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**SOIL INVESTIGATION REPORT
DAVIS-HOWLAND OIL
CORPORATION**

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WATER DIVISION
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**ANDERSON AVENUE SITE
ROCHESTER, NEW YORK**

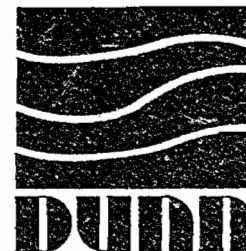
Prepared for:

DAVIS-HOWLAND OIL CORPORATION

200 Anderson Avenue

Rochester, New York 14607

November 26, 1991



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SOIL INVESTIGATION REPORT
FOR
REMEDIAL INVESTIGATION

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1.0 INTRODUCTION

This report, prepared for the Davis-Howland Oil Corporation (Davis-Howland), describes the soil investigation program performed by Dunn Corporation (DUNN) on October 16-17, 1991. This program was implemented at the Davis-Howland facility located at 200 Anderson Avenue in Rochester, New York.

2.0 PURPOSE AND SCOPE

The purpose of this investigation was to determine the presence of contaminated soils at the rear of the Anderson Avenue property. To accomplish this objective, a soil survey and test pit excavation program was performed which included the collection and laboratory analysis of soil samples.

2.1 Soil Gas Survey

The soil gas survey was completed on October 16, 1991. The property was gridded off (refer to Figure 2-1) for a total of twenty sampling points. At each location, a slam bar with a one-half inch diameter stainless steel rod was driven, at most locations, to a depth of approximately four feet. At several locations penetration was arrested at less than four feet because of rocks. A hollow aluminum rod which was pinched off at the bottom and had several holes drilled into the bottom one-foot was inserted into each hole. After the rod was inserted into the hole, the top of the hole was sealed off and the end of the aluminum rod was connected to the inlet of an HNU photoionization vapor detector with a rubber hose. Readings were taken using two HNU photoionization vapor detectors incorporating two lamps including the standard 10.2 eV lamp and the 11.7 eV lamp. The 11.7 eV lamp HNU was added to this study because of the potential presence of single carbon chlorinated solvents which may not have been detected by the 10.2 eV lamp.

There was some difficulty in obtaining readings from the originally planned twenty-one locations primarily because of drums staged on the property. Therefore, the grid had to be adjusted and one location, SG-9, was eliminated. One location, SG-6, was not sampled because of what appeared to be a concrete floor several inches below the surface. Several other locations including SG-2, SG-4, SG-14, and SG-16 were not sampled because of extremely hard soil conditions and/or it was determined from surrounding samples that the (unsampled) data point was not needed to delineate the boundaries of contamination.

2.2 Test Pit Program

It was originally intended to collect several subsurface samples using a hand auger. However, after observing the difficulty in driving the slam bar into the highly compacted soil containing numerous rocks, it was decided to secure the use of a backhoe for the subsurface investigation on

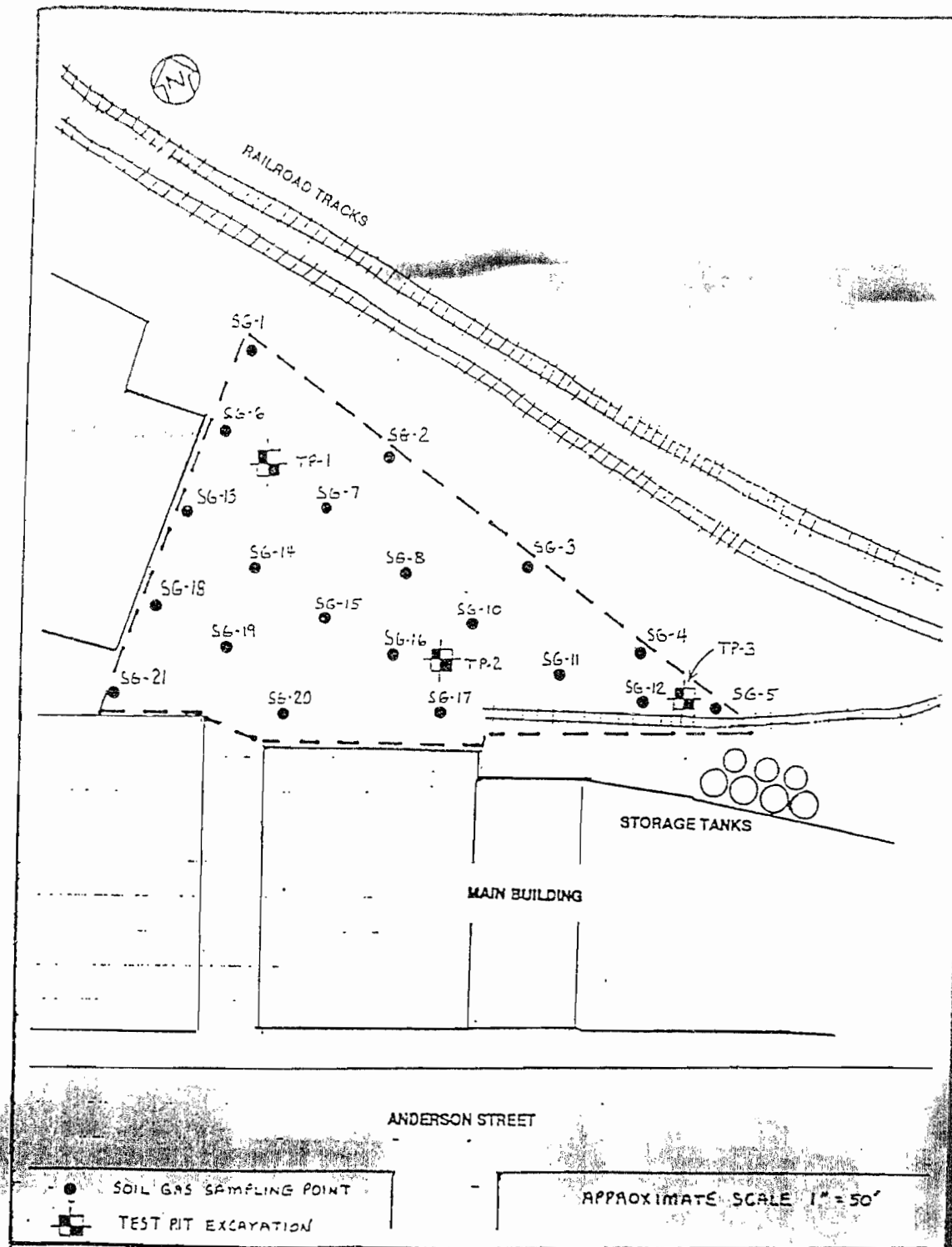


FIGURE 2-1
LOCATIONS OF SOIL GAS SAMPLING POINTS
AND TEST PIT EXCAVATIONS
DAVIS HOWLAND OIL CORPORATION



the following day, November 17, 1991. A total of three test pits were excavated to a depth of six to eight feet (refer to Figure 2-1) from which six samples were collected (two from each hole).

Each test pit was logged for soil type and observations noted during excavation (refer to Appendix A). All samples were collected in pre-cleaned bottles and placed on ice until received at the laboratory. All samples were analyzed for the following:

- Volatiles on TCLP Extract using USEPA Method 8240;
- Semi-volatiles on TCLP Extract using USEPA Method 8270;
- PCBs/Pesticides by USEPA Method 8080; and
- TCLP Metals on TCLP Extract.

3.0 RESULTS

3.1 Soil Gas Samples

The clearest interpretation of soil gas data occurs when the measurements show a significant difference between one area and another on a site. In general, large relative differences suggest one area may be more "contaminated" than another. It is much more difficult to interpret small differences in readings even when the values may be elevated (e.g., all readings between 100 and 120 ppm). Another problem with interpreting soil gas data is peak verses steady readings. In many cases, in particular with the 11.7 eV lamp, there was an initial peak reading followed by a decrease to a steady reading. Finally, variations in soil type (i.e., particle size, density) and moisture can affect readings.

Of the two HNU lamps that were employed in this survey, the 11.7 eV lamp revealed a more dramatic variation in readings across the site than the 10.2 eV lamp. Figure 3-1 shows the peak readings obtained across the site using the 10.2 eV lamp. Elevated readings on the western half of the site were generally, slightly higher (150-200 ppm), than readings on the eastern end of the site (100-110 ppm). However, in both areas there were anomalies and the differences between the two areas were not as clearly delineated as with the 11.7 eV lamp. Elevated readings of two to five times the readings from other sampling points were recorded at SG-8 (450 ppm) and SG-10 (500 ppm).

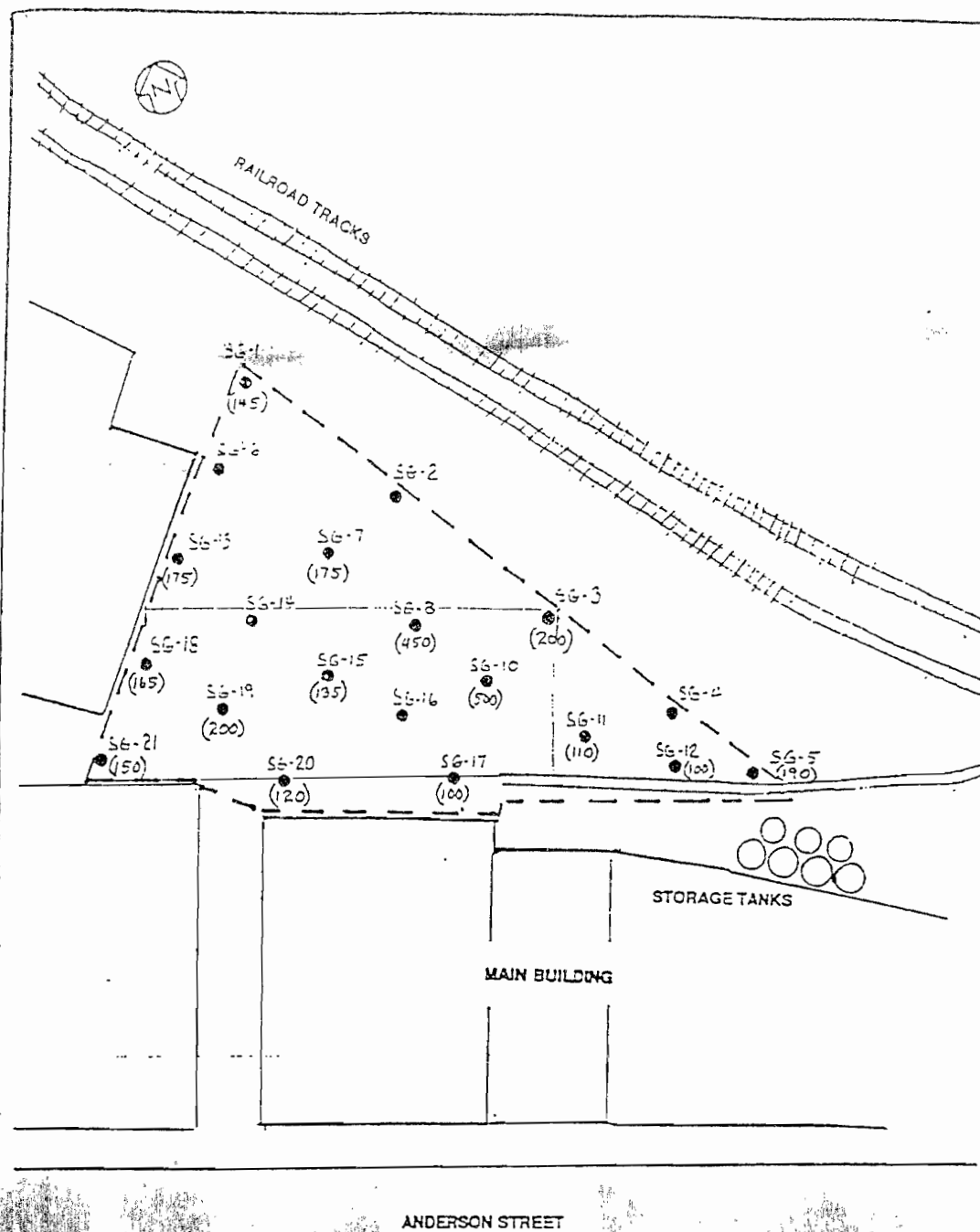
A somewhat clearer picture emerged using the 11.7 eV lamp (refer to Figure 3-2). With this lamp, the highest readings were obtained at the western portion of the site (170-200 ppm) and the lowest readings were recorded at several points on the eastern side of the property (0.5-2 ppm). The 11.7 eV lamp did not show the same elevated readings in the central part of the site that the 10.2 eV lamp did. However, the results of the 11.7 eV lamp did show a correlation with the analytical results for volatile organics on test pit soil samples collected for this study (refer to Section 3.2). A summary of the soil gas survey data is presented in Table 3-1.

TABLE 3-1

SOIL GAS SURVEY RESULTS
DAVIS-HOWLAND OIL CORPORATION

Sampling Location	Depth	Peak Reading using HNU Photoionizer (ppm)*	
		10.2 eV Lamp	1.7 eV Lamp
SG-1	4'	145	110
SG-2	Not Sampled	---	---
SG-3	4'	200	2
SG-4	Not Sampled	---	---
SG-5	4'	190	5
SG-6	Not Sampled	---	---
SG-7	3' 11"	175	200
SG-8	3' 8"	450	170
SG-9	Sampling Point Was Eliminated	---	---
SG-10	3' 8"	500	20
SG-11	4'	110	0.5
SG-12	3' 6"	100	0.5
SG-13	3' 10"	175	200
SG-14	Not Sampled	---	---
SG-15	2' 6"	135	70
SG-16	Not Sampled	---	---
SG-17	3' 6"	100	100
SG-18	3' 6"	165	195
SG-19	2' 6"	200	170
SG-20	4'	120	190
SG-21	3' 10"	150	30

* All readings in ppm as calibrated to a benzene surrogate calibration gas (isobutylene).



SG-8
● SOIL GAS SAMPLING POINT
(450) HNU READING IN PPM

APPROXIMATE SCALE 1" = 50'



FIGURE 3-1
HNU READINGS USING 10.2 eV LAMP
DAVIS HOWLAND OIL CORPORATION

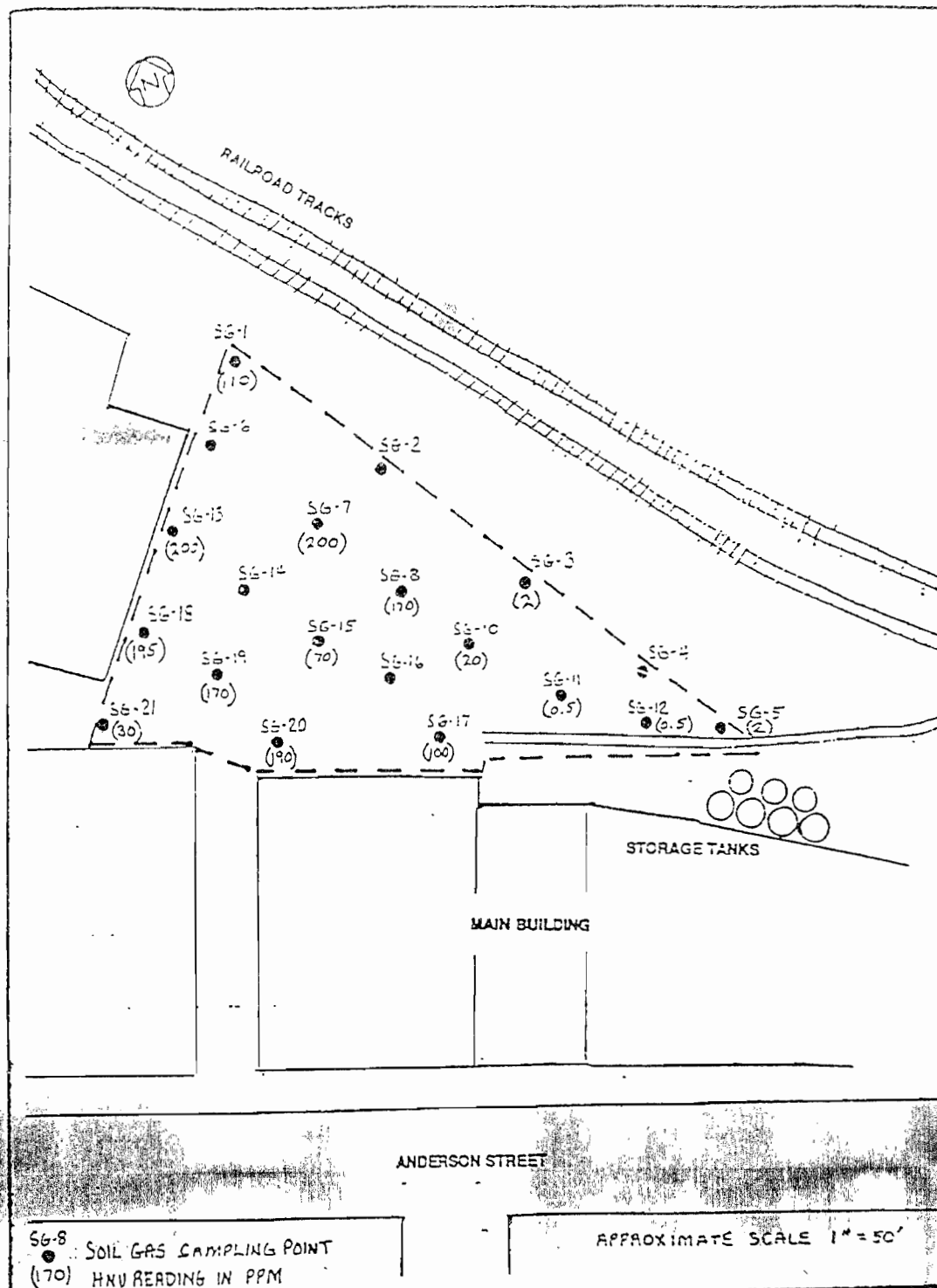


FIGURE 3-2
HNU READINGS USING 11.7 eV LAMP
DAVIS HOWLAND OIL CORPORATION



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3.2 Test Pit Samples

Observations made during the test pit excavations indicated visually stained soils to a depth of seven to eight feet at TP-1 and six feet at TP-2 (refer to Appendix A). Very strong odors were noted at all three test pits. HNU readings (10.2 eV lamp) ranged up to 250 ppm in the upper soils of TP-1 and a black stained silty sand at seven feet measured 70 ppm with the HNU. Breathing zone measurements inside the excavation of 20 ppm were also recorded at TP-1 requiring the use of a full-face respirator to enter the excavation to collect samples. TP-2 also had strong odors and HNU readings of 10 to 20 ppm in upper soils; over 200 ppm at three to four feet in depth; and 40 ppm at six and one-half feet in depth. Black discolorations were observed at the bottom of the hole at six and one half feet. TP-3 appeared to be relatively clean compared to the other two test pits. HNU reading of 1 to 2 ppm were recorded during the excavation of the soils. At the completion of the excavation the formation of a small pool of standing water was observed. However, it is not certain that this represented the groundwater surface since standing water was not observed in TP-1 which was deeper than TP-3. Strong odors were noted during the backfilling of the hole.

The analytical results from test pit soils indicate the presence of several chlorinated and non-chlorinated solvents at depths down to seven feet in TP-1 and six feet in TP-2 (refer to Table 3-2). At TP-1, these compounds including acetone (1,100 ppb), trans-1,2-dichloroethene (43 ppb), methyl ethyl ketone (10,000 ppb), 1,1,1-trichloroethane (5.1 ppb), 1,1,2-trichloroethane (6.9 ppb), and trichloroethene (40 ppb) were found at concentrations that exceed the standards for Class GA Groundwaters in New York State (6NYCRR Part 703). Soils from TP-2 had similar exceedances for 1,1,1-trichloroethane (17 ppb), and trichloroethene (400 ppb). Three additional compounds including methylene chloride (83 ppb), toluene (5.7 ppb) and xylene (13 ppb) were detected at concentrations greater than the standard for Class GA Groundwaters. Methyl ethyl ketone and trans-1,2-dichloroethene which were detected in TP-1 were not observed in TP-2.

Two of the compounds detected in soils at the site, methyl ethyl ketone and trichloroethene are TCLP compounds and in neither case were these compounds detected above their respective TCLP limit for characterization of a RCRA hazardous waste. No volatile organic compounds were detected in soils from TP-3.

Two metals were detected in test pit soils above the groundwater standard including lead and cadmium. Both lead (73 ppb) and cadmium (1,100 ppb) were detected at the three foot level in TP-1 and only lead (51 ppb) was detected at the three and one-half foot level in TP-2. Cadmium in TP-1 was the only instance of a detected compound or analyte being detected above the TCLP limit for characterization of a RCRA hazardous waste. No metals above the groundwater standard were detected in TP-3. (NOTE: It is Davis-Howland's contention that metals contamination is a result of operations conducted by previous owner.)

TABLE 3-2
SUMMARY OF ANALYTICAL RESULTS
DAVIS-HOWLAND OIL CORPORATION

COMPOUND	CONCENTRATIONS ug/l (ppb)						NYS GROUNDWATER STANDARD
	TP1A 3 ft.	TP1B 7.0 ft.	TP2A 3.5 ft.	TP2B 6.5 ft.	TP3A 3.0 ft.	TP3B 6.0 ft.	TCLP Limit
VOAS							
Acetone	...	1100	...	27	...	...	N/A
Trans-1,2-dichloroethene	...	43	...	...	...	...	N/A
Methylene chloride	...	...	...	83	...	...	N/A
Methyl ethyl ketone	10000	...	...	...	...	...	200000
Toluene	...	...	57	...	...	...	N/A
1,1,1-Trichloroethane	5.1	...	17	...	...	...	N/A
1,1,2-Trichloroethane	6.9	...	...	...	...	...	N/A
Trichloroethene*	...	40	400	...	...	...	500
Xylenes	...	...	...	13	...	...	N/A
SEMI-VOAS	NO SEMI-VOA COMPOUNDS DETECTED IN TCLP EXTRACT						
METALS*							
Barium	...	55	630	700	300	420	100000
Chromium	...	...	...	...	10	...	5000
Lead	73	...	51	...	...	...	5000
Silver	24	15	8	8	8	9	5000
Cadmium	1100	...	...	...	...	...	1000
PESTICIDES/PCBs	NO PESTICIDES/PCBS DETECTED						

* Matrix Corrected Values

No semi-volatile or pesticides/PCBs were detected in test pit soils above detection limits.

It should be noted that an analytical bias correction sample (matrix spike) was performed per the TCLP method. This bias correction was applied to all detected compounds which are included as TCLP parameters (e.g., trichloroethene and all metals). The bias correction was not applied to those compounds which are not TCLP parameters.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The results of this study shows subsurface contamination exists in the north yard area of the site. Visually stained materials were observed over most of the surface soils and at a depth of seven \pm feet in TP-1 and six \pm feet in TP-2.

Analytical results from the test pit samples indicate the presence of chemistry at various depths that do not exceed TCLP Limits (except cadmium in TP-1) but do exceed groundwater standards.

Specific contaminants were found as follows:

- 1) Visually stained soil appears to extend to a significant depth at the location of TP-1 (down to seven feet) and TP-2 (down to six feet);
- 2) Chlorinated and non-chlorinated solvents are present on-site at TP-1 (down to seven feet) and TP-2 (down to six feet) at levels that exceed groundwater standards;
- 3) Cadmium is present on-site at TP-1 (to a depth of 3 feet) at levels that exceed groundwater standards and the TCLP limit for a hazardous waste;
- 4) Lead is present on-site at TP-1 (to a depth of 3 feet) and TP-2 (to a depth of 3.5 feet) at levels that exceed groundwater standards;
- 5) No Pesticide/PCB contamination appears to be on-site at depth; and
- 6) No semi-volatile contamination appears to be on-site at depth.

As indicated in the work plan and the NYSDEC letter of July 26, 1991, all visually stained soils must be removed from the site. Based upon a site inspection and observations made during the test pit program, it is recommended that surficial visually stained soils be removed to a depth of two feet or to a depth such staining is not observed.

The test pit program revealed that visually contaminated soils were present at a depth of seven feet at TP-1 and six feet at TP-2 and strong odors were noted at all three test pits. If the visual

criterion is the only guide for the removal of soil, it could result in a very significant amount of soil being removed at certain locations in terms of both volume and cost. Therefore, before remediation of deeper soils is attempted, it is recommended that a cleanup level for volatile organics in soils be determined by the NYSDEC.

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