser pit area	
TP2-0.9	1.4-1.6	G404D	02/14/94	Soil from test pit TP-2 located on the northwest side of degreaser pit area	
TP1-W	1.3	G404G	02/14/94	Water collected from test pit TP-1; apparently originating from gutter along sump wall used for control of groundwater seepage and from seepage through the sides of the test pit excavation	
SU-W	1.8	G404I	02/14/94	Water collected near sump pump at south corner of degreaser pit area	Sample archived
TR-W	---	G404E	02/14/94	Rinsate blank of soil sampling equipment	
TF-W	---	G404F	02/14/94	Transfer blank	
TP-W	---	G404H	02/07/94 (b)	Trip blank	

(a) Measured, in feet, below top of concrete floor of sump. Concrete floor is about 0.7 ft thick at these locations.
(b) Trip blank prepared by laboratory.

TABLE 2
ALL FAB, INC. SITE
BUILDING C-19 - DEGREASER PIT INVESTIGATION
RESULTS FOR VOLATILE ORGANICS (Method 8240A)

Sample No.:	TP1-0.0	TP1-0.9	TP2-0.1	TP2-0.9	TP1-W	TR-W	TF-W	TP-W	SU-W
Date Collected:	02/14/94	02/14/94	02/14/94	02/14/94	02/14/94	02/14/94	02/14/94	02/07/94	02/14/94
Lab ID:	G404A	G404B	G404C	G404D	G404G	G404E	G404F	G404H	G404I
Matrix:	Soil	Soil	Soil	Soil	Water	Water	Water	Water	Water
Units:	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	
VOLATILE ORGANICS									
Chloromethane	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	Sample
Bromomethane	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	Archived
Vinyl Chloride	2.3 U	2.2 U	2.2 U	2.3 U	5.1 M	2.0 U	2.0 U	2.00 U	
Chloroethane	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	
Methylene Chloride	5.7 U	5.7 U	5.2 U	5.3 U	2.0 U	2.0 U	2.0 U	2.00 U	
Acetone	6.6	5.5 U	5.6 U	5.6 U	17	5.0 U	5.0 U	5.00 U	
Carbon Disulfide	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
1,1-Dichloroethene	2.2	1.1 U	1.1 U	1.1 U	21	1.0 U	1.0 U	1.00 U	
1,1-Dichloroethane	2.3	2.0	1.1 U	1.1 U	32	1.0 U	1.0 U	1.00 U	
Trans-1,2-Dichloroethene	1.1 U	1.1 U	1.1 U	1.1 U	3.9	1.0 U	1.0 U	1.00 U	
Cis-1,2-Dichloroethene	8.1	11	1.1 U	1.1 U	94	1.0 U	1.0 U	1.00 U	
Chloroform	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
1,2-Dichloroethane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
2-Butanone	5.6 U	5.5 U	5.6 U	5.6 U	160	5.0 U	5.0 U	5.00 U	
1,1,1-Trichloroethane	44	39	5.4	1.1 U	230	1.0 U	1.0 U	1.00 U	
Carbon Tetrachloride	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Vinyl Acetate	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Bromodichloromethane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
1,2-Dichloropropane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
cis-1,3-Dichloropropene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Trichloroethene	220 *	590 *	19	27	15000	1.0 U	1.0 U	1.00 U	
Dibromochloromethane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
1,1,2-Trichloroethane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Benzene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Trans-1,3-Dichloropropene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
2-Chloroethylvinylether	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Bromoform	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
4-Methyl-2-Pentanone	5.6 U	5.5 U	5.6 U	5.6 U	5.8	5.0 U	5.0 U	5.00 U	
2-Hexanone	5.6 U	5.5 U	5.6 U	5.6 U	5.0 U	5.0 U	5.0 U	5.00 U	
Tetrachloroethene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
1,1,2,2-Tetrachloroethane	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Toluene	1.1 U	1.1 U	1.1 U	1.1 U	1.6	1.0 U	1.0 U	1.00 U	
Chlorobenzene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Ethylbenzene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Styrene	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.0 U	1.0 U	1.00 U	
Total Xylenes	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	
Trichlorofluoromethane	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	
1,1,2-Trichlorotrifluoroethane	2.3 U	2.2 U	2.2 U	2.3 U	2.0 U	2.0 U	2.0 U	2.00 U	

U Indicates the compound was undetected at the reported detection limit.
M Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match, qualifier asigned by laboratory.
* Dilution results.

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TABLE 3
ALL FAB, INC. SITE
BUILDING C-19 - DEGREASER PIT INVESTIGATION
COMPARISON OF DETECTED CONCENTRATIONS TO MTCA CLEANUP LEVELS

Sample No.:	TP1-0.0	TP1-0.9	TP2-0.1	TP2-0.9	TP1-W	MTCA Cleanup Levels			
Matrix:	Soil	Soil	Soil	Soil	Water	Method A (a)	Method B (a)	Method A (b)	Method B (c)
Units:	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/L)	Soil (ug/kg)	Soil (ug/kg)	Groundwater (ug/L)	Groundwater (ug/L)
1,1,1-Trichloroethane (TCA)	44	39	5.4	ND	230	2.0E+4 (d)	7.2E+6	200 (e)	720
Trichloroethene (TCE)	220	590	19	27	15000	5.0E+2 (d)	9.1E+4	5 (e)	3.98
Acetone	6.6	ND	ND	ND	17	—	8.0E+6	—	800
1,1-Dichloroethene	2.2	ND	ND	ND	21	—	1.7E+3	—	0.07
1,1-Dichloroethane	2.3	2.0	ND	ND	32	—	8.0E+6	—	800
Cis-1,2-Dichloroethene	8.1	11	ND	ND	94	—	8.0E+4	—	80
Trans-1,2-Dichloroethene	ND	ND	ND	ND	3.9	—	1.6E+6	—	160
2-Butanone (MEK)	ND	ND	ND	ND	160	—	4.8E+7	—	4800
4-Methyl-2-Pentanone	ND	ND	ND	ND	5.8	—	NA	—	NA
Toluene	ND	ND	ND	ND	1.6	4.0E+4 (d)	1.6E+7	40 (f)	1600
Vinyl Chloride	ND	ND	ND	ND	5.1 M	—	5.3E+2	0.2 (g)	2.3E-2

(a) WAC 173-340-740 and -745. Cleanup level for both nonindustrial and industrial sites.
(b) WAC 173-340-740. Cleanup level for nonindustrial sites.
(c) WAC 173-340-720.
(d) Cleanup level is based on protection of groundwater.
(e) Cleanup level is equivalent to MCL.
(f) Cleanup level is equivalent to secondary MCL (adverse aesthetic quality).
(g) Cleanup level based on Method B cleanup level which is modified based on analytical considerations.
ND Not detected.
NA Not applicable.
M Flag indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
Shading indicates exceedance of either Method A or Method B cleanup levels.

LANDAU ASSOCIATES, INC.

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04/25/94

APPENDIX A

FIELD EXPLORATION AND SAMPLING PROCEDURES

The field investigation was conducted on February 14, 1994. Two locations were selected for collection of samples beneath the concrete floor of the pit, based on the following criteria:

- Accessibility. Both locations were chosen because equipment in the pit precluded coring at many other locations.
- Proximity to sump pump. TP-1 was cored near the sump pump (Figure 3) because the long-term presence of water would increase chances of a release at this location.
- Structural integrity of concrete floor. Although much of the floor was covered by equipment and the exposed floor appeared to be in relatively good condition, tiny fractures were observed. TP-2 was cored at one of these tiny fractures.

To access the sample locations, 14-inch diameter holes were cored in the concrete floor of the pit at locations TP-1 and TP-2 (Figure 3). A layer of plastic sheeting lay between the base of the concrete slab and the soil surface. Water was observed on the plastic, but may have originated from the coring process and was pumped out of the hole before removing the plastic sheeting. After digging to the desired depth with a posthole digger and a digging bar, two soil samples were collected in each test pit using decontaminated hand tools. One soil sample was collected from directly beneath the concrete slab. A second sample was collected from approximately 1 ft beneath the slab. Each soil sample was transferred directly from the test pit into the sample bottle with a stainless-steel spoon. Sampling equipment was decontaminated between sample locations by scrubbing it with an Alconox solution and successively rinsing it with tap and distilled water.

Two water samples, TP1-W and SU-W, were collected from within the degreaser pit area. TPI-W was collected using a decontaminated, stainless-steel soup ladle, and SU-W was collected by directly filling the sample container by immersing in the sump water. Water sample TP1-W was collected of water seepage that accumulated in test pit TP-1 about 2 hours after excavation. This sample was composed of groundwater that could have originated from a combination of two sources: seepage into the sides of the excavation, and groundwater seepage originating from weep holes located at the base of the pit walls and flowing over the concrete floor and into the excavation.

Sample SU-W was taken of water from a small sump that contained a sump pump for water level control, located on the south side of the degreaser pit. The water contained in the sump appears to originate from the weep holes at the base of the pit wall and is directed along the walls by "gutters." This sample was not analyzed because it was considered to represent a similar source as water from TP1-W.

Three field QC samples were collected. Sample TR-W was a rinsate blank water sample collected for evaluation of cross-contamination and decontamination procedures for the soil sampling equipment. The rinsate blank was prepared in the field by pouring laboratory-supplied, volatile organic free water over the stainless-steel spoon used for collecting soil sample TP2-0.1, following decontamination of the spoon as described above. Sample TF-W was a transfer blank water sample collected to demonstrate that sample contamination was not caused by vapors present in the air (for example, as a result of ongoing manufacturing activities). The transfer blank was prepared in the pit near the time that samples TR-W and TP2-0.1 were collected by pouring laboratory-supplied, volatile organic-free water directly into sample containers. Sample TP-W was a trip blank water sample that was prepared in the laboratory prior to the field investigation and that accompanied the sample bottles through all transport and sampling activities. This sample bottle was never opened outside the laboratory. Its purpose was to demonstrate that sample contamination did not occur as a result of sample bottle contamination during bottle preparation and transportation.

The field investigation was accomplished in accordance with a health and safety plan prepared for the project by Landau Associates. Accordingly, air quality was monitored with a hand-held photoionizing detector (PID). At test pit TP-1, PID readings increased from 4 ppm above the plastic sheeting to about 14 ppm within the excavation, but remained 0 ppm in the breathing zone. Since a PID response was noted in the vicinity of the test pit openings, a ventilation fan with flexible duct pipes was set up to extract any vapors from the test pit openings and to discharge them outside the building. Following sample collection, all test pits were backfilled with soil cuttings and patched with concrete.

TP-1

Depth[a] (ft)	Unified Soil Classification System Symbol	Description	PID Readings (ppm)	Sample No./Depth (ft)[a]
0.0-0.7		Concrete		
0.7		Black plastic sheeting	4	
0.7-1.6	SM	Gray silty fine SAND with trace gravel (dense, moist) (till)	14	TP1-0.0/0.7-0.9 TP1-0.9/1.4-1.6

Test pit completed to 1.6 ft on 02-14-94.
Slight groundwater seepage encountered at base of concrete.

TP-2

Depth[a] (ft)	Unified Soil Classification System Symbol	Description	PID Readings (ppm)	Sample No./Depth (ft)[a]
0.0-0.7		Concrete		
0.7		Black plastic sheeting	0.4	
0.7-1.6	SM	Gray silty fine SAND with trace gravel (medium dense, moist) (till)	0.5	TP2-0.1/0.8-1.0 TP2-0.9/1.4-1.6

Test pit completed to 1.6 ft on 02-14-94.
Slight groundwater seepage encountered at base of concrete.

(a) Depth below top of concrete.

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Log of Test Pits | Figure A-1

LAB Data

Not included,