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L. Young

PHASE II
ENVIRONMENTAL INVESTIGATION REPORT

Vibratech, Inc.
Buffalo, New York

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JUNE 1994

REF. NO. 5028 (3)

CONESTOGA-ROVERS & ASSOCIATES

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES
(Following Report)

LIST OF APPENDICES

1.0 INTRODUCTION

Vibratech, Inc. owns and operates a facility (Site) at 537 East Delevan Avenue in Buffalo, New York, which manufacturers vibration dampers and rotary shock absorbers for the trucking and railroad industries.

In August of 1992, Conestoga-Rovers & Associates (CRA) performed a Phase I Environmental Assessment of the Site to assess potential environmental liabilities associated with existing environmental conditions resulting from current and former operations at the Site. The results of this assessment were presented in the report entitled, "Phase I Environmental Assessment Report, Vibratech, Inc., Buffalo, New York", dated September 10, 1992. Based on the Phase I assessment results, it was recommended that additional work be performed to better assess the environmental condition of the Site soils and a Phase II environmental investigation program was developed.

In December 1993, CRA implemented the Phase II investigation program which included the collection and analyses of soil samples within areas of concern identified during the Phase I assessment.

This report describes the Phase II field activities performed and presents the analytical results, conclusions and recommendations.

2.0 SCOPE OF WORK

The objective of the Phase II environmental investigation program was to document the existing environmental condition of Site soils within the following areas of concern:

i) the vicinity of three former underground storage tanks which were all closed by removal in the 1980s. These tanks stored diesel fuel, curing/quenching oil and a degreasing solvent (believed to be 1,1,1-trichloroethane or an oil thinner mixture);

ii) the area where a closed-in-place underground storage tank exists south of Interstate Tires. The contents of this tank was unknown and was emptied and filled with concrete in 1986;

iii) the area near two existing underground fuel oil tanks;

iv) the general yard/parking lot on the east end of the property; and

v) along the railroad spurline.

Figure 2.1 illustrates the Site layout and the location of these areas and the sample locations.

Field activities included the installation and overburden sampling of boreholes and the excavation and sampling of test pits. Soil samples were collected for analyses of the Target Compound List (TCL) Volatile Organic Compounds (VOCs), Total Petroleum Hydrocarbons (TPHs), and/or the Target Analyte List (TAL) metals and cyanide.

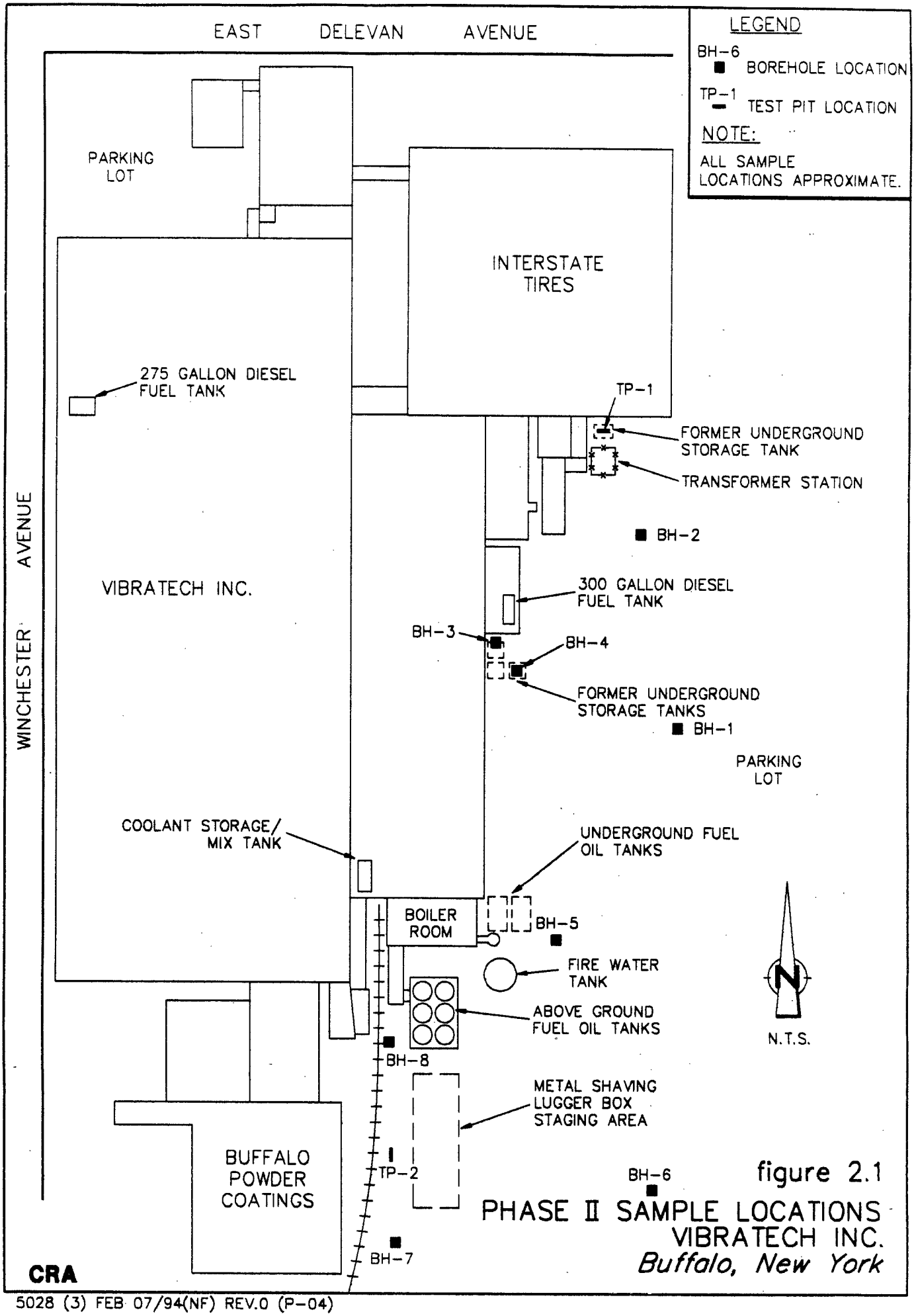


figure 2.1

PHASE II SAMPLE LOCATIONS
VIBRATECH INC.
Buffalo, New York

5028 (3) FEB 07/94(NF) REV.0 (P-04)

3.0 FIELD ACTIVITIES

The Phase II field activities were performed on December 16 and 17, 1993. A description of the activities performed and the procedures utilized are described below.

The sample locations are shown on Figure 2.1, the Site layout.

3.1 BOREHOLE SAMPLING

Boreholes were advanced at the locations identified on Figure 2.1 until the top of bedrock or refusal was encountered. All drilling activities were performed by Buffalo Drilling Company using a CME-55 truck-mounted drilling rig. CRA personnel supervised all drilling and sampling activities.

Prior to the commencement of drilling, and after the completion of each borehole, all drilling tools were decontaminated by steam cleaning to prevent cross-contamination from off-site sources or between boreholes. All decontamination water was collected in 55-gallon drums.

The borings were advanced using 4.25 inch inside diameter hollow stem augers. Continuous soil samples were collected using 2-foot long, 2-inch diameter stainless steel split spoon samplers advanced ahead of the augers.

Each split spoon sampler was laid down on clean plastic and was carefully opened. The soil core was screened for organic vapors using a photoionization detector (MSA Photon) and the stratigraphy of the core was logged. Aliquots of soil were collected from each split spoon and were placed in a precleaned stainless steel bowl for compositing. Soil collected over the entire depth of each boring were composited into one sample for analyses.

Table 3.1 presents a sample collection key and describes the analyses performed. Table 3.2 summarizes the organic vapor results for each boring.

No soil samples were collected for chemical analyses from BH-5 advanced near the two existing underground fuel oil tanks since only gravel was encountered. Another borehole was advanced near BH-5 with no soil recovery in the spoons.

Following the completion of each boring, cement bentonite grout mixed with the borehole cuttings was used to backfill the open hole.

3.2 TEST PIT SAMPLING

Two test pits (TP-1 and TP-2) were excavated at the Site by Buffalo Drilling Company using a backhoe. Test pit TP-1 was excavated near a closed-in-place underground storage tank located between the Interstate Tire warehouse building and a transformer station. Test pit TP-2 was excavated adjacent to the rail spur in an area displaying surficial soil staining next to the spurline switch mechanism (see Figure 2.1). Table 3.3 presents the test pit logs.

The test pit (TP-1) adjacent to the Interstate Tire warehouse was excavated through fill material to the top of the concrete-filled underground storage tank (UST) to an approximate depth of 3.7 feet below ground surface (bgs). This UST location is bounded on three sides by the building walls and a fenced transformer station. Because of the small size of this area, the test pit could not be excavated along the side of this UST.

A test pit (TP-2) was excavated immediately adjacent to the railroad spurline in an area of visibly stained soils to the top of what

appeared to be bedrock (approximately 1.7 feet bgs). A 6-inch diameter steel pipe running parallel to the spurline was encountered in test pit TP-2 at an approximate depth of 1.4 feet bgs. An oil-like black material was noted to be present around the pipe in the surrounding soil.

The stratigraphic logs for each test pit and the organic vapor readings detected in the soil excavated from the test pits are presented on Table 3.3.

At each test pit location, grab samples of soil were collected over the entire depth of the test pit using a precleaned stainless steel spoon and were placed into a precleaned stainless steel bowl and composited into one sample for analyses of the TCL VOCs and TPH (see Table 3.1).

3.3 SAMPLE HANDLING AND ANALYSIS

At each borehole and test pit location soil representing the entire thickness of the overburden (fill and natural material) was collected and composited in a precleaned stainless steel bowl. This composited soil sample was then placed into the appropriated precleaned, laboratory supplied sample jars. One duplicate sample, matrix spike/matrix spike duplicate (MS/MSD) sample, and one equipment rinsate blank sample were also collected for quality assurance/quality control (QA/QC) purposes. All soil samples were labeled, packaged in a sealed cooler with ice and shipped to Phoenix Environmental Laboratories Inc. in Manchester, Connecticut by overnight delivery.

Table 3.4 describes the analytical methodologies utilized by the laboratory.

4.0 ANALYTICAL RESULTS

4.1 GENERAL

The analytical results are summarized on Table 4.1. Appendix B contains the analytical report as provided by the laboratory. The analytical data were evaluated for precision, accuracy and compliance with the analytical methodologies. The results of this evaluation are presented in Appendix C. Based on the data assessment and validation performed, the data provided by the laboratory are found to be acceptable with the qualifiers identified in Appendix C.

The analytical data are discussed below based on the following areas of sample collection:

i) underground storage tank areas;
ii) parking lot; and
iii) railroad spurline.

The analytical results were compared to recommended soil cleanup levels presented in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels (see Appendix D). The recommended soil cleanup levels are also summarized on Table 4.1. Published background metal concentrations for uncontaminated soils are presented on Table 4.2. No background soil samples were collected from the area.

4.2 UNDERGROUND STORAGE TANK AREAS

No soil samples could be collected for analyses from the vicinity of the two existing underground fuel oil tanks as discussed in Section 3.1.

One test pit soil sample (TP-1) was collected near the closed-in-place underground storage tank located adjacent to the Interstate Tire warehouse for analyses of the TCL VOCs and TPH. Trichloroethene, 1,1,1-trichloroethane, 1,2-dichlorobenzene and cis-1,2-dichloroethane were detected in the soil sample collected from test pit TP-1 at concentrations ranging from 40.6 µg/kg to 180 µg/kg. These concentrations were detected below the respective NYSDEC recommended soil cleanup objectives for the detected parameters. TPH was detected at 1010 ppm in the soil sample collected from test pit TP-1. The organic vapor levels (see Table 3.3) detected during excavation of test pit TP-1 ranged up to 102 ppm. This is likely a result of the presence of VOCs and TPH in the soils.

Samples were collected from borehole BH-3 and BH-4 which are located within the area of the three former USTs. No organic vapors (see Table 3.2) were detected in boreholes BH-3 and BH-4 except for the two to four foot interval of BH-3 which had an organic vapor level of 11.8 ppm. The soil samples collected from borehole BH-4 were analyzed for the TCL VOCs, TAL metals, TPH and cyanide, while the sample collected from BH-3 was analyzed for TCL VOCs only. No cyanide was detected in samples collected from BH-4 and the metals detected were at levels similar to those found in uncontaminated soils (see Table 4.2) and were similar to or slightly above the NYSDEC recommended cleanup levels (see Appendix D). TPH was detected at 185 mg/kg and 265 mg/kg in the sample collected from BH-4. VOCs consisting of 1,1-dichloroethane, 1,2-dichloroethene (cis and trans), 1,1,1-trichloroethane, trichloroethene and vinyl chloride were detected at concentrations ranging from 20 µg/kg to 1,260 µg/kg. Trichloroethene, detected at 1,260 µg/kg, was the only VOC detected above the NYSDEC recommended soil cleanup level of 700 µg/kg.

4.3 PARKING LOT AREA

The soil samples collected from three boreholes (BH-1, BH-2, and BH-6) in the parking lot area were analyzed for the TCL VOCs, TAL metals, cyanide and TPH.

No cyanide was detected in any of these samples and TPH was detected at levels ranging from 102 mg/kg to 283 mg/kg.

Lead (12-105 mg/kg), zinc (40-142 mg/kg) and cadmium (1.1 mg/kg) were detected slightly above the NYSDEC recommended cleanup levels (see Table 4.1). However, these detected concentrations are similar to published levels found in uncontaminated soils (see Table 4.2).

VOCs consisting of 1,1,1-trichloroethane, tetrachloroethane, 2-butanone and acetone were detected at levels ranging from 27.5 µg/kg to 564 µg/kg (acetone). Acetone was the only VOC detected above the NYSDEC recommended cleanup level of 200 µg/kg.

No organic vapors were detected during the collection of soil samples in boreholes BH-1 and BH-2 (see Table 3.2) and low levels of organic vapors (up to 25.2 ppm) were detected in borehole BH-6. These organic vapor levels are generally consistent with the analytical results obtained.

4.4 RAILROAD SPURLINE

Soil samples were collected from two borings (BH-7 and BH-8) and one test pit (TP-2) installed/excavated along the railroad spurline. Samples collected from BH-7 and BH-8 were analyzed for the TCL VOCs, TAL metals, cyanide and TPH. The soil sample collected from TP-2 was only analyzed for the TCL VOCs and TPH.

Cyanide was only detected in the sample collected from BH-8 at 1.49 mg/kg. TPH was detected in BH-7, BH-8 and TP-2 at levels ranging from 123 mg/kg to 71,100 mg/kg (BH-8). It should be noted that a black oil-like material was present in the soil samples collected from BH-8 and in test pit TP-2. Chromium (4.6-25 mg/kg), lead (7.1-283 mg/kg), and zinc (33-55 mg/kg) were the only metals detected above the respective NYSDEC

recommended cleanup levels (see Table 4.1). However, the detected chromium, lead and zinc concentrations are similar to published levels (see Table 4.2) for uncontaminated soils.

Several VOCs were detected in soil samples collected from BH-7, BH-8 and TP-2 at levels ranging up to 675,000 µg/kg. The highest VOC concentrations included 1,1,1-trichloroethane (675,000 µg/kg) and tetrachloroethene (87,600 µg/kg) which were detected in TP-2. Acetone, benzene, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene (cis and trans), 1,1,1-trichloroethane, trichloroethene, vinyl chloride and tetrachloroethene were detected up to three orders of magnitude above NYSDEC recommended cleanup levels (see Table 4.1).

5.0 CONCLUSIONS

Based on the results obtained, the following conclusions are made:

i) fill material at the Site consists primarily of crushed limestone and clayey silt and varied in thickness from 0.6 to 8 feet;

ii) native glacial till deposits consisting of silts and sands were generally encountered below the fill material and extended to the top of bedrock. The thickness of the glacial material varied from 0 to 2.8 feet;

iii) underlying the glacial till layer is a limestone bedrock which is a member of the Onondaga Limestone Formation. Regionally, the Onondaga Limestone Formation has a pronounced fracture system and is considered a waterbearing unit in Western New York;

iv) the fill material within the underground storage tank areas and parking lot have low levels of VOC contamination. Acetone and trichloroethene were the only VOCs detected above the NYSDEC recommended soil cleanup objectives of 200 µg/kg and 700 µg/kg, respectively. The highest acetone and trichloroethene concentrations detected in these areas were 564 µg/kg and 1260 µg/kg, respectively. TPH was found at an elevated concentration of 1010 ppm in the area of the closed-in-place underground tank;

v) VOCs were detected up to three orders of magnitude above the respective NYSDEC recommended cleanup levels in the fill materials within the railroad spurline. This chemical presence may be attributable in part to the black oil-like material encountered in the fill; and

vi) the most predominant VOCs detected in the Site soils consisted of 1,1,1-trichloroethane, tetrachloroethene, trichloroethene, 1,2-dichloroethene, 1,1-dichloroethane and vinyl chloride.

TABLES

TABLE 3.1

SAMPLE COLLECTION KEY
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK

Sample ID	*Location*	*Date*	*Time*	*Matrix*	*Interval Sample (Feet bgs)*	*Analyses*	*Comments*
5028-001	BH-1	12/16/93	1015	Soil	0-4.2	TCL VOCs, TPH, TAL	
5028-002	BH-2	12/16/93	1045	Soil	0-5.7	TCL VOCs, TPH, TAL	
5028-003	BH-3	12/16/93	1130	Soil	0-8.5	TCL VOCs, TPH, TAL	
5028-004	BH-4	12/16/93	1250	Soil	0-8.7	TCL VOCs, TPH, TAL	
5028-005	BH-4	12/16/93	1250	Soil	0-8.7	TCL VOCs, TPH, TAL	Duplicate of 5028-004
5028-006	BH-6	12/16/93	1400	Soil	0-5.1	TCL VOCs, TPH, TAL	MS/MSD
5028-007	BH-7	12/16/93	1445	Soil	0-4.3	TCL VOCs, TPH, TAL	
5028-008	BH-8	12/16/93	1500	Soil	0-2.2	TCL VOCs, TPH, TAL	
5028-009	TP-1	12/17/93	1100	Soil	0-3.5	TCL VOCs, TPH	
5028-010	TP-2	12/17/93	1130	Soil	0-1.7	TCL VOCs, TPH	
Sample Rinsate Blank		12/16/93	1415	Water		TCL VOCs, TAL, TPH	Collected after collection of sample 5028-006

Notes:
TCL Target Compound List
VOCs Volatile Organic Compounds
TPH Total Petroleum Hydrocarbons
TAL Target Analyte List Metals and Cyanide

TABLE 3.2

BOREHOLE ORGANIC VAPOR READINGS (1)
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK

Location	*Interval (Feet bgs)*	*Organic Vapor Reading (ppm)*
BH-1	0-2	0
	2-4	0
	4-6	0
BH-2	0-2	0
	2-4	0
	4-6	0
	6-8	0
	8-10	0
BH-3	0-2	0
	2-4	11.8
	4-6	0
	6-8	0
	8-10	0
BH-4	0-2	0
	2-4	0
	4-6	0
	6-8	0
	8-10	0
BH-5	0-2	0
BH-6	0-2	25.2
	2-4	12.5
	4-6	18.2
BH-7	0-2	72
	2-4	12
	4-6	0
BH-8	0-2	25.2
	2-4	8

Note:

(1) As measured by an MSA Photon photoionization detector on December 16, 1993.

TABLE 3.3

TEST PIT LOGS
PHASE II INVESTIGATION
VIRBRATECH INC.
BUFFALO, NEW YORK

Location	*Date*	*Interval (Feet bgs)*	*Description*	*Organic Vapor Reading (1) (ppm)*
TP-1	12/17/93	0-3.7	Brown silt with some clay and gravel fill, mixed and in layers, no staining; moderate petroleum odor	102 ppm max.
		3.7	Top of flat-topped rusted steel tank.	-
TP-2	12/17/93	0-1.7	#2 and #4 crushed limestone fill with some sand; at 1.4 ft bgs, a 6" steel pipe was encountered running N-S, parallel to the RR tracks; black oil-like material was present in the soil surrounding pipe down to the top of bedrock.	20 ppm max.
		1.7	Top of bedrock.	

Note:
(1) As measured by an MSA Photon photoionization detector on December 17, 1993.

TABLE 3.4
LABORATORY ANALYTICAL METHODOLOGIES
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK

Parameter	*Methodology*
TCL VOCs	SW-846 8240
TPH	USEPA 418.1
TAL Metals	SW-846 6010/7000 Series
Cyanide	USEPA 335.2

Notes:
SW-846 = "Test Methods for Evaluating Solid Waste" SW-846 3rd Edition, 1986.
USEPA = "Methods for Chemical Analysis of Waster and Wastes", March 1983.

TABLE 4.1

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
DECEMBER 1993

Sample ID	*NYSDEC*	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*Cleanup*	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*Levels (1)*	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Volatile Organic Compounds (ug/kg)											
Acetone	200	20U	298J	20U	20UJ	20UJ	564J	879J	20U	20U	373J
Acrolein	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Acrylonitrile	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Benzene	60	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	89	20U	20UJ
Bromodichloromethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Bromoform	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Bromomethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
2-Butanone	300	32.6J	71.6J	20U	20UJ	20UJ	36J	78J	20U	20U	20UJ
Carbon disulfide	2700	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Carbon tetrachloride	600	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chlorobenzene	1700	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	24.7	20U	20UJ
Chlorodibromomethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chloroethane	1900	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
2-Chloroethylvinylether	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chloroform	300	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	50.5	20U	65.8J
Chloromethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,2-Dichlorobenzene	7900	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	51.8j	20UJ
1,3-Dichlorobenzene	1600	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,4-Dichlorobenzene	8500	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,1-Dichloroethane	200	20U	20UJ	69J	104J	27.4J	20UJ	20UJ	8060	20U	24700J
1,2-Dichloroethane	100	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	226	20U	20UJ
1,1-Dichloroethene	400	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	59.5	20U	8610J
cis-1,2-Dichloroethene	-	20U	20UJ	20U	124J	31.9J	20UJ	20UJ	4210	40.6	6360J
trans-1,2-Dichloroethene	300	20U	20UJ	20U	19.7J	20UJ	20UJ	20UJ	1410J	20U	562J
1,2-Dichloropropane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
cis-1,3-Dichloropropene	300 (2)	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
trans-1,3-Dichloropropene	300 (2)	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Ethylbenzene	5500	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	45.1	20U	20UJ
2-Hexanone	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Methylene chloride	100	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	55.3U	20U	20UJ
4-Methyl-2-pentanone	1000	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Styrene	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ

TABLE 4.1

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
DECEMBER 1993

Sample ID	*NYSDEC*	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*Cleanup*	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*Levels (1)*	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Volatile Organic Compounds (ug/kg)											
1,1,2,2-Tetrachloroethane	600	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Tetrachloroethene	1400	22.5J	20UJ	20U	20UJ	20UJ	20UJ	20UJ	30.3	20U	87600J
Toluene	1500	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	198	20U	123J
1,1,1-Trichloroethane	800	111J	80.9J	79.5J	108J	50.5J	20UJ	20UJ	1050	105	675000J
1,1,2-Trichloroethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	80.8J
Trichloroethene	700	20U	20UJ	83.8J	1260J	184J	20UJ	20UJ	733	180	3260J
Trichlorofluoromethane	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,2,3-Trichloropropane	400	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Vinyl acetate	-	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Vinyl chloride	200	20U	20UJ	20U	20J	24.3J	20UJ	20UJ	3440	20U	673J
Total Xylenes	1200	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	196	20U	62.2J
Inorganics (mg/kg)											
Total Petroleum Hydrocarbons	-	102	283	589	254	185	42.4	123	71100	1010	23500
Total Cyanide	-	1.0U	1.0U	NA	1.0U	1.0U	1.0U	1.0U	1.49	NA	NA
Metals (mg/kg)											
Aluminum	30 or SB	12426	9110	NA	5156	6069	9365	4660	3840	NA	NA
Antimony	30 or SB	0.50U	0.50U	NA	0.50U	0.50U	0.50U	0.50U	0.50U	NA	NA
Arsenic	7.5 or SB	0.59U	0.46U	NA	3.1J	6.8J	0.59U	0.53U	1.5	NA	NA
Barium	300 or SB	99	43	NA	12	14	40	20	46	NA	NA
Beryllium	0.14	0.59U	0.46U	NA	0.58U	0.50U	0.59U	0.53U	0.47U	NA	NA
Cadmium	1 or SB	1.7	1.1	NA	0.81	0.79	1	0.81	1.7	NA	NA
Calcium	SB	20237	4963	NA	61500J	26200J	61000	109574	13175	NA	NA
Chromium	10 or SB	175	6.2	NA	5.2	5.7	8.3	4.6	25	NA	NA
Cobalt	30 or SB	12	3.9	NA	3.6	3.6	7.9	6.6	4.5	NA	NA
Copper	25 or SB	477	8.2	NA	7.4	6.7	9.4	6.7	194	NA	NA
Iron	2000 or SB	26150	13578	NA	9746	10396	13176	7870	16870	NA	NA
Lead	30 or SB	105	21	NA	10	8.8	13	7.1	283	NA	NA
Manganese	SB	469	602	NA	68	63	250	184	212	NA	NA
Magnesium	SB	6900	1180	NA	4430	3420	17176	24470	1010	NA	NA

TABLE 4.1

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
DECEMBER 1993

Sample ID	*NYSDEC*	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*Cleanup*	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*Levels (1)*	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Metals (mg/kg)											
Mercury	0.1	0.39U	0.38U	NA	0.40U	0.40U	0.38U	0.36U	0.38U	NA	NA
Nickel	13 or SB	22	7.2	NA	8.9	9.2	12	5.8	17	NA	NA
Potassium	4000 or SB	1751	518	NA	936J	1505J	2441	904	507	NA	NA
Selenium	2 or SB	0.59U	1.7	NA	0.58U	1.6	0.89	0.53U	0.47U	NA	NA
Silver	200	1.8	1.9	NA	0.58U	0.10U	0.59U	0.56	10	NA	NA
Sodium	3000 or SB	293	144	NA	111	94	148	144	101	NA	NA
Thallium	20 or SB	0.50U	0.50U	NA	0.50U	0.50U	0.50U	0.50U	0.50U	NA	NA
Vanadium	150 or SB	72	11	NA	7.8	7.8	15	10	8.6	NA	NA
Zinc	20 or SB	142	38	NA	47	42	40	33	55	NA	NA

Notes:

U Not detected at the stated detection limit.

NA Not Analyzed.

J Associated value is estimated.

\- Not available.

SB Site Background (see Table 4.2 for published background metal concentrations).
Indicates exceedance of specific NYSDEC recommended cleanup objective or published background metal concentrations in soils present on Table 4.2.

(1) NYSDEC recommended soil cleanup objective taken from NYSDEC TAGM 4046: Determination of Soil Cleanup Objectives and Cleanup Levels, dated November 16, 1992; as per this TAGM, the total VOCs must be less than 10 ppm or 10,000 ppb.

(2) 300 µg/kg for total 1,3-dichloropropane.

TABLE 4.2
BACKGROUND METAL CONCENTRATIONS IN SOILS
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK

Chemical Parameter	*Published Concentrations (1) (2)*		*NYSDEC (3) (4) Published Concentrations*	
	Range (ppm)	*Mean (ppm)*	*Range (ppm)*	*Mean (ppm)*
Silver	NR	NR	NR	NR
Aluminum	4,500-100,000	NR	1,000-2,000	33,000
Arsenic	<1.0 - 93.2	7.0	3 - 12	5
Barium	>0 - 3,000	560	15 - 600	290
Beryllium	<1 - 5	1.6	0 - 1.75	0.6
Calcium	NR	NR	130 - 35,000	1,651
Cadmium	0.4 - 1.1	0.5	0.01 - 0.88	0.21
Cobalt	3 - 50	10.5	2.5 - 60	5.9
Chromium	7 - 1500	50	1.5 - 40	33
Copper	3 - 300	26	5 - 38	13
Iron	0.5 - 5%	NR	2,000-550,000	14,000
Mercury	0.02 - 1.5	0.17	0.042-0.066	0.081
Potassium	NR	NR	8,500-43,000	12,000
Magnesium	NR	NR	100 - 5,000	2,300
Manganese	20 - 3,000	490	50 - 5,000	285
Sodium	NR	NR	<500-50,000	2,500
Nickel	<5 - 150	18.5	0.5 - 25	19.5
Lead	<10 - 70	26	4 - 61	17
Antimony	0.25 - 0.6	NR	NR	NR
Selenium	<0.1 - 4.0	0.31	<1 - 3.9	0.3
Thallium	0.02 - 2.8	NR	NR	NR
Vanadium	0.7 - 98	NR	1 - 300	43
Zinc	13 - 300	73.5	9 - 50	40
Cyanide	NR	NR	NR	NR

Notes:

(1) Data are reported in "Trace Elements in Soils and Plants", Kabata Pendias, Alina and Itenryk Pendias, CRC Press, Inc., Boca Raton, Florida, 1985.

(2) Data are reported for various types of surface soils in the United States.

(3) Data reported in "Background concentrations of 20 Elements in Soils with Special Regard to New York State", E. Carol McGovern, NYSDEC.

(4) Data reported for uncontaminated soils in New York State or eastern United States.

NR Not Reported.

APPENDIX A

BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-01)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-1
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
	Black asphalt pavement	-0.3					
	FILL, #2 crushed limestone	-0.5					
	ML-SILT(FILL), some clay, trace gravel, soft, fragmented, brown, moist	-1.5	CUTTINGS	1SS		15	0
2.5	ASH(FILL), some coal fragments, black, moist	-2.1	8"ø BOREHOLE	2SS		17	0
	ML-SILT, little to some sand, compact, brown, moist	-3.9					
5.0	SM-SAND(GLACIAL TILL), some silt, some gravel, compact, brown, moist	-4.2		3SS			0
	Apparent bedrock						
7.5	END OF HOLE @ 4.2 FT. BGS						
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

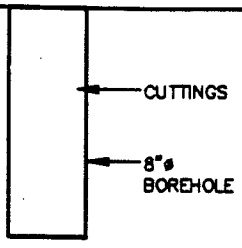
CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-02)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-2
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
	Black asphalt pavement	-0.3		1SS		16	0
	FILL, #2 crushed limestone	-1.6					
2.5	ML-SILT, little to some sand, little gravel, compact, red brown, moist			2SS		81	0
	Limestone, fractured	-3.1					
	- void (4.5 to 5.1 ft BGS)						
5.0				3SS		6	0
	END OF HOLE @ 5.7 FT. BGS	-5.7					
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-03)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-3
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
	Black asphalt pavement	-0.3		1SS		16	0
2.5	FILL, #2 crushed limestone, some coarse sand		CUTTINGS	2SS		8	11.8
5.0				3SS		4	0
	ML/SM-SILT and SAND(FILL), some gravel, loose, fine to medium grained, brown, moist	-5.7	8" ø BOREHOLE				
7.5				4SS		4	0
	ML-SILT, little clay, little sand, trace angular gravel, loose, stained black, extremely moist	-8.0 -8.4		5SS			0
10.0	END OF HOLE @ 8.4 FT. BGS						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-04)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-4
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
0	Black asphalt pavement	-0.3		1SS		22	0
	FILL, #2 crushed limestone, some coarse sand		CUTTINGS				
2.5				2SS		11	0
5.0			8"ø BOREHOLE	3SS		8	0
7.5				4SS		6	0
	ML-SILT(FILL), little sand, brick and gravel fragments	-7.5					
		-8.0		5SS			0
	ML-SILT, little clay, little sand, little gravel, loose, brown, extremely wet	-8.7					
10.0	Apparent bedrock						
	END OF HOLE ⊕ 8.7 FT. BGS						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-05)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-5
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
2.5	Black asphalt pavement	-0.3	CUTTINGS	1SS		30	0
	FILL, #2 crushed limestone	-1.0	8" ø BOREHOLE				
	Apparent bedrock	-1.6					
	Spoon refusal						
	END OF HOLE ● 1.6 FT. BGS						
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-06)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-6
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
	Black asphalt pavement	-0.1					
	FILL, #2 crushed limestone	-0.6					
2.5	ML-SILT, some clay, trace gravel, firm, red brown, moist, gray verticle dessication cracks		CUTTINGS; 8"ø BOREHOLE	1SS		9	25.2
				2SS		27	12.5
5.0	Apparent bedrock	-5.1		3SS			18.2
	END OF HOLE @ 5.1 FT. BGS						
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-7
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
	FILL, #2 crushed limestone	-0.4	CUTTINGS	1SS		15	72
	ML-SILT, little to some clay, trace gravel, firm, red brown, gray verticle dessication cracks	-2.1	8"ø BOREHOLE				
2.5	SM-SAND(REWORKED TILL), some silt, little to some rounded gravel, moderately compact, fine to medium grained, light brown, moist			2SS		33	12
	Apparent bedrock	-4.3		3SS			0
5.0	END OF HOLE ⊙ 4.3 FT. BGS						
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: VIBRATECH, INC
PROJECT NO.: 5028
CLIENT: VIBRATECH, INC
LOCATION: BUFFALO, NEW YORK

HOLE DESIGNATION: BH-8
DATE COMPLETED: DECEMBER 16, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. GILL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE OVA (ppm)
0	FILL, #2 crushed limestone	-0.5	CUTTINGS	1SS		15	25.2
	SP-SAND(FILL), some crushed limestone, loose to medium dense, coarse grained, black stained, moist, petroleum odor		8" ø BOREHOLE				
2.5	Apparent bedrock	-2.2		2SS			8
	END OF HOLE @ 2.2 FT. BGS						
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX B

LABORATORY REPORT

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O. Box 418, Manchester, CT 06040
Tel. (203) 645-1102 Fax (203) 645-0823

January 21, 1994

Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Attn: Ms. Lisa Reyes

SAMPLE I.D.#: AA33311 To AA33323 (Revised)

This laboratory is in compliance with the QA/QC procedure outlined in EPA 600/4-79-019, Handbook for Analytical Quality Control in Water and Waste Water, March 1979, and SW846 QA/QC requirements of procedures used.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

John M. Schreiber
Laboratory Supervisor

CT Lab. Registration #PH-0618
MA Lab. Registration #CT-007
NY Lab. Registration #11301
RI Lab. Registration #63
NH Lab. Registration #213693-A,B

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33311
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-001
Sample collection date: 12/16/93
Sample collection time: 10:15
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	102.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	12426	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	Below det lim	mg/Kg	0.59	12/22/93	KG	SW-7060
Barium	99	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.59	12/22/93	KG	6010/E200.7
Cadmium	1.7	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	20237	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	175	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	12	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	477	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	26150	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	105	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	469	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	6900	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.39	12/21/93	AM	SW-7470
Nickel	22	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	1751	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	Below det lim	mg/Kg	0.59	12/22/93	KG	SW-7740
Silver	1.8	mg/Kg	0.10	12/22/93	KG	Sw-7760
Sodium	293	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	72	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	142	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	32.6	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	Not detected	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	Not detected	20
trans-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	22.5	20
Toluene	Not detected	20
1,1,1-Trichloroethane	111.	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	Not Detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33312
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-002
Sample collection date: 12/16/93
Sample collection time: 10:45
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	283.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	9110	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	Below det lim	mg/Kg	0.46	12/22/93	KG	SW-7060
Barium	43	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.46	12/22/93	KG	6010/E200.7
Cadmium	1.1	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	4963	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	6.2	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	3.9	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	8.2	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	13578	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	21	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	602	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	1180	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.38	12/21/93	AM	SW-7470
Nickel	7.2	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	518	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	1.7	mg/Kg	0.05	12/22/93	KG	SW-7740
Silver	1.9	mg/Kg	0.10	12/22/93	KG	Sw-7760
Sodium	144	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	11	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	38	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	298.	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	71.6	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	Not detected	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	Not detected	20
trans-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	80.9	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	Not detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
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(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33313
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-003
Sample collection date: 12/16/93
Sample collection time: 10:45
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	589.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.

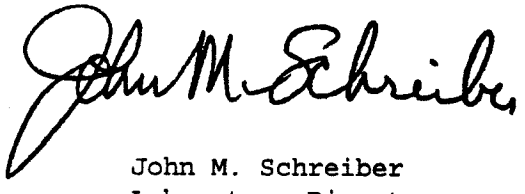
Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	69.0	20
1,2-Dichloroethane	Not detected	20

Data For Volatiles:

Component Name	Result	Component MDL
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	Not detected	20
trans-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	79.5	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	83.8	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.



John M. Schreiber
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Phoenix Environmental Laboratories Inc.
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(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33314
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-004
Sample collection date: 12/16/93
Sample collection time: 12:50
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	254.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	5156	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	3.1	mg/Kg	0.05	12/22/93	KG	SW-7060
Barium	12	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.58	12/22/93	KG	6010/E200.7
Cadmium	0.81	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	61500	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	5.2	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	3.6	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	7.4	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	9746	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	10	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	68	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	4430	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.40	12/21/93	AM	SW-7470
Nickel	8.9	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	936	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	Below det lim	mg/Kg	0.58	12/22/93	KG	SW-7740
Silver	BD L	mg/Kg	0.58	12/22/93	KG	Sw-7760
Sodium	111	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	7.8	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	47	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	104.	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	124.	20
trans-1,2-Dichloroethylene	19.7	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	108.	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	1260.	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	20.0	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
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To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33315
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-005
Sample collection date: 12/16/93
Sample collection time: 13:15
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	185.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	6069	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	6.8	mg/Kg	0.05	12/22/93	KG	SW-7060
Barium	14	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.50	12/22/93	KG	6010/E200.7
Cadmium	0.79	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	26200	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	5.7	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	3.6	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	6.7	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	10396	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	8.8	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	63	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	3420	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.40	12/21/93	AM	SW-7470
Nickel	9.2	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	1505	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	1.6	mg/Kg	0.05	12/22/93	KG	SW-7740
Silver	Below det lim	mg/Kg	0.10	12/22/93	KG	Sw-7760
Sodium	94	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	7.8	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	42	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	27.4	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	31.9	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	50.5	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	184.	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	24.3	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
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(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33316
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-006
Sample collection date: 12/16/93
Sample collection time: 14:00
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	42.4	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	9365	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	Below det lim	mg/Kg	0.59	12/22/93	KG	SW-7060
Barium	40	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.59	12/22/93	KG	6010/E200.7
Cadmium	1.0	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	61000	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	8.3	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	7.9	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	9.4	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	13176	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	13	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	250	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	17176	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.38	12/21/93	AM	SW-7470
Nickel	12	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	2441	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	0.89	mg/Kg	0.05	12/22/93	KG	SW-7740
Silver	Below det lim	mg/Kg	0.59	12/22/93	KG	Sw-7760
Sodium	148	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	15	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	40	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	564.	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	36.0	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	Not detected	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	Not detected	20
trans-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	Not detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
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To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33317
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-007
Sample collection date: 12/16/93
Sample collection time: 14:45
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	123.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	JD	SW846 - 3050
Aluminum	4660	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	Below det lim	mg/Kg	0.53	12/22/93	KG	SW-7060
Barium	20	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.53	12/22/93	KG	6010/E200.7
Cadmium	0.81	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	109574	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	4.6	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	6.6	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	6.7	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	7870	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	7.1	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	184	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	24470	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.36	12/21/93	AM	SW-7470
Nickel	5.8	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	904	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	Below det lim	mg/Kg	0.53	12/22/93	KG	SW-7740
Silver	0.56	mg/Kg	0.10	12/22/93	KG	Sw-7760
Sodium	144	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	10	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	33	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	Below det lim	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	879.	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	78.0	20
Carbon disulfide	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,1-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	Not detected	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	Not detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33318
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-008
Sample collection date: 12/16/93
Sample collection time: 15:00
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	71100.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.
Total Metals Digest	Completed			12/21/93	-0-	SW846 - 3050
Aluminum	3840	mg/Kg	0.30	12/27/93	EM	6010/E200.7
Antimony	Below det lim	mg/Kg	0.50	12/27/93	AM	SW7041
Arsenic	1.5	mg/Kg	0.05	12/22/93	KG	SW-7060
Barium	46	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/Kg	0.47	12/22/93	KG	6010/E200.7
Cadmium	1.7	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Calcium	13175	mg/Kg	1.0	12/27/93	EM	6010/E200.7
Chromium	25	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Cobalt	4.5	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Copper	194	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Iron	16870	mg/Kg	0.10	12/27/93	EM	6010/E200.7
Lead	283	mg/Kg	0.10	12/22/93	KG	EPA 200.7
Manganese	212	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Magnesium	1010	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7471
Mercury	Below det lim	mg/kg	0.38	12/21/93	AM	SW-7470
Nickel	17	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Potassium	507	mg/Kg	1.0	12/22/93	KG	7610/E258.1
Selenium	Below det lim	mg/Kg	0.47	12/22/93	KG	SW-7740
Silver	10	mg/Kg	0.10	12/22/93	KG	Sw-7760
Sodium	101	mg/Kg	1.0	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/Kg	0.50	12/21/93	AM	SW7841
Vanadium	8.6	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Zinc	55	mg/Kg	0.10	12/22/93	KG	6010/E200.7
Total Cyanide	1.49	mg/Kg	1.0	12/27/93	JD	S412B/E335.2

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	89.0	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Chlorobenzene	24.7	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	50.5	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	8060.	20
1,2-Dichloroethane	226.	20
1,1-Dichloroethylene	59.5	20
cis-1,2-Dichloroethylene	4210.	20
trans-1,2-Dichloroethylene	1410.	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	45.1	20
2-Hexanone	Not detected	20
Methylene chloride	55.3	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	30.3	20
Toluene	198.	20
1,1,1-Trichloroethane	1050.	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	733.	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	3440.	20
Xylene	196.	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33319
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-009
Sample collection date: 12/17/93
Sample collection time: 11:00
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	1010.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.

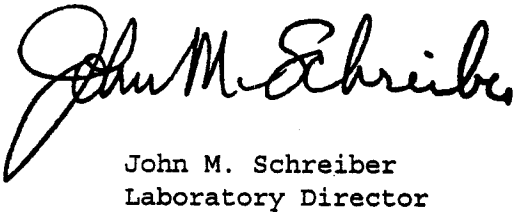
Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	51.8	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20
cis-1,2-Dichloroethylene	40.6	20
trans-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20

Data For Volatiles:

Component Name	Result	Component MDL
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
Ethylbenzene	Not detected	20
2-Hexanone	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	105.	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethene	180.	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.



John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33320
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE 5028-010
Sample collection date: 12/17/93
Sample collection time: 11:30
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Solid

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93	DLS	SW 8240
Tot.Petroleum HC	23500.	mg/Kg	20.0	12/21/93	JB	E418.1 Mod.

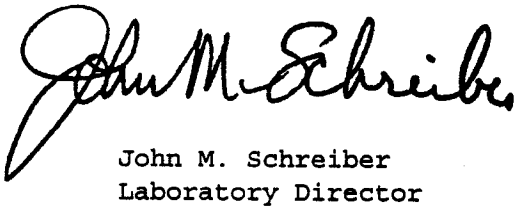
Data For Volatiles:

Component Name	Result	Component MDL
Acetone	373.	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon disulfide	Not detected	20
Carbon tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	65.8	20
Chloromethane	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	24,700.	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	8610.	20

Data For Volatiles:

Component Name	Result	Component MDL
cis-1,2-Dichloroethylene	6360.	20
trans-1,2-Dichloroethylene	562.	20
1,2-Dichloropropane	Not detected	20
cis-1,3-Dichloropropene	Not detected	20
trans-1,3-Dichloropropene	Not detected	20
2-Hexanone	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	87,600.	20
Toluene	123.	20
1,1,1-Trichloroethane	675,000.	20
1,1,2-Trichloroethane	80.8	20
Trichloroethene	3260.	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl acetate	Not detected	20
Vinyl chloride	673.	20
Xylene	62.2	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.



John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33321
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE RINSATE BLANK
Sample collection date: 12/16/93
Sample collection time: 14:15
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Water

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/L	5.0	12/23/93	DLS	SW 8240
Tot.Petroleum HC	Below det lim	mg/L	2.0	12/21/93	JB	S503B/E418.1
Total Cyanide	Below det lim	mg/L	0.01	12/27/93	JD	9010/E335.2
Total Metals Digest	Completed			12/21/93	KC	SW846 - 3005
Aluminum	0.10	mg/L	0.03	12/22/93	KG	6010/E200.7
Antimony	Below det lim	mg/L	0.005	12/27/93	AM	7041/E204.2
Arsenic	Below det lim	mg/L	0.01	12/28/93	KG	SW7060/206.2
Barium	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Beryllium	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Calcium	0.40	mg/L	0.10	12/22/93	KG	6010/200.7
Cadmium	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Chromium	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Cobalt	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Copper	0.02	mg/L	0.01	12/22/93	KG	6010/E200.7
Iron	0.35	mg/L	0.01	12/22/93	KG	6010/E200.7
Lead Analysis By Furnace	0.04	mg/l	0.005	12/27/93	AM	7421/E239.2
Manganese	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Magnesium	0.11	mg/L	0.01	12/22/93	KG	6010/E200.7
Mercury Digestion	Completed			12/21/93	RS	SW7470
Mercury	Below det lim	mg/L	0.001	12/21/93	AM	7470/E245.1
Nickel	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Potassium	0.60	mg/L	0.30	12/29/93	KG	7610/E258.1
Selenium	Below det lim	mg/L	0.002	12/28/93	KG	SW7740/270.2
Silver	Below det lim	mg/L	0.01	12/22/93	KG	SW-7760
Sodium	1.2	mg/L	0.10	12/22/93	KG	6010/E200.7
Thallium	Below det lim	mg/L	0.001	01/03/94	KG	279.2/SW7841
Vanadium	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7
Zinc	Below det lim	mg/L	0.01	12/22/93	KG	6010/E200.7

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	5.0
Acrolein	Not detected	5.0
Acrylonitrile	Not detected	5.0
Benzene	Not detected	5.0
Bromodichloromethane	Not detected	5.0
Bromoform	Not detected	5.0
Bromomethane	Not detected	5.0
2-Butanone	Not detected	5.0
Carbon Disulfide	Not detected	5.0
Carbon Tetrachloride	Not detected	5.0
Chlorobenzene	Not detected	5.0
Chlorodibromomethane	Not detected	5.0
Chloroethane	Not detected	5.0
2-Chloroethyl vinyl ether	Not detected	5.0
Chloroform	Not detected	5.0
Chloromethane	Not detected	5.0
1,2-Dichlorobenzene	Not detected	5.0
1,3-Dichlorobenzene	Not detected	5.0
1,4-Dichlorobenzene	Not detected	5.0
1,1-Dichloroethane	Not detected	5.0
1,2-Dichloroethane	Not detected	5.0
1,1-Dichloroethylene	Not detected	5.0
c-1,2-Dichloroethylene	Not detected	5.0
t-1,2-Dichloroethylene	Not detected	5.0
1,2-Dichloropropane	Not detected	5.0
c-1,3-Dichloropropene	Not detected	5.0
t-1,3-Dichloropropene	Not detected	5.0
Ethyl benzene	Not detected	5.0
2-Hexanone	Not detected	5.0
Methylene chloride	44.5	5.0
4-Methyl-2-pentanone	Not detected	5.0
Styrene	Not detected	5.0
1,1,2,2-Tetrachloroethane	Not detected	5.0
Tetrachloroethylene	Not detected	5.0
Toluene	Not detected	5.0
1,1,1-Trichloroethane	Not detected	5.0
1,1,2-Trichloroethane	Not detected	5.0
Trichloroethylene	Not detected	5.0
Trichlorofluoromethane	Not detected	5.0
1,2,3-Trichloropropane	Not detected	5.0
Vinyl Acetate	Not detected	5.0
Vinyl Chloride	Not detected	5.0
Xylene	Not detected	5.0

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: AA33322
Purchase order number: 5028
Project Code:
Loc. Desc.: SAMPLE TRIP BLANK
Sample collection date: 12/16/93
Sample collection time: 14:15
Sample collector: GREG

Received by: BP
Validated by: RJ
Location Code: CRA

Lab submittal date: 12/18/93
Lab submittal time: 09:48
Matrix: Water

Parameter	Result	Units	MDL	Completed		Reference
Volatiles	Listed Below	ug/L	5.0	12/23/93	DLS	SW 8240

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	5.0
Acrolein	Not detected	5.0
Acrylonitrile	Not detected	5.0
Benzene	Not detected	5.0
Bromodichloromethane	Not detected	5.0
Bromoform	Not detected	5.0
Bromomethane	Not detected	5.0
2-Butanone	Not detected	5.0
Carbon Disulfide	Not detected	5.0
Carbon Tetrachloride	Not detected	5.0
Chlorobenzene	Not detected	5.0
Chlorodibromomethane	Not detected	5.0
Chloroethane	Not detected	5.0
2-Chloroethyl vinyl ether	Not detected	5.0
Chloroform	Not detected	5.0
Chloromethane	Not detected	5.0
1,2-Dichlorobenzene	Not detected	5.0
1,3-Dichlorobenzene	Not detected	5.0
1,4-Dichlorobenzene	Not detected	5.0
1,1-Dichloroethane	Not detected	5.0
1,2-Dichloroethane	Not detected	5.0
1,1-Dichloroethylene	Not detected	5.0

Data For Volatiles:

Component Name	Result	Component MDL
c-1,2-Dichloroethylene	Not detected	5.0
t-1,2-Dichloroethylene	Not detected	5.0
1,2-Dichloropropane	Not detected	5.0
c-1,3-Dichloropropene	Not detected	5.0
t-1,3-Dichloropropene	Not detected	5.0
Ethyl benzene	Not detected	5.0
2-Hexanone	Not detected	5.0
Methylene chloride	42.9	5.0
4-Methyl-2-pentanone	Not detected	5.0
Styrene	Not detected	5.0
1,1,2,2-Tetrachloroethane	Not detected	5.0
Tetrachloroethylene	Not detected	5.0
Toluene	Not detected	5.0
1,1,1-Trichloroethane	Not detected	5.0
1,1,2-Trichloroethane	Not detected	5.0
Trichloroethylene	Not detected	5.0
Trichlorofluoromethane	Not detected	5.0
1,2,3-Trichloropropane	Not detected	5.0
Vinyl Acetate	Not detected	5.0
Vinyl Chloride	Not detected	5.0
Xylene	Not detected	5.0

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

From: Phoenix Environmental Laboratories Inc.
587 E. Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

January 21, 1994

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. AA33323 Location code: CRA
Location Description: SAMPLE QC33311-33322
Sample collector: W-GREG
Sample collection date: 12/16/93 Time: 14:15
Lab submittal date: 12/18/93 Time: 09:48
Received by: BP Validated by: RJ

Parameter: Volatiles (MS) Analysis QC
Method reference: Phoenix QAQC Unit:
Result: see below
Date started: 12/28/93 Date finished: 12/28/93
Time started: Analyst: DLS

Parameter: Total Cyanide Analysis QC
Method reference: Phoenix QAQC Unit:
Result: see below
Date started: 12/27/93 Date finished: 12/27/93
Time started: Analyst: JD

Parameter: AA Metals Analysis QC
Method reference: Phoenix QAQC Unit:
Result: see below
Date started: 01/05/94 Date finished: 01/05/94
Time started: 14:38 Analyst: AM

Parameter: ICP Metals Analysis QC
Method reference: Unit:
Result: see below
Date started: 12/27/93 Date finished: 12/27/93
Time started: 22:47 Analyst: KG

Parameter: Total Petroleum HC/IR Q
Method reference: Phoenix QAQC Unit:
Result: see below
Date started: 12/21/93 Date finished: 12/21/93
Time started: Analyst: JB

Data for Volatiles (MS) Analysis QC:

QC Source: EP0601MA Analyte	System Blank (ppb)	Matrix Spike (%Rec)	Duplicate Spike (%Rec)	Replicate Analysis (%Diff)
Acetone	nd			
Acrylamide	nd			
Benzene	nd			
Bromobenzene	nd			
Bromochloromethane	nd			
Bromodichloromethane	nd	118.8%	105.1%	11.5%
Bromoform	nd	97.9%	97.7%	0.2%
Bromomethane	nd			
n-Butylbenzene	nd			
s-Butylbenzene	nd			
t-Butylbenzene	nd			
Carbon disulfide	nd			
Carbon tetrachloride	nd	105.8%	89.5%	15.4%
Chlorobenzene	nd	97.1%	87.5%	9.8%
Chlorodibromomethane	nd	109.5%	89.4%	18.3%
Chloroethane	nd			
Chloroform	nd	109.3%	90.7%	17.1%
Chloromethane	nd			
2-Chlorotoluene	nd			
4-Chlorotoluene	nd			
1,2-Dibromo-3-chloropropane	nd			
1,2-Dibromoethane	nd			
Dibromomethane	nd			
1,2-Dichlorobenzene	nd	117.0%	64.1%	45.2%
1,2-Dichlorobenz.-d4(Surr)	nd	106.9%	75.9%	29.1%
1,3-Dichlorobenzene	nd	119.6%	75.7%	36.7%
1,4-Dichlorobenzene	nd	121.0%	72.7%	39.9%
Dichlorodifluoromethane	nd			
1,1-Dichloroethane	nd	118.5%	104.9%	11.4%
1,2-Dichloroethane	nd	93.4%	82.2%	12.0%
1,2-Dichloroethane-d4(Surr)	nd	98.1%	97.1%	1.0%
1,1-Dichloroethylene	nd	123.1%	96.0%	22.1%
cis-1,2-Dichloroethene	nd			
trans-1,2-Dichloroethene	nd	164.2%	127.1%	22.6%
Dichloromethane	nd			
1,1-Dichloropropane	nd			
1,2-Dichloropropane	nd	105.0%	93.8%	10.7%
1,3-Dichloropropane	nd			
2,2-Dichloropropane	nd			
cis-1,3-Dichloropropene	nd	108.4%	100.2%	7.6%
trans-1,3-Dichloropropene	nd	108.3%	101.9%	5.8%
Diethyl ether	nd			
Ethanol	nd			
Ethyl benzene	nd			
Hexachlorobutadiene	nd			
Isopropylbenzene	nd			
p-Isopropyltoluene	nd			
Methyl ethyl ketone	nd			

Data for Volatiles (MS) Analysis QC (continued):

Methyl isobutyl ketone	nd			
Methyl t-butyl ketone	nd			
Naphthalene	nd			
n-Propylbenzene	nd			
Styrene	nd			
1,1,1,2-Tetrachloroethane	nd			
1,1,2,2-Tetrachloroethane	nd	99.3%	96.0%	3.4%
Tetrachloroethylene	nd	114.9%	106.9%	7.0%
Toluene	nd			
Toluene-d8 (Surr)	nd	99.9%	99.5%	0.4%
1,2,3-Trichlorobenzene	nd			
1,2,4-Trichlorobenzene	nd			
1,1,1-Trichloroethane	nd	112.6%	93.7%	16.8%
1,1,2-Trichloroethane	nd	108.8%	105.3%	3.2%
Trichloroethylene	nd	115.4%	110.0%	4.6%
Trichlorofluoromethane	nd	145.0%	113.5%	21.7%
1,2,3-Trichloropropane	nd			
1,2,4-Trimethylbenzene	nd			
1,3,5-Trimethylbenzene	nd			
Vinyl chloride	nd			
Total Xylene	nd			
Freon 113	nd			

Data for Total Cyanide Analysis QC:

QC BLANK:0.0 UNITS:MG/L
QC CHECK SAMPLE % RECOVERY:84 QC SOURCE:ERA 9947
QC SAMPLE SPIKE % RECOVERY:74 SPIKED SAMPLE:AA33318
QC SAMPLE REPLICATE % CHANGE:0.0 REPLICATED SAMPLE:AA33321

Data for AA Metals Analysis QC:

Analyte	QC Source: ERA3402 Sample ID: AA 30901 AA 30901	QC Blank (PPM)	QC Check Sample (% Rec.)	QC Spike Sample (% Rec.)	QC Sample Replicate (% change)
AS Arsenic					
Hg Mercury		<0.005	95	84	nd 0
Pb Lead					
Sb Antimony		<0.005	105	84	nd 0
Se Selenium					
Tl Thallium		<0.005	110	105	nd 0
K Potasium		<0.3	100	101	2.9

Data for ICP Metals Analysis QC:

Analyte	QC Blank	QC Check Sample (% Rec.)	QC Spike Sample (% Rec.)	QC Sample Replicate (% change)
QC Source: ERA9947 / Sample ID: AA33293 AA33321				
Ag Silver	<0.01	95	90	2.7
Al Aluminum	<0.03	105	96	1.6
As Arsenic	<0.10	97	93	16
Au Gold				
B Boron				
Ba Barium	<0.01	97	84	3.7
Be Beryllium	<0.01	92	91	4.6
Bi Bismuth				
Ca Calcium	<0.10	98	74	3.2
Cd Cadmium	<0.01	96	94	3.5
Co Cobalt	<0.01	94	91	1.3
Cr Chromium	<0.01	99	89	1.6
Cu Copper	<0.01	98	88	4.1
Fe Iron	<0.01	100	89	4.3
Hg Mercury				
K Potassium				
Li Lithium				
Mg Magnesium	<0.01	106	104	0.35
Mn Manganese	<0.01	99	91	1.3
Mo Molybdenum				
Na Sodium	<0.10	102	102	5.3
Ni Nickel	<0.01	107	90	5.9
Pb Lead	<0.10	96	90	1.9
Sb Antimony				
Se Selenium	<0.10	96	93	12
Si Silicon				
Sn Tin				
Tl Thallium				
V Vanadium	<0.01	101	86.4	2.3
Zn Zinc	<0.01	100	84	3.1

Data for Total Petroleum HC/IR Q:

QC BLANK: 0.0
QC CHECK SAMPLE % RECOVERY: 92%
SP SAMPLE SPIKE % RECOVERY: 114%
QC SAMPLE REPLICATE % CHANGE: 0%

UNITS: MG/L
QC SOURCE: IN HOUSE
SPIKE SAMPLE: AA33321
REPLICATED SAMPLE: AA33321

If there are any questions regarding this data, please call.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
Conestoga-Rovers & Associates
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: BLANK 12/23/93
Purchase order number: 5028
Project Code:
Loc. Desc.:

Received by: BP
Validated by: RJ
Location Code: CRA

Parameter	Result	Units	MDL	Completed	Reference
Volatiles	Listed Below	ug/Kg	20	12/23/93 DLS	SW 8240

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon Disulfide	Not detected	20
Carbon Tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	Not detected	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20

Data For Volatiles:

Component Name	Result	Component MDL
		20
c-1,2-Dichloroethylene	Not detected	20
t-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
c-1,3-Dichloropropene	Not detected	20
t-1,3-Dichloropropene	Not detected	20
Ethyl benzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	Not detected	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethylene	Not detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl Acetate	Not detected	20
Vinyl Chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

Phoenix Environmental Laboratories Inc.
587 E.Middle Turnpike, Box 418
Manchester, Ct. 06045-0418
(203) 645-1102 Fax 645-0823

To: Attn: Ms. Lisa Reyes
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Date: January 21, 1994

The following analytical results have been obtained for the indicated sample.

Sample I.D.: BLANK 12/29/93
Purchase order number: 5028
Project Code:
Loc. Desc.:

Received by: BP
Validated by: RJ
Location Code: CRA

Parameter	Result	Units	MDL	Completed	Reference
Volatiles	Listed Below	ug/Kg	20	12/29/93 DLS	SW 8240

Data For Volatiles:

Component Name	Result	Component MDL
Acetone	Not detected	20
Acrolein	Not detected	20
Acrylonitrile	Not detected	20
Benzene	Not detected	20
Bromodichloromethane	Not detected	20
Bromoform	Not detected	20
Bromomethane	Not detected	20
2-Butanone	Not detected	20
Carbon Disulfide	Not detected	20
Carbon Tetrachloride	Not detected	20
Chlorobenzene	Not detected	20
Chlorodibromomethane	Not detected	20
Chloroethane	Not detected	20
2-Chloroethyl vinyl ether	Not detected	20
Chloroform	Not detected	20
Chloromethane	Not detected	20
1,2-Dichlorobenzene	Not detected	20
1,3-Dichlorobenzene	Not detected	20
1,4-Dichlorobenzene	Not detected	20
1,1-Dichloroethane	Not detected	20
1,2-Dichloroethane	Not detected	20
1,1-Dichloroethylene	Not detected	20

Data For Volatiles:

Component Name	Result	Component MDL
		20
c-1,2-Dichloroethylene	Not detected	20
t-1,2-Dichloroethylene	Not detected	20
1,2-Dichloropropane	Not detected	20
c-1,3-Dichloropropene	Not detected	20
t-1,3-Dichloropropene	Not detected	20
Ethyl benzene	Not detected	20
2-Hexanone	Not detected	20
Methylene chloride	Not detected	20
4-Methyl-2-pentanone	Not detected	20
Styrene	Not detected	20
1,1,2,2-Tetrachloroethane	Not detected	20
Tetrachloroethylene	Not detected	20
Toluene	Not detected	20
1,1,1-Trichloroethane	Not detected	20
1,1,2-Trichloroethane	Not detected	20
Trichloroethylene	Not detected	20
Trichlorofluoromethane	Not detected	20
1,2,3-Trichloropropane	Not detected	20
Vinyl Acetate	Not detected	20
Vinyl Chloride	Not detected	20
Xylene	Not detected	20

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

John M. Schreiber
Laboratory Director

VOLATILE SURROGATE RECOVERIES

SAMPLE NUMBER	1,2-DICHLOROBENZENE-D4	1,2-DICHLOROETHANE-D4	TOLUENE-D8
AA33311	109	168	82
AA33312	62	189	73
AA33313	93	194	148
AA33314	10	154	102
AA33315	11	136	169
AA33316	66	99	76
AA33317	61	58	72
AA33318	10	64	122
AA33318r	89	133	94
AA33319	58	62	98
AA33319r	58	84	99
AA33320	42	62	99
AA33320r	36	149	117
BLANK A	109	92	84
BLANK B	110	94	89

Advisory Limits for all surrogate recoveries are 50-150% recovery.
Poor purging properites of these samples may have affected surrogate recoveries obtained.

VOLATILE SURROGATE RECOVERIES

SAMPLE NUMBER	1,2-DICHLOROBENZENE-D4	1,2-DICHLOROETHANE-D4	TOLUENE-D8
AA33321	103	94	90
AA33322	76	115	94

Advisory Limits for all surrogate recoveries are 50-150% recovery.

APPENDIX C

ANALYTICAL ASSESSMENT AND VALIDATION

TABLE OF CONTENTS

LIST OF TABLES
(Following Report)

1.0 OVERVIEW

The following memo details the assessment and validation of analytical results reported by Phoenix Environmental Laboratories, Inc. (Phoenix) for environmental samples collected during the Phase II Investigation for Vibratech, Buffalo, New York during the month of December 1993. Nine soil samples, one field duplicate, a rinsate blank, and a trip blank were submitted for TCL Volatiles (VOCs), total cyanide, TAL metals, and total petroleum hydrocarbons (TPH). Table 1 presents all sample locations, parameters of interest, and methods of analyses. Table 2 presents the analytical data for the investigative soil samples.

Evaluation of the data was based on information derived from the finished data sheets, chain of custody forms, blank data, and recovery data for matrix spikes (MS), surrogates, and reference standards. This assessment of analytical data includes checks for: data consistency; adherence to accuracy and precision data; transmittal errors; and anomalously high and low parameter values.

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed were the analytical methods, the 1988 United States Environmental Protection Agency (USEPA) Functional Guidelines for Evaluating Inorganic Analyses, and the 1990 USEPA Functional Guidelines for Evaluating Organic Analyses (Rev. 6/91). Based on review of these data and related quality control data, the following are noted.

2.0 SAMPLE HOLDING TIMES

Comparison of the sampling data for all samples (from the notation appearing on the chain of custody document) and the reported dates of analyses, indicated that all samples were analyzed within the following holding times:

Parameter	*Matrix*	*Technical Holding Time*
Volatiles	Soils	14 days from collection to analysis
	Water	7 days from collection to analysis
TPH	Soils	14 days from collection to analysis
	Water	14 days from collection to analysis
TAL Metals	Soil and Water (Except Mercury)	6 months from collection to analysis
Mercury	Soil	28 days from collection to analysis
	Water	28 days from collection to analysis
Total Cyanide	Soil	14 days from collection to analysis
	Water	14 days from collection to analysis

3.0 SURROGATE SPIKE RECOVERIES - ORGANICS

Spiking each sample with a known amount of surrogate prior to sample preparation serves as an indicator of the efficiency of analyte extraction, dissolution, or other matrix modifying technique.

All samples were spiked with the following surrogate compounds: 1,2-Dichloroethane-d_4, 1,2-Dichlorobenzene-d_4, and toluene-d_8. Due to analytical difficulties with the soil matrix and purging efficiencies, various surrogates yielded outlying recoveries. Samples 5028-008 and 5028-009 were re-analyzed due to poor purging efficiency and yielded acceptable recoveries, therefore required no qualification. Toluene-d_8 yielded an outlying recovery by 2 percent for sample 5028-001, however sample results were not qualified on this basis due to the negligible effects of 2 percent. All remaining soil samples required qualification of sample results based on outlying surrogate recoveries. Table 3 presents the outliers and associated qualified sample data. All remaining surrogates yielded acceptable recoveries.

4.0 LABORATORY BLANK ANALYSES

The purpose of assessing the results of laboratory blank analyses was to determine the existence and magnitude of sample contamination problems. Laboratory blanks were analyzed at a minimum frequency of one per 20 investigative samples and/or one per analytical sequence. All laboratory blanks yielded not-detected quantities, thus indicating that the potential for sample contamination attributed to laboratory conditions or procedures was minimal during these analyses.

5.0 BLANK SPIKE ANALYSES

The recoveries of blank spike analyses are used to assess the analytical accuracy achieved by the laboratory. As the blank spike analyses are independent of potential matrix effects, they give a true indication of the analytical accuracy achieved by the laboratory for the respective analyses performed. Blank spikes were analyzed at a minimum frequency of one per 20 investigative samples for all parameters.

In general, all check standards were within acceptable control limits with the exception of VOC compounds 1,2-Dichlorobenzene, trans-1,2-Dichloroethene, and trichlorofluoromethane. Low recoveries give low bias to sample results therefore both non-detect and detected sample results required qualification. High recoveries give high bias to sample results, therefore only detected sample results required qualification. Refer to Table 4 for qualification of associated samples. All associated samples yielded non-detect results for trichlorofluoromethane, therefore not requiring qualification of sample results based on high outlying blank spike recoveries.

6.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES - ORGANICS

The recoveries of MS/MSD analyses were used to establish the analytical accuracy on an individual sample basis, while the percent reproducibility (RPD) between the MS and MSD indicates the analytical precision for that sample.

Due to sample matrix interferences, no MS/MSD samples was performed for volatiles and therefore cannot be evaluated.

7.0 MATRIX SPIKE ANALYSES INORGANICS

To establish analytical accuracy on an individual sample basis, evaluation of MS samples was performed.

Sample 5028-006 was submitted for matrix spike analysis, however, due to laboratory error, this sample was not spiked for any parameter. Sample 5028-008 was spiked for total cyanide yielding 74 percent recovery. Although MS control limits are 75-125 percent, the 1 percent outlying recovery was considered negligible and sample results were not qualified.

The rinsate blank was spiked during the TPH analysis yielding acceptable recovery, however not evaluated since this is not representative of the soil samples that were analyzed.

8.0 DUPLICATE ANALYSES - INORGANICS

To establish precision for a particular sample matrix, duplicate analyses were performed. The rinsate blank was analyzed as the duplicate sample for total cyanide and TPH yielding acceptable RPD values. However, the rinsate blank is not representative of the soil samples analyzed and should not be used to assess analytical precision for the soil samples. Analytical precision on the soil samples was evaluated during field duplicate analyses (see Section 9.0).

9.0 FIELD QA/QC

9.1 FIELD DUPLICATE

In order to assess the analytical sampling protocol precision, a field duplicate was collected and submitted "blind" to the laboratory. The field duplicate consisted of sample 5028-004 and its duplicate 5028-005.

High RPD values were observed for 1,1-Dichloroethane, cis-1,2-Dichloroethene, 1,1,1-Trichloroethane, and trichloroethene for volatiles; and arsenic, calcium, and potassium for metals. Qualification of sample results can be found in Table 5. All remaining field duplicate results yielded acceptable RPDs indicating that analytical sampling protocol precision was achieved.

9.2 TRIP BLANKS

To evaluate the possibility of contamination arising from sample transport, the environment, and/or shipping, one trip blank was submitted to the laboratory for TCL VOC analysis.

Methylene chloride was found in the trip blank at 42.9 ug/L. All sample results yielded concentrations either greater than 10 times the trip blank concentration or non-detect results, therefore no qualication was performed on this basis. All remaining VOC compounds yielded non-detect results for trip blank analysis.

9.3 RINSATE BLANKS

In order to assess the efficiency of the sampling device cleansing protocols performed in the field, one rinsate blank was collected and submitted to the laboratory for volatiles, TAL metals, TPH, and total cyanide. The rinsate blank yielded non-detect quantities for all compounds of interest with the exception of methylene chloride (44.5 ug/L). Any sample results less

than ten times the rinsate blank concentration should be qualified as non-detect. Methylene chloride was either non-detect or detected at concentrations greater than 10 times the blank contamination, therefore having negligible effects on the sample results.

10.0 CONCLUSION

Based on the assessment detailed in the foregoing, the data reported by Phoenix are acceptable with the qualifications noted herein.

TABLE 1

SAMPLE COLLECTION KEY
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*Location*	*Interval Sample # (Feet)*	*Collection Date*	*Matrix*	*Parameters*	*Methodology (1)*
5028-001	BH-1	0-4.2 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-002	BH-2	0-5.7 Composite	12/16/93	Soil	TCL VOC TPH	SW-846 8240 EPA 418.1
5028-003	BH-3	0-8.5 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-004	BH-4	0-8.7 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-005 (Dup. of 5028-004)	BH-4	0-8.7 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1

TABLE 1

SAMPLE COLLECTION KEY
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*Location*	*Interval Sample # (Feet)*	*Collection Date*	*Matrix*	*Parameters*	*Methodology (1)*
5028-006 MS/MSD	BH-6	0-5.1 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-007	BH-7	0-4.3 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-008	BH-8	0-2.2 Composite	12/16/93	Soil	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 SW-846 9010 EPA 418.1
5028-009	TP-1	0-3.5 Composite	12/17/93	Soil	TCL VOC TPH	SW-846 8240 EPA 418.1
5028-010	TP-2	0-1.7 Composite	12/17/93	Soil	TCL VOC TPH	SW-846 8240 EPA 418.1

TABLE 1

SAMPLE COLLECTION KEY
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*Location*	*Interval Sample # (Feet)*	*Collection Date*	*Matrix*	*Parameters*	*Methodology (1)*
Rinsate Blank	-	-	12/16/93	Water	TCL VOC TAL Metals Cyanide TPH	SW-846 8240 SW-846 6010/7000 EPA 335.2 EPA 418.1
Trip Blank	-	-	12/16/93	Water	TCL VOC	SW-846 8240

Notes:

(1) Methods referenced from the following:
SW-846 "Test Methods for Evaluating Solid Hazardous Waste" USEPA, SW-846, 3rd Edition, September, 1986.
EPA "Methods for Chemical Analysis" March 1983.

TABLE 2

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Volatile Organic Compounds (ug/kg)										
Acetone	20U	298J	20U	20UJ	20UJ	564J	879j	20U	20U	373J
Acrolein	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Acrylonitrile	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Benzene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	89	20U	20UJ
Bromodichloromethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Bromoform	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Bromomethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
2-Butanone	32.6J	71.6J	20U	20UJ	20UJ	36J	78J	20U	20U	20UJ
Carbon disulfide	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Carbon tetrachloride	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chlorobenzene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	24.7	20U	20UJ
Chlorodibromomethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chloroethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
2-Chloroethylvinylether	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Chloroform	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	50.5	20U	65.8J
Chloromethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,2-Dichlorobenzene	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	20UJ	51.8J	20UJ
1,3-Dichlorobenzene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20UJ	20U	20UJ
1,4-Dichlorobenzene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,1-Dichloroethane	20U	20UJ	69J	104J	27.4J	20UJ	20UJ	8060	20U	24700J
1,2-Dichloroethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	226	20U	20UJ
1,1-Dichloroethene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	59.5	20U	8610J
cis-1,2-Dichloroethene	20U	20UJ	20U	124J	31.9J	20UJ	20UJ	4210	40.6	6360J
trans-1,2-Dichloroethene	20U	20UJ	20U	19.7J	20UJ	20UJ	20UJ	1410J	20U	562J
1,2-Dichloropropane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
cis-1,3-Dichloropropene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
trans-1,3-Dichloropropene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Ethylbenzene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	45.1	20U	20UJ
2-Hexanone	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Methylene chloride	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	55.3	20U	20UJ
4-Methyl-2-pentanone	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Styrene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ

TABLE 2

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Volatile Organic Compounds (ug/kg)										
1,1,2,2-Tetrachloroethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Tetrachloroethene	22.5J	20UJ	20U	20UJ	20UJ	20UJ	20UJ	30.3	20U	87600J
Toluene	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	198	20U	123J
1,1,1-Trichloroethane	111J	80.9J	79.5J	108J	50.5J	20UJ	20UJ	1050	105	675000J
1,1,2-Trichloroethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	80.8J
Trichloroethene	20U	20UJ	83.8J	1260J	184J	20UJ	20UJ	733	180	3260J
Trichlorofluoromethane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
1,2,3-Trichloropropane	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Vinyl acetate	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	20U	20U	20UJ
Vinyl chloride	20U	20UJ	20U	20J	24.3J	20UJ	20UJ	3440	20U	673J
Total Xylenes	20U	20UJ	20U	20UJ	20UJ	20UJ	20UJ	196	20U	62.2J
Inorganics (mg/kg)										
Total Petroleum Hydrocarbons	102	283	589	254	185	42.4	123	71100	1010	23500
Total Cyanide	1.0U	1.0U	NA	1.0U	1.0U	1.0U	1.0U	1.49	NA	NA
Metals (mg/kg)										
Aluminum	12426	9110	NA	5156	6069	9365	4660	3840	NA	NA
Antimony	0.50U	0.50U	NA	0.50U	0.50U	0.50U	0.50U	0.50U	NA	NA
Arsenic	0.59U	0.46U	NA	3.1J	6.8J	0.59U	0.53U	1.5	NA	NA
Barium	99	43	NA	12	14	40	20	46	NA	NA
Beryllium	0.59U	0.46U	NA	0.58U	0.50U	0.59U	0.53U	0.47U	NA	NA
Cadmium	1.7	1.1	NA	0.81	0.79	1	0.81	1.7	NA	NA
Calcium	20237	4963	NA	61500J	26200J	61000	109574	13175	NA	NA
Chromium	175	6.2	NA	5.2	5.7	8.3	4.6	25	NA	NA
Cobalt	12	3.9	NA	3.6	3.6	7.9	6.6	4.5	NA	NA
Copper	477	8.2	NA	7.4	6.7	9.4	6.7	194	NA	NA
Iron	26150	13578	NA	9746	10396	13176	7870	16870	NA	NA
Lead	105	21	NA	10	8.8	13	7.1	283	NA	NA
Manganese	469	602	NA	68	63	250	184	212	NA	NA
Magnesium	6900	1180	NA	4430	3420	17176	24470	1010	NA	NA

TABLE 2

ANALYTICAL RESULTS
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Sample ID	*5028-001*	*5028-002*	*5028-003*	*5028-004*	*5028-005*	*5028-006*	*5028-007*	*5028-008*	*5028-009*	*5028-010*
Sample Location	*BH-1*	*BH-2*	*BH-3*	*BH-4*	*BH-4*	*BH-6*	*BH-7*	*BH-8*	*TP-1*	*TP-2*
Sample Interval	*0-4.2'*	*0-5.7'*	*0-8.5'*	*0-8.7'*	*0-8.7'*	*0-5.1'*	*0-4.3'*	*0-2.2'*	*0-3.5'*	*0-1.7'*
Metals (mg/kg)										
Mercury	0.39U	0.38U	NA	0.40U	0.40U	0.38U	0.36U	0.38U	NA	NA
Nickel	22	7.2	NA	8.9	9.2	12	5.8	17	NA	NA
Potassium	1751	518	NA	936J	1505J	2441	904	507	NA	NA
Selenium	0.59U	1.7	NA	0.58U	1.6	0.89	0.53U	0.47U	NA	NA
Silver	1.8	1.9	NA	0.58U	0.10U	0.59U	0.56	10	NA	NA
Sodium	293	144	NA	111	94	148	144	101	NA	NA
Thallium	0.50U	0.50U	NA	0.50U	0.50U	0.50U	0.50U	0.50U	NA	NA
Vanadium	72	11	NA	7.8	7.8	15	10	8.6	NA	NA
Zinc	142	38	NA	47	42	40	33	55	NA	NA

Notes:
U Not detected at the stated detection limit.
NA Not Analyzed.
J Associated value is estimated.

TABLE 3

QUALIFICATION OF SAMPLE RESULTS DUE TO OUTLYING SURROGATE RECOVERIES
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Parameter	*Sample ID*	*Surrogate Compound*	*Outlying Percent Recovery*	*Associated Compounds (1)*	*Qualifier*
VOCs	5028-001	1,2-Dichloroethane-d4	168	Positive concentrations only	J
VOCs	5028-002	1,2-Dichloroethane-d4	189	All compounds	J
		Toluene-d8	73		
VOCs	5028-003	1,2-Dichloroethane-d4	194	Positive concentrations only	J
		Toluene-d8	148		
VOCs	5028-004	1,2-Dichlorobenzene-d4	10	All compounds	J
		1,2-Dichloroethane-d4	154		
VOCs	5028-005	1,2-Dichlorobenzene-d4	11	All compounds	J
		1,2-Dichloroethane-d4	136		
		Toluene-d8	169		
VOCs	5028-006	Toluene-d8	76	All compounds	J
VOCs	5028-007	1,2-Dichloroethane-d4	58	All compounds	J
		Toluene-d8	72		
VOCs	5028-010	1,2-Dichlorobenzene-d4	36	All compounds	J
		1,2-Dichloroethane-d4	149		

Notes:
(1) All compounds refers to all TCL VOC compounds reported as detected or not detected in the sample. Positive concentrations refer to only the VOC compounds detected.
J Associated value is estimated.

TABLE 4

QUALIFICATION OF SAMPLE RESULTS DUE TO OUTLYING BLANK SPIKE ANALYSES
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Parameter	*Compound*	*Outlying Percent Recovery*	*Associated Samples*	*Sample Result (ug/kg)*	*Qualifier*
Volatiles	1,2-Dichlorobenzene	64	5028-001	20U	J
			5028-002	20U	*
			5028-003	20U	J
			5028-004	20U	*
			5028-005	20U	*
			5028-006	20U	*
			5028-007	20U	*
			5028-008	20U	J
			5028-009	51.8	J
			5028-010	20U	*
Volatiles	trans-1,2-Dichloroethene	164	5028-004	19.7	*
			5028-008	1410	J
			5028-010	562	*

Notes:
J Associated value is estimated.
* Previously qualified as estimated.

TABLE 5

QUALIFICATION OF SAMPLE RESULTS DUE TO POOR FIELD DUPLICATE PRECISION
PHASE II INVESTIGATION
VIBRATECH INC.
BUFFALO, NEW YORK
DECEMBER 1993

Parameter	*Compound*	*Sample ID (5028-004) (ug/kg)*	*Duplicate ID (5028-005) (ug/kg)*	*RPD*	*Qualifier (1)*
Volatiles	1,1-Dichloroethane	104	27.4	117	*
	cis-1,2-Dichloroethene	124	31.9	118	*
	1,1,1-Trichloroethane	108	50.5	73	*
	Trichloroethene	1,260	184	149	*
TAL Metals	Arsenic	3.1	6.8	74	J
	Calcium	61,500	26,200	80	J
	Potassium	936	1,505	47	J

Notes:
RPD Relative Percent Difference
(1) Qualifier is assigned to both sample and duplicate result unless previously qualified.
* Sample was previously qualified as estimated.
J Associated value is estimated.

TABLE 6

QUALIFICATION OF SAMPLE RESULTS DUE TO TRIP BLANK CONTAMINATION
PHASE II INVESTIGATION
VIBRATECH INC.
DECEMBER 1993

Parameter	*Trip Blank*	*Analyte*	*Trip Blank Result (ug/L)*	*Associated Samples*	*Sample Results (ug/kg)*	*Qualified Sample Results*
Volatiles	Trip Blank (12/16/93)	Methylene Chloride	42.9	5028-008	55.3	55.3U

APPENDIX D

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S RECOMMENDED CLEANUP LEVELS FOR SOILS

New York State Department of Environmental Conservation November 16, 1992

MEMORANDUM

TO: Regional Haz. Waste Remediation Engineers, Bureau Dirs. & Section Chiefs
FROM: Michael J. O'Toole, Jr., Director, Div. of Hazardous Waste Remediation
SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM: DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS
DATE: NOV 16 1992

Michael J. O'Toole Jr.

The **cleanup goal** of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. INTRODUCTION:

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment of these generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. [redacted]

It should be noted that even after soil cleanup levels are established in the ROD, these levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. BASIS FOR SOIL CLEANUP OBJECTIVES:

The following alternative bases are used to determine soil cleanup objectives:

(a) Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

(b) Human health based levels for systemic toxicants, calculated from

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Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

(c) Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;

(d) Background values for contaminants; and

(e) Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

(1) Class A are proved human carcinogens
(2) Class B are probable human carcinogens
(3) Class C are possible human carcinogens

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

3. DETERMINATION OF SOIL CLEANUP GOALS FOR ORGANICS IN SOIL FOR PROTECTION OF WATER QUALITY

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

PART A: PARTITION THEORY MODEL

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration $Cs = f \times Koc \times Cw$. . . . (1)

Where: f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be estimated by the following equation:

$\log Koc = 3.64 - 0.55 \log S$

S = water solubility in ppm
Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual should be used for the purpose. If the Koc value for a contaminants is not listed, it should be estimated using the above mentioned equation.

PART B: PROCEDURE FOR DETERMINATION OF SOIL CLEANUP OBJECTIVES

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1) Total VOC's $\leq$ 10 ppm.
2) Total Semi VOC's $\leq$ 500 ppm.
3) Individual Semi VOC's $\leq$ 50 ppm.
4) Total Pesticides $\leq$ 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. DETERMINATION OF FINAL CLEANUP LEVELS:

Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the

preferred remedial action must be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

Attachments

cc: T. Jorling
J. Lacey
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Regional Directors
Regional Engineers
Regional Solid and Haz. Waste Engrs.
Regional Citizen Participation Spec.

APPENDIX A
TABLE 1
Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Contaminant	Solubility mg/l or ppm S	Partition coefficient Koc	Groundwater Standards/ Criteria Cw ug/l or ppb.	a Allowable Soil conc. ppm. Cs	b ** Soil Cleanup objectives to Protect GW Quality (ppm)	USEPA Health Based (ppm) Carcinogens	Systemic Toxicants	CRQL (ppb)	*** Rec.soil Cleanup Objct. (ppm)
Benzene	1,750	83	0.7	0.0006	0.06	24	N/A	5	0.06
Xylenes	198	240	5	0.012	1.2	N/A	200,000	___	1.2
Ethylbenzene	152	1,100	5	0.055	5.5	N/A	8,000	5	5.5
Toluene	535	300	5	0.015	1.5	N/A	20,000	5	1.5
Tetrachloroethene	150	277	5	0.014	1.4	14	800	5	1.4
Trichloroethene	1,100	126	5	0.007	0.70	64	N/A	5	0.7
Methylene chloride	16,700	21	5	0.001	0.1	93	5,000	5	0.1
Acetone	1,000,000	2.2	50	0.0011	0.11	N/A	8,000	10	0.2
2-Butanone	268,000	4.5•	50	0.003	0.3	N/A	4,000	10	0.3
4-Methyl-2-Pentanone	19,100	19•	50	0.01	1.0	N/A	N/A	10	1.0
1,1-Dichloroethane	5,500	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	8,520	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1,1-Trichloroethane	1,500	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	2,900	118	5	0.006	0.6	35	N/A	5	0.6
1,1-Dichloroethene	2,250	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene(trans)	6,300	59	5	0.003	0.3	N/A	2,000	5	0.3
Chlorobenzene	466	330	5	0.017	1.7	N/A	2,000	5	1.7
Bromoethane	5,740	37•	50	0.019	1.9	N/A	N/A	10	1.9
1,2-Dichlorobenzene	100	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	123	310 •	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	79	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,2,4-Trichlorobenzene	30	670 •	5	0.034	3.4	N/A	N/A	330	3.4
Vinyl chloride	2,670	57	2	0.0012	0.12	N/A	N/A	10	0.2
1,2,3-trichloropropane	1,900	68	5	0.0034	0.34	N/A	80	5	0.4
1,3-dichloropropane	2,700	51	5	0.003	0.3	N/A	N/A	5	0.3
Dibromochloromethane	N/A	N/A	50	N/A	N/A	N/A	N/A	5	N/A
Chloroform	8,200	31	7	0.003	0.30	114	800	5	0.3
Carbon Tetrachloride	757	110•	5	0.006	0.6	5.4	60	5	0.6
Benzoic Acid	2,900	54•	50	0.027	2.7	N/A	200,000	5	2.7
Carbon Disulfide	2,940	54•	50	0.027	2.7	N/A	8,000	5	2.7

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)

• Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64. Other values are experimental values.
** Correction Factor (CF) of 100 is used as per proposed TARM
*** As per proposed TARM, Total VOCs < 10 ppm.

Note: Soil clean objectives are developed for soil organic carbon content (f) of 1% , and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A (cont.)
TABLE 2
Recommended Soil Cleanup Objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Solubility mg/l or ppm @	Partition coefficient Koc	Groundwater Standards/ Criteria Cv ug/l or ppb.	a Allowable Soil conc. ppm. Cs	b ** Soil Cleanup objectives to Protect GW Quality (ppm)	USEPA Health Based (ppm) Carcinogens	Systemic Toxicants	CRQL (ppb)	Rec.soil Clnup Objct. (ppm)
Benzo(b)fluoranthene	0.014	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo(k)fluoranthene	0.0043	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Phenanthrene	1.0	4,365•	50	2.20	220.0	N/A	N/A	330	50.0•••
Fluoranthene	0.206	38,000	50	19	1900.0	N/A	3,000	330	50.0•••
Pyrene	0.132	13,295•	50	6.65	665.0	N/A	2,000	330	50.0•••
Benzo(a)pyrene	0.0012	5,500,000	0.002(ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Indeno(1,2,3-cd)pyrene	0.0005	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
2-Methylphenol	31,000	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	24,000	17	50	0.009	0.9	N/A	4,000	330	0.9
Fluorene	1.7	7,300	50	3.5	350.0	N/A	3,000	330	50.0•••
Dibenzofuran	10	1,230•	5	0.062	6.2	N/A	N/A	330	6.2
Acenaphthene	3.42	4,600	20	0.9	90.0	N/A	5,000	330	50.0•••
Acenaphthylene	3.93	2,056•	20	0.41	41.0	N/A	N/A	330	41.0
Naphthalene	31.70	1,300	10	0.130	13.0	N/A	300	330	13.0
2-methylnaphthalene	26.00	727•	50	0.364	36.4	N/A	N/A	330	36.4
Anthracene	0.045	14,000	50	7.00	700.0	N/A	20,000	330	50.0•••
Bis(2-ethylhexyl)phthalate	0.285	8,706•	50	4.35	435.0	50	2,000	330	50.0•••
Dimethylphthlate	5,000	40	50	0.020	2.0	N/A	80,000	330	2.0
Diethylphthlate	896.00	142	50	0.071	7.1	N/A	60,000	330	7.1
Butylbenzylphthlate	2.9	2,430	50	1.215	122.0	N/A	20,000	330	50.0•••
Di-n-butyl phthalate	400	162•	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	3.0	2,346•	50	1.2	120.0	N/A	2,000	330	50.0•••
Chrysene	0.0018	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
Benzo(a)anthracene	0.0057	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.220 or MDL
Benzo(g,h,i)perylene	0.0007	1,600,000	5	0.0	800	N/A	N/A	330	50.0•••
2,4-Dichlorophenol	4,600	380	1	0.004	0.4	N/A	200	330	0.4
2,4,5-Trichlorophenol	1,190	89•	1	0.001	0.1	N/A	8,000	330	0.1

APPENDIX A (cont.)
TABLE 2
Recommended Soil Cleanup Objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Solubility mg/l or ppm s	Partition coefficient Koc	Groundwater Standards/ Criteria Cw ug/l or ppb.	a Allowable Soil conc. ppm. Cs	b ** Soil Cleanup objectives to Protect GW Quality (ppm)	USEPA Health Based (ppm) Carcinogens	Systemic Toxicants	CRQL (ppb)	Rec.soil Clnup Objct. (ppm)
Dibenzo(a,h)anthracene	0.0005	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobenzene	0.006	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Phenol	82,000	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pentachlorophenol	14.00	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Nitrobenzene	1,900	36	5	0.002	0.2	N/A	40	330	0.200 or MDL
4-Chloro-3-methylphenol	3,850	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2,4-Dinitrophenol	5,600	38	5	0.002	0.2	N/A	200	1,600	0.200 or MDL
4-Nitrophenol	16,000	21	5	0.001	0.1	N/A	N/A	1,600	0.100 or MDL
2-Nitrophenol	2,100	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
2-Chlorophenol	28,500	15*	50	0.008	0.8	N/A	400	330	0.8
Aniline	35,000	13.8	5	0.001	0.1	123	N/A	330	0.1
2-Nitroaniline	1,260	86	5	0.0043	0.43	N/A	N/A	1,600	0.430 or MDL
3-Nitroaniline	1,100	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
4-Chloroaniline	----	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL
2,6 Dinitrotoluene	277.0	198*	5	0.01	1.0	1.03	N/A	330	1.0

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)

MDL is Method Detection Limit
b. Soil cleanup objective = Cs x Correction Factor (CF)
* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64. Other values are experimental values.
** Correction Factor (CF) of 100 is used as per proposed TAGM
*** As per proposed TAGM, Total VOCs < 10 ppm., Total Semi-VOCs < 500 ppm. and Individual Semi-VOCs < 50 ppm.
**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels.....
EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'HAZH'.

Note: Soil clnup objectives are developed for soil organic carbon content (f) of 1%,
and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A (cont.)

TABLE 3

Recommended soil cleanup objectives (mg/kg or ppm)

Organic Pesticides / Herbicides and PCBs

Contaminant	Solubility mg/l or ppm S	Partition coefficient Koc	Groundwater Standards/ Criteria Cv ug/l or ppb.	a Allowable Soil conc. ppm. Cs	b ** Soil Cleanup objectives to Protect GW Quality (ppm)	USEPA Health Based (ppm) Carcinogens	Systemic Toxicants	CRQL (ppb)	*** Rec.soil Cleup Objct. (ppm)
4,4'-DDD	0.16	770,000*	ND(<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	0.04	440,000*	ND(<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	0.005	243,000*	ND(<0.01)	0.025	2.5	2.1	40	16	2.1
Dieldrin	0.195	10,700*	ND(<0.01)	0.0010	0.1	0.044	4	16	0.044
Endrin	0.26	9,157*	ND(<0.01)	0.001	0.1	N/A	20	8	0.10
Aldrin	0.017	96,000	ND(<0.01)	0.005	0.5	0.041	2	8	0.041
Endosulfan I	0.32	8,168*	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	0.33	8,031*	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	0.22	10,038*	0.1	0.01	1.0	N/A	N/A	16	1.0
Heptachlor	0.18	12,000	ND(<0.01)	0.0010	0.1	0.16	40	8	0.10
Heptachlor epoxide	0.35	220	ND(<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Chlordane	0.056	21,385*	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	890	104*	4.4	0.005	0.5	N/A	800	800	0.5
2,4,5-T	238	53	35	0.019	1.9	N/A	200	330	1.9
Silver	140	2,600	0.26	0.007	0.7	N/A	400	330	0.7
PCBs	0.88	17,510*	0.1	0.1	10.0	1.0	N/A	160	1.0(Surface) 10.0 (Sub-surface)
Polychlorinated dibenzo-furans(PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzo-P-dioxins(PCDD) 2,3,7,8 TCDD	0.0000193	1709000	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
alpha - BHC	1.63	3,800	ND(<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	0.24	3,800	ND(<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	3.14	6,600	ND(<0.05)	0.003	0.3	N/A	N/A	8	0.3
gamma - BHC (Lindane)	7.0	1,080	ND(<0.05)	0.0006	0.06	5.4	20	8	0.06
Parathion	24.0	760	1.5	0.012	1.2	N/A	500	8	1.2
Nitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methoxychlor	0.040	25,637	35.0	9.0	900	N/A	400	80	10.0***
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - chlordane	0.56	140,000	0.1	0.14	14.0	0.54	5	80	0.54

a. Allowable Soil Concentration Cs = f x Cv x Koc

b. Soil cleanup objective = Cs x Correction Factor (CF)

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64. Other values are experimental values.

** Correction Factor (CF) of 100 is used as per proposed TAGM

*** As per proposed TAGM, Total Pesticides < 10 ppm.

Note: Soil clnup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB guidance document), and should be adjusted for the actual soil organic Carbon content if it is known.

APPENDIX A
TABLE 4
Recommended Soil Cleanup Objectives (mg/kg or ppm)
for Heavy Metals

Contaminants	USEPA HEALTH BASED (ppm) Carcinogens	Systemic Toxicants	Protect water Quality ppm	Eastern USA Background ppm	CRDL * mg/kg or ppm	Rec.soil Clnup Goal (ppm)
Aluminum	N/A	30 [a]	N/A	33,000	0.2	30 or SB
Antimony	N/A	30	N/A	N/A	0.6	30 or SB
Arsenic	N/A	N/A	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	4,000	N/A	15-600	0.2	300 or SB
Beryllium	0.143	400	N/A	0-1.75	0.05	0.14
Cadmium	N/A	N/A	N/A	0.1-1	0.05	1 or SB
Calcium	N/A	3,000 [b]	N/A	130 - 35,000 **	50.0	SB
Copper	N/A	N/A	N/A	1-50	0.25	25 or SB
Chromium	N/A	400 [c]	N/A	1.5-40 **	0.1	10 or SB
Cobalt	N/A	N/A	N/A	2.5-60 **	0.5	30 or SB
Cyanide	N/A	2,000	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	2,000 - 550,000	1.0	2,000 or SB
L[illegible]	N/A	N/A	N/A	4-61	0.05	30 or SB
Magnesium	N/A	N/A	N/A	100 - 5,000	50.0	SB
Manganese	N/A	N/A	N/A	50 - 5,000	0.15	SB
Mercury	N/A	N/A	N/A	0.001-0.2	0.002 - 0.2	0.1
Nickel	N/A	2,000	N/A	0.5-25	0.4	13 or SB
Potassium	N/A	4,000 [e]	N/A	8,500 - 43,000 **	50.0	4,000 or SB
Silver	N/A	200	N/A	N/A	0.1	200
Selenium	N/A	N/A	N/A	0.1-3.9	0.05	2 or SB
Sodium	N/A	3,000 [f]	N/A	6,000 - 8,000	50.0	3,000 or SB
Thallium	N/A	20 [h]	N/A	N/A	0.1	20 or SB
Vanadium	N/A	2,000 [g]	N/A	1-300	0.5	150 or SB
Zinc	N/A	20 [d]	N/A	9-50	0.2	20 or SB

* CRDL for soil is approx. 10 times the CRDL for water
** New York State background
SB is site background
a Aluminum as aluminum phosphide
b Calcium as Calcium Cyanide
c Chromium as Chromium (VI)
d Zinc as Zinc phosphide
e Potassium as Potassium Cyanide
f Sodium as Sodium Cyanide
g Vanadium as Vanadium Pentoxide
h Thallium as Thallium Sulfate

TOTAL ORGANIC CARBON (TOC)

USE AND LIMITATIONS

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

FIELD PROCEDURES

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 mo under that condition. Excessive temperatures should not be used to thaw samples.

LABORATORY PROCEDURES

Analytical Procedures

- Equipment
  - Induction furnace
    e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106
  - Analytical balance
    0.1 mg accuracy
  - Desiccator
  - Combustion boats
  - 10 percent hydrochloric acid (HCl)
  - Cupric oxide fines (or equivalent material)
  - Benzoic acid or other carbon source as a standard.

- Equipment preparation
  - Clean combustion boats by placing them in the induction furnace at 950° C. After being cleaned, combustion boats should not be touched with bare hands.
  - Cool boats to room temperature in a desiccator.
  - Weigh each boat to the nearest 0.1 mg.

- Sample preparation
  - Allow frozen samples to warm to room temperature.
  - Homogenize each sample mechanically, incorporating any overlying water.
  - Transfer a representative aliquot (5-10 g) to a clean container.

- Analytical procedures
  - Dry samples to constant weight at 70 ± 2° C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
  - Cool dried samples to room temperature in a desiccator.
  - Grind sample using a mortar and pestle to break up aggregates.
  - Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
  - Determine sample weight to the nearest 0.1 mg.
  - Add several drops of HCl to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCl atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
  - Dry the HCl-treated sample to constant weight at 70 ± 2° C.
  - Cool to room temperature in a desiccator.
  - Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
  - Combust the sample in an induction furnace at a minimum temperature of 950 ± 10° C.

- Calculations
  - If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

$$\text{Percent carbon} = \frac{A(0.2729)(100)}{B}$$

Where:

A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion
B = dry weight (g) of the unacidified sample in the combustion boat
0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

DATA REPORTING REQUIREMENTS

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method

blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).