MALCOLM PIRNIE

ROCHESTER FIRE TRAINING ACADEMY
BENCH-SCALE SOIL VOLATILIZATION STUDY

ROCHESTER, NEW YORK

MAY 1996

MALCOLM PIRNIE, INC.

1000 Pittsford-Victor Road
Pittsford, NY 14534-3822

0965-086/BSVS

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TABLE OF CONTENTS

LIST OF TABLES

MALCOLM PIRNIE

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BENCH-SCALE SOIL VOLATILIZATION STUDY

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF APPENDICES

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1.0 STUDY OBJECTIVES

The overall objective of this laboratory study was to:

- Illustrate the rate of air drying and volatilization of volatile organic contaminants (VOCs) from South Disposal Area soils.
- Demonstrate whether the contract-specified soil volatilation performance criteria (viz. less than 10 mg/day total VOC dry weight) can be achieved.
- Illustrate the effect of clod size and air temperature on the rate of volatilization.

2.0 SAMPLE COLLECTION

On March 14, 1996 Malcolm Pirnie personnel collected samples from the South Disposal Area soils staged inside the sprung structure. The sprung structure is 240 feet long, 88 feet wide and 36 feet high and is located in a north to south alignment on the west side of the South Disposal Area. The outside air temperature was approximately 42° F. The Contractor, Thermocor Kimmins (TK) provided an operator and backhoe for the sample collection since frost depth in the soils inside the sprung structure was 12 to 14 inches. Samples were collected from soils beneath the frost line.

The Contractor's Health and Safety Officer was present during sample collection. The background ambient air VOC concentrations taken inside the sprung structure prior to any soil disturbance ranged from 5 to 10 ppm. During the sampling, VOC levels greater than 100 ppm were measured with a portable Organic Vapor Analyser (OVA) directly above the sampling location excavations.

Sampling locations were selected based on locations previously characterized by TK in support of their December 1995 performance demonstration test. The sampled soil consisted of material which had been excavated and placed within the sprung structure's

footprint during site preparation for the erection of the sprung structure and underlying undisturbed soil and fill material.

A test pit measuring approximately 15 to 30 inches deep was excavated with a backhoe at each of the locations identified on Figure 1 in Appendix A. Soil temperatures measured at the bottom of the excavation averaged about 35° F at the time of the excavation. The excavated material was piled alongside each test pit location. A five-gallon pail was filled from the material excavated from each of the six test pits. The samples were then sealed and transported back to Malcolm Pirnie's laboratory.

3.0 SAMPLE PREPARATION/CONDITIONING

3.1 Initial Soil Mixing and Characterization

Six 5-gallon pails of soil were received at Malcolm Pirnie's Soils Testing Laboratory on March 14, 1996 (see Chain of Custody documentation in Appendix A). The pails remained sealed and stored on ice until the following day when the pails were unsealed and emptied onto a plastic liner in a lift approximately three inches thick for mixing prior to initial characterization. The mixing activities took place outdoors. The weather was sunny with a light breeze and an air temperature of 48° F and relative humidity of 56% . Readings with an HNu photoionization detector inside the pails before they were emptied averaged 400 ppm. HNu readings two inches above the soil as it was placed on the plastic liner averaged 15 ppm but remained 1 to 2 ppm in the breathing zone during the entire mixing procedure.

Two technicians mixed the soils using the quartering procedure described in ASTM D421 with spades and shovels for approximately 1 1/2 hours. After the soils were visually determined to be thoroughly mixed, a sample (viz. Sample S1) was collected for volatile organic content, moisture content, gradation and Atterberg limits in accordance with the analytical protocols described in the study scope (See Appendix B). A blind duplicate VOC sample (viz. sample S1-dup) was collected subsequently and sent to General Testing

Laboratory under chain of custody (see Appendix A). The mixed soil was repacked tightly into six 5-gallon pails, the top of the soil layer was sealed with cellophane, the tops placed on the pails and taped to seal. The pails were then placed on ice in the adjacent unheated laboratory garage until initial sample results were received and the study could begin. Initial soil characterization and VOC concentration results are summarized on Tables 1 and 2, respectively. The results illustrate that the in situ material in the area sampled is a lean clay with 25.1% average moisture content, and a plasticity index of 15. The initial total VOC content ranged from 578.7 mg/kg to 699.4 mg/kg thus averaged 639 mg/kg, on a dry weight basis. Trichloroethylene, 1,1,1-trichloroethane and toluene were present at concentrations in excess of 100 mg/kg and tetrachloroethene and m,p&o -xylene were also present between 10 and 100 mg/kg; similar to the VOC makeup of the 1992 Malcolm Pirnie pilot volatilization study. The raw data is included as Appendix A.

3.2 Sample Drying

Following receipt of the analytical data confirming the presence of VOCs in the soils, two of the six pails were emptied into ten stainless steel pans approximately 1 ½ inches deep. The pans were placed inside a fume hood on drying racks (maintaining approximately two inches between vertically stacked pans. Ambient air circulation was maintained by additionally placing a fan inside the fume hood. The air temperature inside the fume hood remained between 68° and 72° F throughout the drying period (see Appendix C) with a relative humidity of 34 to 41% . Approximately every 30 minutes for eight hours during laboratory operating hours each pan was removed from the fume hood and the soils in the pan were turned using a large spatula to expose all clods to the ambient air. The pans remained in the fume hood for 12 hours overnight without mechanical agitation. Within eight hours of initiating the drying process, the moisture content had been reduced to the plastic limit for the soil (i.e. 21%). After the initial 24 hour drying period, the air dried samples were then manually sieved (see Table 3) to separate the clod sizes into three size fractions: > 1/4 inch, > the No. 10 sieve and less than the No. 10 sieve. Only a small portion of the sample existed as greater than one inch and thus very little crushing was necessary to break down clods to prepare the size fractions. Two pans of each size fraction

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South Disposal Area Soils
Bench-Scale Soil Volatilization Study

Table 1: Initial Soil Characterization

Parameter	Sample S1
% Moisture	25.1
Plasicity Index	15
Liquid Limit	36

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South Disposal Area Soils
Bench-Scale Soil Volatilization Study

Table 2: Initial Soil VOC Concentration
(μg/kg dry weight basis)

Constituent	Sample S1	Sample S1-dup
Vinyl Chloride	ND	ND
Chloroethane	ND	ND
Methylene Chloride	ND	ND
Acetone	ND	ND
1,1-Dichloroethene	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethene (total)	8,500	9,500
Chloroform	ND	ND
1,2-Dichloroethane	ND	ND
2-Butanone	ND	ND
1,1,1-Trichloroethane	130,000	150,000
Trichloroethene	210,000	290,000
Benzene	ND	ND
2-Methyl-2-Pentanone	ND	ND
Tetrachloroethene	67,000	97,000
Toluene	100,000	110,000
Chlorobenzene	ND	2,000 J
Ethylbenzene	7,200 J	8,900
m&p-Xylene	ND	14,000
o-Xylene	56,000	18,000
Carbon Disulfide	ND	ND
Total Volatiles	**578,700**	**699,400**

Notes:
ND = Not Detected
J = Estimated Value. Compound is detected below sample quantitation limit

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Bench-Scale Soil Volatilization Study

Table 3 Particle Size Distribution

Sieve Size	Percent Finer
1 inch	100
0.75 inch	81.6
0.5 inch	57.4
0.375 inch	38.8
0.25 inch	13.7
No. 10	4.9

were prepared for the study with two extra pans of the > No. 10 and <1/4 -inch sample prepared for use as "control" samples at outside ambient air temperatures during the study. These pans were then sealed in plastic bags overnight to minimize further loss of VOC's prior to initiating the enhanced volatilization phase of the study.

4.0 BASELINE ENHANCED VOLATILIZATION

4.1 Procedures

On the morning of March 17, 1996, two pans of each size fraction were placed on the drying rack inside the fume hood. Two pans of the < 1/4-inch and > No. 10 were placed in the loading area of a locked vehicle outside to serve as a "control" sample at outside ambient temperatures. The control samples were manually turned approximately every two hours. Outside ambient air temperatures remained in the range of 30° to 35° F over the duration of the test.

Each pan was initially sampled for VOCs and moisture content. The soils in each pan continued to be turned every hour with samples collected for analysis for VOCs , moisture content and jar headspace readings every hour for the first eight hours and then at 12 and 24 hours of enhanced volatilization. Table 4 and Figure 2 illustrate the rate of volatilization as recorded by the HNu results. The VOC samples collected at 0, 8, 12 and 24 hours were sent under chain of custody (see Appendix A) to General Testing for analysis. The results are summarized in Table 5. Results after 24 hours of enhanced volatilization illustrated that the soil volatilization performance criteria of <10 mg/kg had been achieved for all size fractions so the study was concluded. The test results are discussed in greater detail below.

4.2 Results

4.2.1 Drying

Figure 3 and Table 6 illustrate the rate of air drying of South Disposal Area soils with nominal agitation at ambient air temperature typical of Western New York summers (ie. 68° to 72° F). Under these conditions the bulk moisture content was reduced from 25.1% (a

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Table 4 - Soil Headspace VOC Concentration vs. Enhanced Volatilization Time

Elapsed Time[1] (hours)	Headspace VOC by Sample Fraction (ppm)[2]			
	>1/4"	<1/4" & >No. 10	<No. 10	Control
0	8.0	29.0	31.0	5.2
1	17.2	24.0	21.0	
2	18.3	15.5	13.2	
3	16.0	19.8	18.0	
4	15.4	16.3	15.4	
5	8.6	13.2	10.6	
6	4.8	9.2	9.0	
7	14.4	8.8	7.2	
8	2.0	6.2	7.4	
12	5.2	8	4.6	
24	3.8	4.83	1.6	11

(1) Readings taken during enhanced volatilization cycle only.
Submitted hour 0 and 24 to General Testing, Inc. for VOC Analysis.
(2) Using 10.2 eV lamp photoionization meter.

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Bench-Scale Soil Volatilization Study

Table 5: Analytical Results for Baseline Enhanced Volatilization (µg/kg)

Sample No.	S33	S34	S35	S36 (control)
Sample Date	3/22/96	3/22/96	3/22/96	3/22/96
Elapsed Time of Enhanc	24 hour	24 hour	24 hour	24 hour
Sample Size Fraction	<#10	>#10<1/4"	>1/4"	>#10<1/4"
Vinyl Chloride	9 J	1 J	ND	ND
Chloroethane	7 J	4 J	ND	6 J
Methylene Chloride	8 J	6 J	6 J	15 J
Acetone	54	56	50	52 J
1,1-Dichloroethene	2 J	ND	3 J	ND
1,1-Dichloroethane	41	27	26	92
1,2-Dichloroethene (total)	170	190	160	940
Chloroform	7 J	3 J	5 J	18 J
1,2-Dichloroethane	8 J	7 J	7 J	23 J
2-Butanone	7 J	19	10 J	7 J
1,1,1-Trichloroethane	310	220	83	3,800
Trichloroethene	320	370	160	3,000
Benzene	4 J	3 J	3 J	8 J
2-Methyl-2-Pentanone	20 J	41	55	81
Tetrachloroethene	95	63	170	530
Toluene	220	120	68	460
Chlorobenzene	9 J	6 J	8 J	31 J
Ethylbenzene	13 J	11	26	43 J
m&p-Xylene	38	49	130	66
o-Xylene	37	38	64	170
Carbon Disulfide	ND	ND	2 J	ND
Total Volatiles	**1,379**	**1,234**	**1,036**	**9,342**

Figure 2
Rochester Fire Training Academy
South Disposal Area Soils
Bench-Scale Volatilization Study
Rate of Volatilization

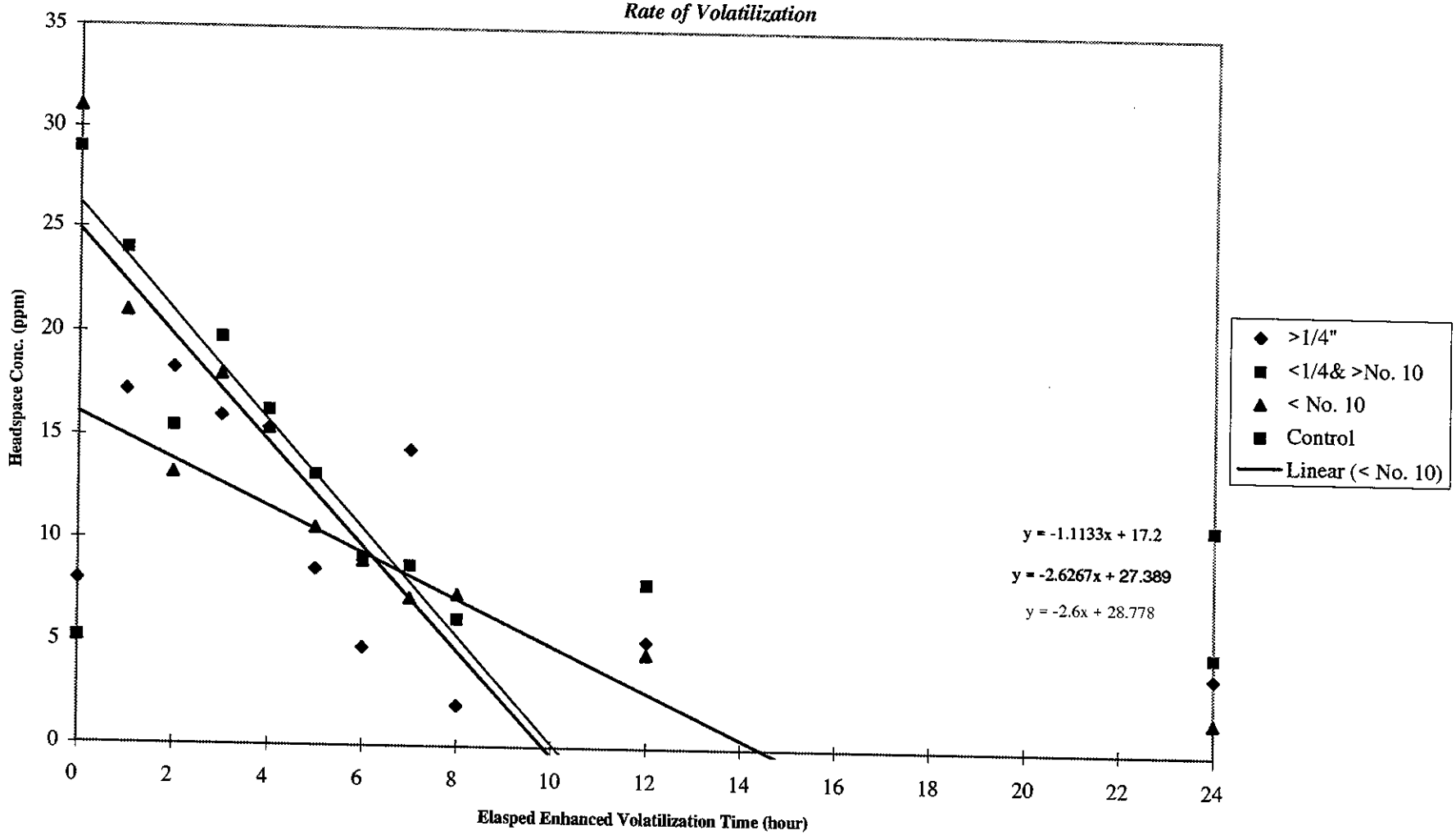
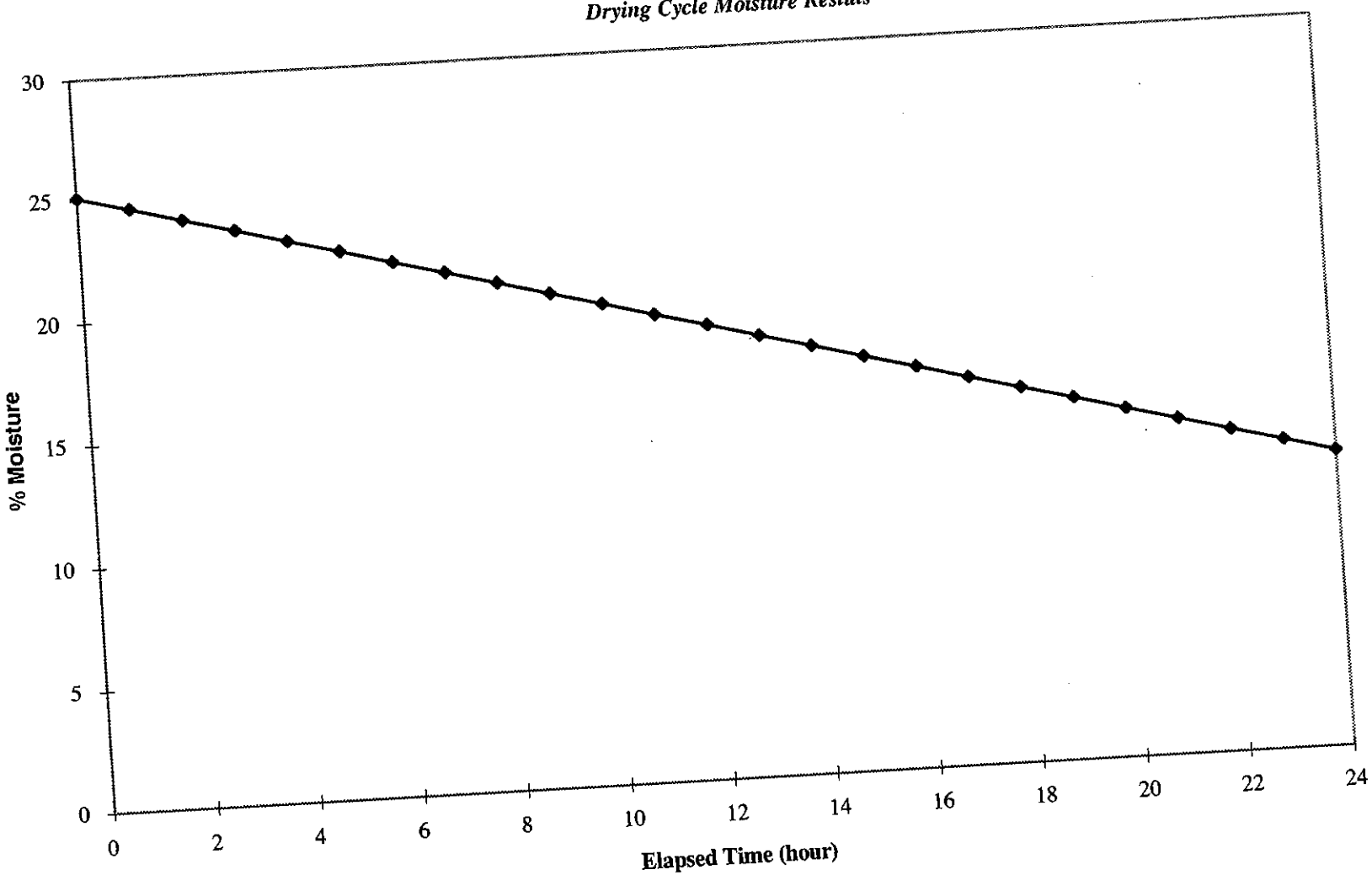


Figure 3
Rochester Fire Training Academy
South Disposal Area Soils
Bench-Scale Soil Volatilization Study
Drying Cycle Moisture Resluts



typical in situ moisture content for a clayey soil) to below the plastic limit (ie. 21%) for the soils within 8 hours and further dried to hardness (i.e. <13%) within 24 hours. When dried to below the plastic limit, the soils were easily crumbled to reduce the clod size. For the three clod sizes tested, the rate of drying was not dramatically different, although the smaller fractions did dry slightly faster (see Figure 4). For the control sample, the rate of drying was significantly slower than for the other samples.

4.2.2 Volatilization

The headspace VOC concentrations correlated well with the quantitative analytical soil VOC data. Figure 5 illustrates that 94% of the volatilized within the 24-hour air drying cycle at 68° to 72° F. The variability of the final VOC concentrations with clod size are within the analytical variability of the test, indicating that clod size below one inch has little impact on the rate of volatilization (see Table 6). The contract-specified soil volatilization performance criteria (viz. <10 mg/kg total VOC, dry wet-basis) was consistently achieved in all soil fractions in less than eight hours of enhanced volatilization and less than 40 hours total air drying and enhanced volatilization at 68°-72° F ambient temperature, typical of Western New York summer conditions (see Figure 5). The initial soil VOC concentrations of 578.7 to 699.4 mg/kg and relative distribution of VOC constituents correlates well to previous test results and is considered representative of South Disposal Area soils. For the control sample, the rate of volatilization was lower (see Figure 4). As the moisture content of the soil decreased, the VOC concentration decreased (see Figure 6).

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South Disposal Area Soils
Bench-Scale Soil Volatilization Study

Table 6 - Soil Drying Time

Elapsed Time (hours)	Initial Drying Cycle	Soil Moisture Content by Sample Fraction (% by weight)			
		>1/4" (1)	<1/4" & >No. 10 (1)	<No. 10 (1)	Control (2) <1/4" & > No. 10
0	25.1				
1	24.6				
2	24.0				
3	23.5				
4	22.9				
5	22.4				
6	21.9				
7	21.3				
8	20.8				
9	20.2				
10	19.7				
11	19.2				
12	18.6				
13	18.1				
14	17.5				
15	17.0				
16	16.5				
17	15.9				
18	15.4				
19	14.8				
25		10.74	13.85	11.83	
26		11.57	13.05	11.26	
27		10.71	12.42	10.84	
28		9.80	12.12	10.06	
29		10.16	11.67	9.22	13.74
30		9.96	11.40	8.51	
31		8.91	10.59	7.62	
32		6.00	10.14	6.45	
33		7.23	9.91	6.34	
37		6.38	8.75	4.45	
49		4.19	4.60	2.01	13.00

(1) Dried at 68 to 72°F

(1) Dried at 30 to 35°F

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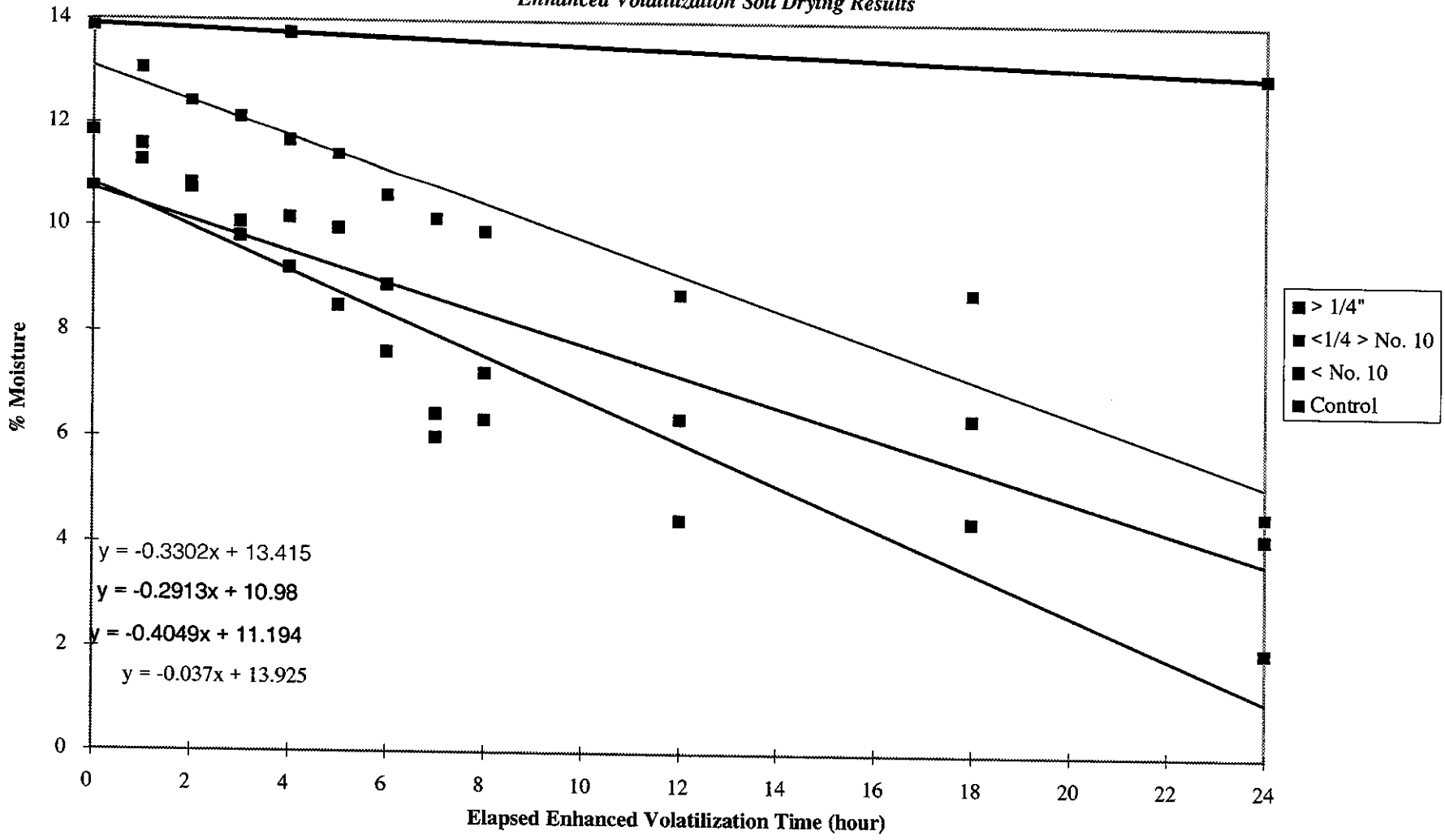
South Disposal Area Soils
Bench-Scale Soil Volatilization Study

Table 7 - Soil VOC Concentration vs. Time

Test Cycle		Elapsed Time (hours)	Total VOC Concentration in Soil (mg/kg)[1]				
			Unconditioned Sample	Conditioned Sample Fraction			
				>1/4"	<1/4" to >No. 10	<No. 10	Control
Drying	Begin	0	578.7 - 699.4				
	End	24					
Sample Preparation	Begin	25					
	End	31					
Enhanced Volatilization	Begin	32		31.4	30.7	48.5	
	Mid	40		23.7	16.1	44.1	
		48		217.3	13.9	33.9	
	End	56		1.1	1.2	1.4	9.3

(1) dry weight basis

Figure 4
Rochester Fire Training Academy
South Disposal Area Soils
Bench-Scale Volatilization Study
Enhanced Volatilization Soil Drying Results



Drying Cycle

Figure 5
Rochester Fire Training Academy
South Disposal Area Soils
Bench-Scale Soil Volatilization Study
Total VOC Results

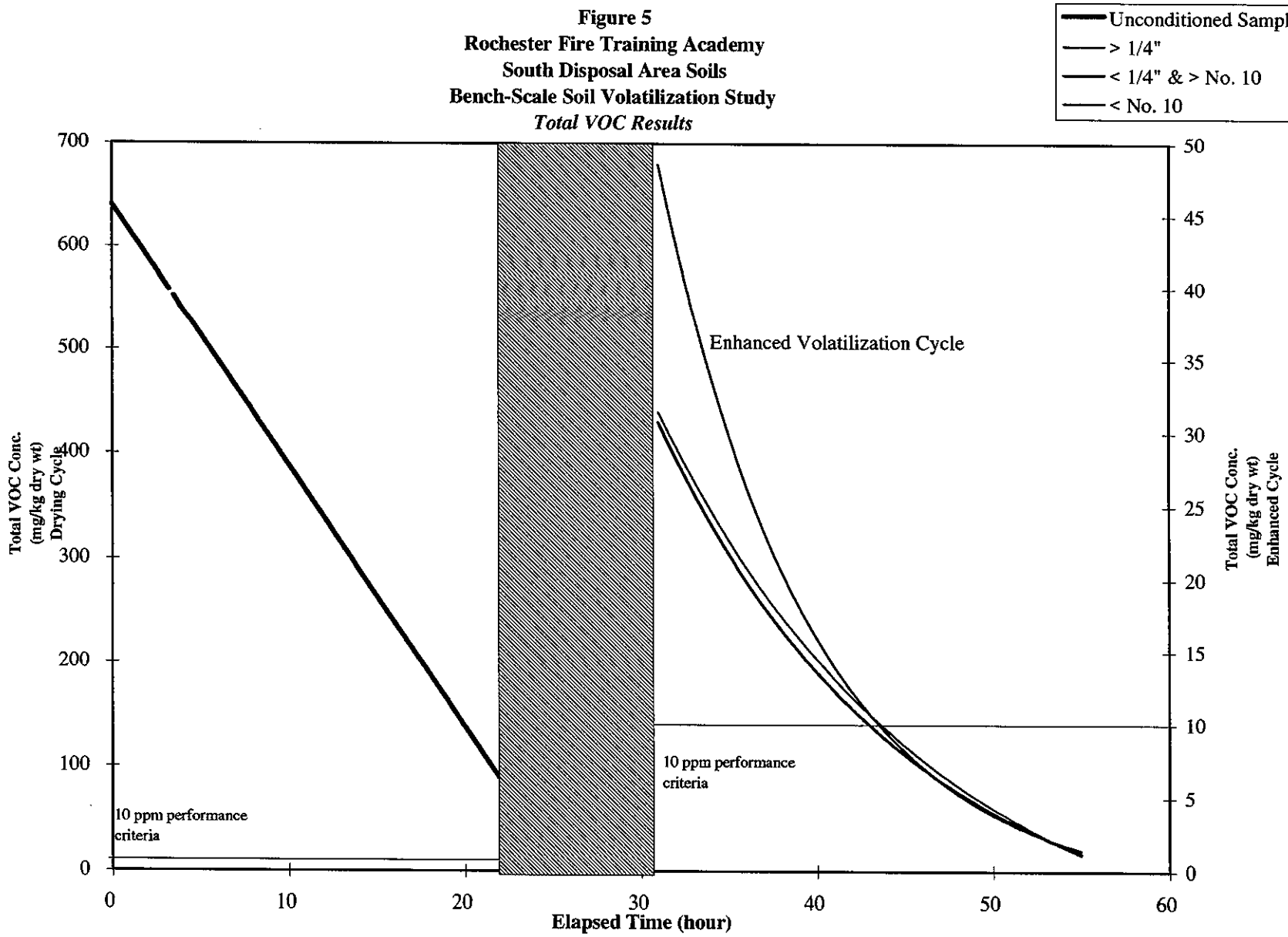
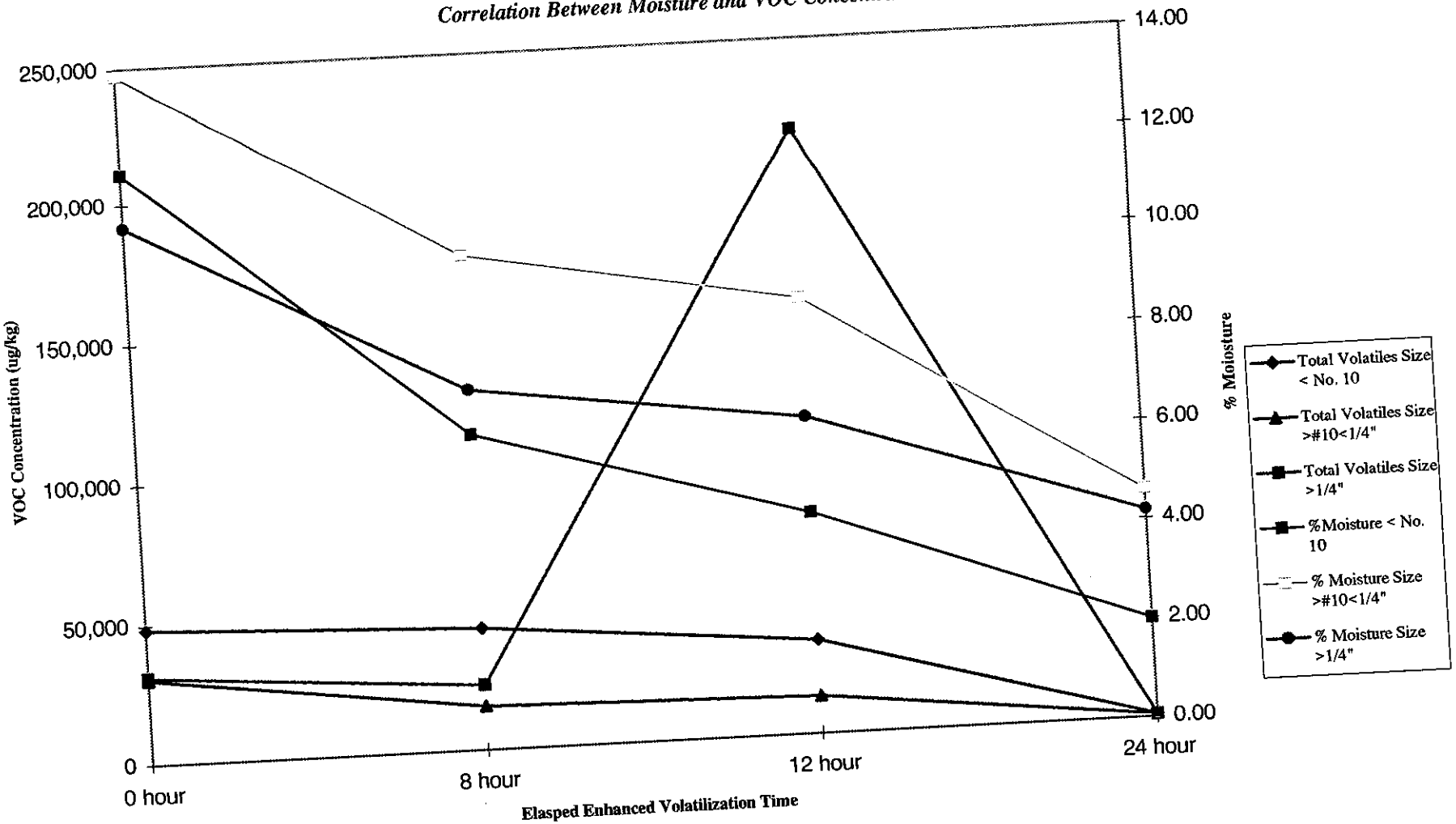


Figure 6
Rochester Fire Training Academy
South Disposal Area Soils
Bench-Scale Volatilization Study
Correlation Between Moisture and VOC Concentration



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APPENDIX A

ANALYTICAL RESULTS

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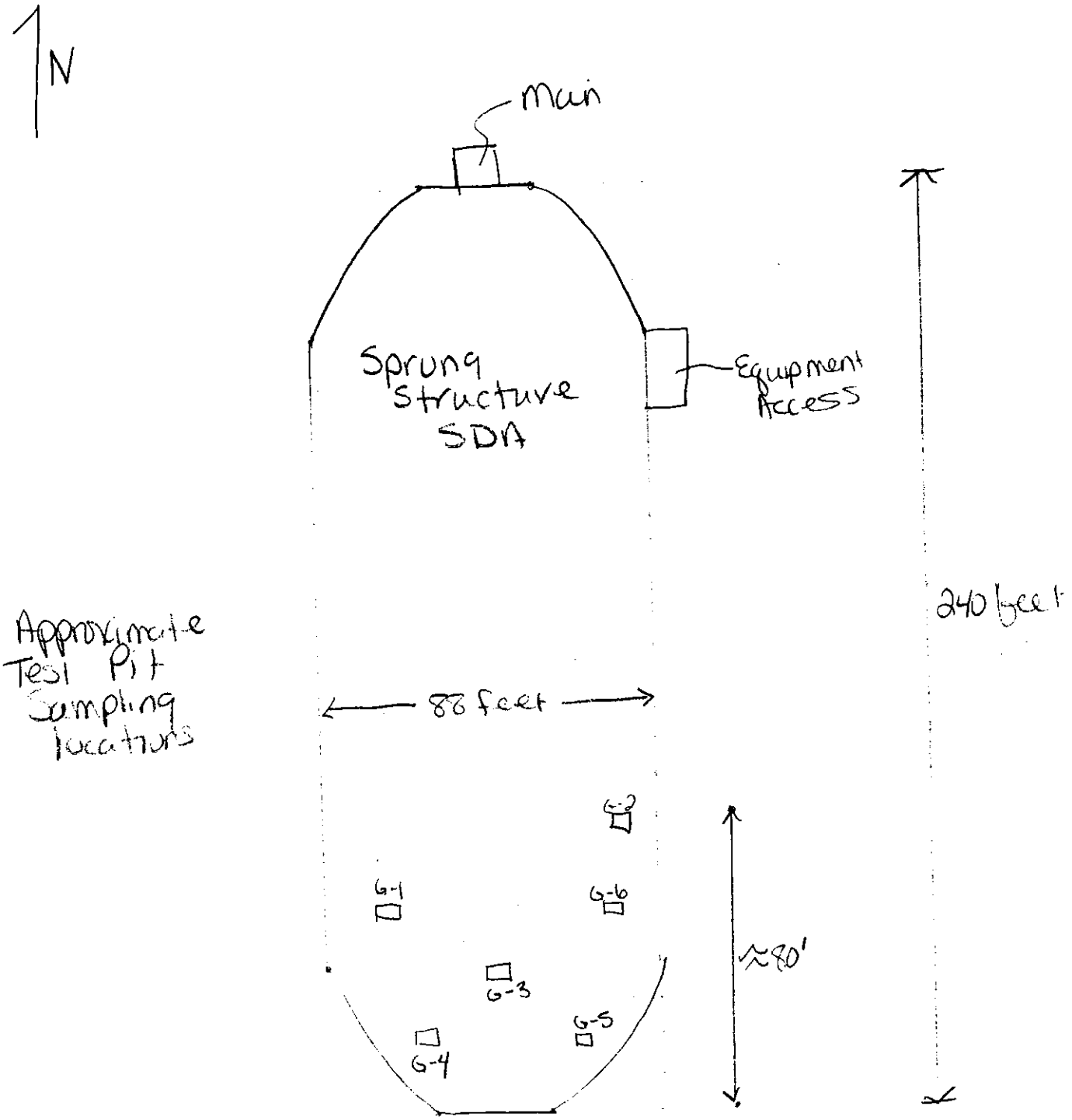
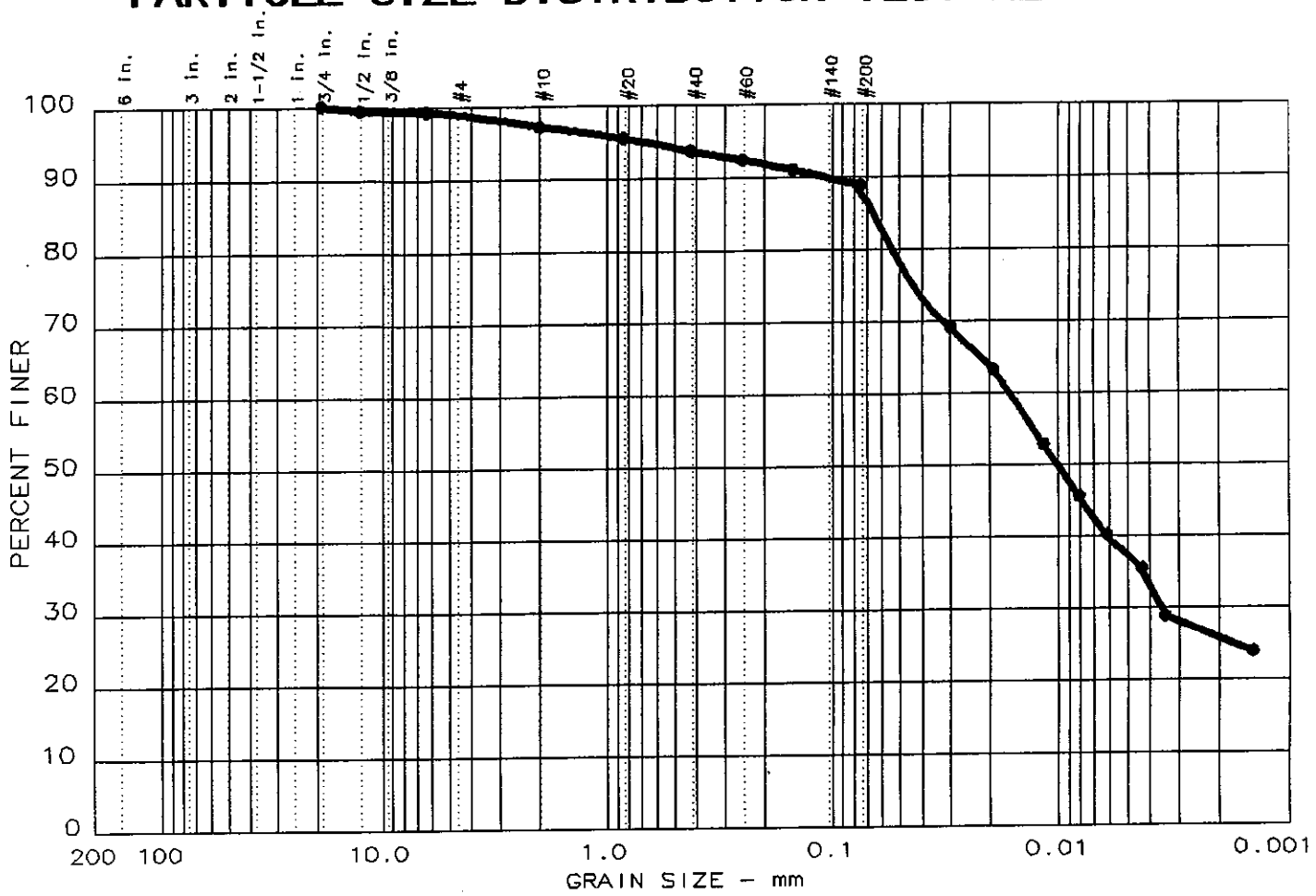
BY AHV DATE 4/15/96 SHEET NO. 1 OF 1

CHKD. BY JS DATE JOB NO. 09650866.320

SUBJECT Sample Collection Locations on 3/14/96 SDA Bench Test



PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	20	0.0	1.1	10.1	63.0	25.8	CL	36	15

SIEVE inches size	PERCENT FINER ●		
0.75	100.0		
0.5	99.4		
0.25	99.2		
	GRAIN SIZE		
D_{60} D_{30} D_{10}	0.004		
	COEFFICIENTS		
C_c C_u			

SIEVE number size	PERCENT FINER ●		
10	97.2		
20	95.5		
40	93.7		
60	92.4		
100	91.0		
200	88.8		

Sample information:
● Soil Vol. Study
LEAN CLAY

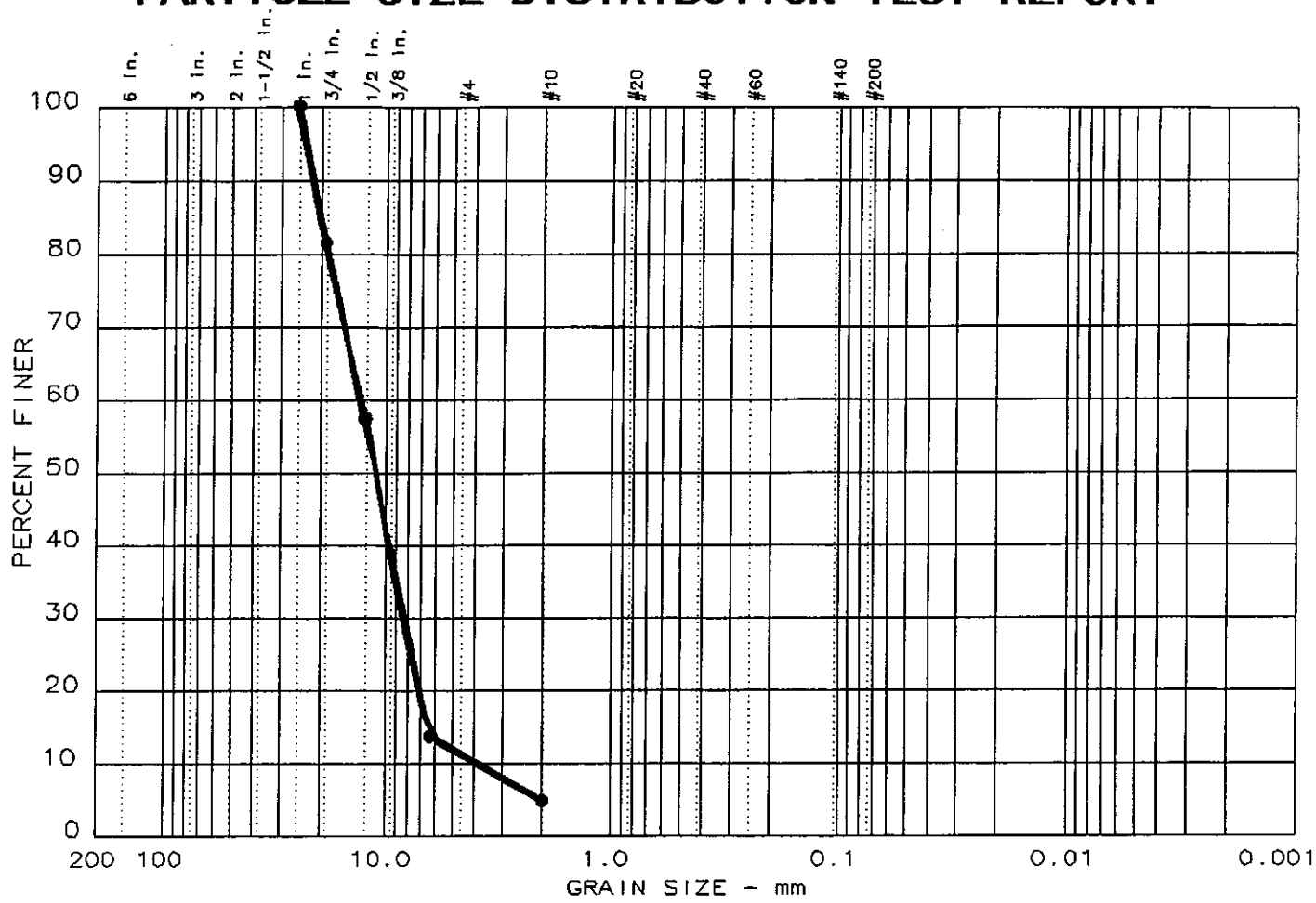
Remarks:

MALCOLM PIRNIE, INC.

Project No.: 0965-08-6
Project: Rochester Fire Academy

Date: 3-25-96 Data Sheet No. ——

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	1	0.0	88.5	11.5					

SIEVE inches size	PERCENT FINER ●		
1	100.0		
0.75	81.6		
0.5	57.4		
0.375	38.8		
0.25	13.7		
	GRAIN SIZE		
D_{60}	13.24		
D_{30}	8.26		
D_{10}	3.85		
	COEFFICIENTS		
C_c	1.34		
C_u	3.4		

SIEVE number size	PERCENT FINER ●		
10	4.9		

Sample information:
● Mat'l > 1/4" Sieve Enhanced Volatilization Sample

Remarks:

MALCOLM PIRNIE, INC.

Project No.: 0965-08-6
Project: Rochester Fire Academy

Date: 3-25-96 Data Sheet No. ——

General Testing Corporation

A Full Service Environmental Laboratory
Affiliated With Columbia Analytical Services, Inc.

Fax Cover Sheet

DATE: 3/18/96

TO: Malcolm Pirnie
Deanne Asquith

PHONE: 828-1300

FAX: 828-0431

FROM: Kathy Wages/
Karen Burke

PHONE: (716) 454-3760

FAX: (716) 454-1245

RE: Fire Academy

CC:

Number of pages including cover sheet: 4

Message

S-1 Results

710 Exchange Street • Rochester, NY 14608 • Tele: (716) 454-3760 • Fax: (716) 454-1245
65 Trinity Place • Hackensack, NJ 07601 • Tele: (201) 488-5242 • Fax: (201) 488-6386
435 Lawrence Bell Drive • Amherst, NY 14221 • Tele: (716) 634-0454 • Fax: (716) 634-9019

General Testing Corporation

A Full Service Environmental Laboratory

Effective 10/30/95

GTC LIST OF QUALIFIERS

(The basis of this proposal are the EPA-CLP Qualifiers)

U - Indicates compound was analyzed for but was not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. For further explanation see case narrative / cover letter.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

N - Spiked sample recovery not within control limits.
(Flag the entire batch - Inorganic analysis only)

* - Duplicate analysis not within control limits.
(Flag the entire batch - Inorganic analysis only)

- Also used to qualify Organics QC data outside limits.

D - Spike diluted out.

S - Reported value determined by Method of Standard Additions. (MSA)

X - As specified in the case narrative.

GTC Lab ID # for State Certifications

NY ID # in Rochester: 10145
NY ID # in Hackensack: 10801
NY ID # in Massachusetts: M-NY032

NJ ID # in Rochester: 73331
NJ ID # in Hackensack: 02317

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 ml
Level: Med
% Moisture: 18
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 67650
Lab File ID: Q8574
Date Received: 3/16/96
Date Analyzed: 3/18/96
Dilution Factor: 1
Soil Aliquot Volume: 20 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	7600	U
74-83-9	Bromomethane	7600	U
75-01-4	Vinyl Chloride	7600	U
75-00-3	Chloroethane	7600	U
75-09-2	Methylene Chloride	7600	U
67-64-1	Acetone	7600	U
75-15-0	Carbon Disulfide	7600	U
75-35-4	1,1-Dichloroethene	7600	U
75-34-3	1,1-Dichloroethane	7600	U
540-59-0	1,2-Dichloroethene(total)	8500	
67-66-3	Chloroform	7600	U
107-06-2	1,2-Dichloroethane	7600	U
78-93-3	2-Butanone	7600	U
71-55-6	1,1,1-Trichloroethane	130000	
56-23-5	Carbon tetrachloride	7600	U
75-27-4	Bromodichloromethane	7600	U
7-87-5	1,2-Dichloropropane	7600	U
10061-01-5	cis-1,3-Dichloropropene	7600	U
79-01-6	Trichloroethene	210000	E
124-48-1	Dibromochloromethane	7600	U
79-00-5	1,1,2-Trichloroethane	7600	U
71-43-2	Benzene	7600	U
10061-02-6	trans-1,3-Dichloropropene	7600	U
75-25-2	Bromoform	7600	U
108-01-1	4-Methyl-2-Pentanone	7600	U
591-78-6	2-Hexanone	7600	U
127-18-4	Tetrachloroethene	67000	
79-34-5	1,1,2,2-Tetrachloroethane	7600	U
108-88-3	Toluene	100000	
108-90-7	Chlorobenzene	7600	U
100-41-4	Ethylbenzene	7200	J
100-42-5	Styrene	7600	U
1330-20-7	Xylene(total)	56000	

FORM I-CLP-VOA

≤ 71.7 ppm

573.7 ppm

WET WT.
Dry WT.

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S1DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 ml
Level: Med
% Moisture: 18
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 67650DL
Lab File ID: Q6575
Date Received: 3/16/96
Date Analyzed: 3/18/95
Dilution Factor: 1.0
Soil Aliquot Volume: 10 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	15000	U
74-83-9	Bromomethane	15000	U
75-01-4	Vinyl Chloride	15000	U
75-00-3	Chloroethane	15000	U
75-09-2	Methylene Chloride	15000	U
67-64-1	Acetone	15000	U
75-15-0	Carbon Disulfide	15000	U
75-35-4	1,1-Dichloroethene	15000	U
75-34-3	1,1-Dichloroethane	15000	U
540-59-0	1,2-Dichloroethene(total)	6500	J
67-66-3	Chloroform	15000	U
107-06-2	1,2-Dichloroethane	15000	U
78-93-3	2-Butanone	15000	U
71-55-6	1,1,1-Trichloroethane	120000	
56-23-5	Carbon tetrachloride	15000	U
75-27-4	Bromodichloromethane	15000	U
7-87-5	1,2-Dichloropropane	15000	U
10061-01-5	cis-1,3-Dichloropropene	15000	U
79-01-6	Trichloroethene	210000	
124-48-1	Dibromochloromethane	15000	U
79-00-5	1,1,2-Trichloroethane	15000	U
71-43-2	Benzene	15000	U
10061-02-6	trans-1,3-Dichloropropene	15000	U
75-25-2	Bromoform	15000	U
108-01-1	4-Methyl-2-Pentanone	15000	U
591-78-6	2-Hexanone	15000	U
127-18-4	Tetrachloroethene	72000	
79-34-5	1,1,2,2-Tetrachloroethane	15000	U
108-88-3	Toluene	110000	
108-90-7	Chlorobenzene	15000	U
100-41-4	Ethylbenzene	7600	J
100-42-5	Styrene	15000	U
1330-20-7	Xylene(total)	58000	

FORM I-CLP-VOA

General Testing Corporation

A Full Service Environmental Laboratory
Affiliated With Columbia Analytical Services, Inc.

Fax Cover Sheet

DATE: 3/25/96

TO: Malcolm Pirnie
Jeanne Asquith

PHONE: 828-1300

FAX: 828-0431

FROM: Kathy Wagner

PHONE: (716) 454-3760

FAX: (716) 454-1245

RE: Fire Academy

CC:

Number of pages including cover sheet: 11

Message

Results For S33
S34
S35
S36

710 Exchange Street • Rochester, NY 14608 • Tele: (716) 454-3760 • Fax: (716) 454-1245
85 Trinity Place • Hackensack, NJ 07601 • Tele: (201) 488-5242 • Fax: (201) 488-6386
435 Lawrence Bell Drive • Amherst, NY 14221 • Tele: (716) 634-0454 • Fax: (716) 634-9019

General Testing Corporation

A Full Service Environmental Laboratory

Effective 10/30/95

GTC LIST OF QUALIFIERS

(The basis of this proposal are the EPA-CLP Qualifiers)

U - Indicates compound was analyzed for but was not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. For further explanation see case narrative / cover letter.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range

A - This flag indicates that a TIC is a suspected aldol-condensation product.

N - Spiked sample recovery not within control limits.
(Flag the entire batch - Inorganic analysis only)

* - Duplicate analysis not within control limits.
(Flag the entire batch - Inorganic analysis only)

- Also used to qualify Organics QC data outside limits.

D - Spike diluted out.

S - Reported value determined by Method of Standard Additions. (MSA)

X - As specified in the case narrative.

GTC Lab ID # for State Certifications

NY ID # in Rochester: 10145
NY ID # in Hackensack: 10801
NY ID # in Massachusetts: M-NY032

NJ ID # in Rochester: 73331
NJ ID # in Hackensack: 02317

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S33

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 2.5 gr ✓
Level: Low
% Moisture: 2
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

Lab Sample ID: 69039
Lab File ID: J7661
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

SDG No: S1

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	20	U
74-83-9	Bromomethane	20	U
75-01-4	Vinyl Chloride	9 ✓	J
75-00-3	Chloroethane	7 ✓	J
75-09-2	Methylene Chloride	(8 ✓	J
67-64-1	Acetone	54 ✓	
75-15-0	Carbon Disulfide	20	U
75-35-4	1,1-Dichloroethene	2 ✓	J
75-34-3	1,1-Dichloroethane	41 ✓	
540-59-0	1,2-Dichloroethene(total)	458	E
67-66-3	Chloroform	7	J
107-06-2	1,2-Dichloroethane	8	J
78-93-3	2-Butanone	7	J
71-55-6	1,1,1-Trichloroethane	310	
56-23-5	Carbon tetrachloride	20	U
75-27-4	Bromodichloromethane	20	U
7-87-5	1,2-Dichloropropane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
79-01-6	Trichloroethene	630	E
124-48-1	Dibromochloromethane	20	U
79-00-5	1,1,2-Trichloroethane	20	U
71-43-2	Benzene	4	J
10061-02-6	trans-1,3-Dichloropropene	20	U
75-25-2	Bromoform	20	U
108-01-1	4-Methyl-2-Pentanone	20	J
591-78-6	2-Hexanone	20	U
127-18-4	Tetrachloroethene	95	
79-34-5	1,1,2,2-Tetrachloroethane	20	U
108-88-3	Toluene	220	
108-90-7	Chlorobenzene	9	J
100-41-4	Ethylbenzene	13	J
100-42-5	Styrene	20	U
1330-20-7	M+P-Xylene	38	
1330-20-7	O-Xylene	37	

170 ✓

320

1.4 ppm

1.379 ppm

1379 ✓

Don't use E's on this page

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S33DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 1.0 gr
Level: Low
% Moisture: 2
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

SDG No: S1
Lab Sample ID: 69039DL
Lab File ID: J7651
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/kg	Q
74-87-3	Chloromethane	51	U
74-83-9	Bromomethane	51	U
75-01-4	Vinyl Chloride	51	U
75-00-3	Chloroethane	51	U
75-09-2	Methylene Chloride	17	JD
67-64-1	Acetone	84	D
75-15-0	Carbon Disulfide	51	U
75-35-4	1,1-Dichloroethene	51	U
75-34-3	1,1-Dichloroethane	15	JD
540-59-0	1,2-Dichloroethene(total)	170	D
67-66-3	Chloroform	51	U
107-06-2	1,2-Dichloroethane	51	U
78-93-3	2-Butanone	51	U
71-55-6	1,1,1-Trichloroethane	160	D
56-23-5	Carbon tetrachloride	51	U
75-27-4	Bromodichloromethane	51	U
7-87-5	1,2-Dichloropropane	51	U
10061-01-5	cis-1,3-Dichloropropene	51	U
79-01-6	Trichloroethene	320	D
124-48-1	Dibromochloromethane	51	U
79-00-5	1,1,2-Trichloroethane	51	U
71-43-2	Benzene	51	U
10061-02-6	trans-1,3-Dichloropropene	51	U
75-25-2	Bromoform	51	U
108-01-1	4-Methyl-2-Pentanone	16	JD
591-78-6	2-Hexanone	51	U
127-18-4	Tetrachloroethene	72	D
79-34-5	1,1,2,2-Tetrachloroethane	51	U
108-88-3	Toluene	130	D
108-90-7	Chlorobenzene	8	JD
100-41-4	Ethylbenzene	11	JD
100-42-5	Styrene	51	U
1330-20-7	M+P-Xylene	43	JD
1330-20-7	O-Xylene	46	JD

FORM I-CLP-VOA

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S34

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 5.0 gr
Level: Low
% Moisture: 3
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

SDG No: S1
Lab Sample ID: 69040
Lab File ID: J7654
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/kg	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	1	J
75-00-3	Chloroethane	4	J
75-09-2	Methylene Chloride	6	J
67-64-1	Acetone	56	
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	27	
540-59-0	1,2-Dichloroethene(total)	190	
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	7	J
78-93-3	2-Butanone	19	
71-55-6	1,1,1-Trichloroethane	~~930~~	E
56-23-5	Carbon tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
7-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene OK	~~370~~	E
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	3	J
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-01-1	4-Methyl-2-Pentanone	41	
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	63	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	~~220~~	E
108-90-7	Chlorobenzene	6	J
100-41-4	Ethylbenzene	11	
100-42-5	Styrene	10	U
1330-20-7	M+P-Xylene	49	
1330-20-7	O-Xylene	36	

FORM I-CLP-VOA

1234

1.2 ppm

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S34DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 2.5 gr
Level: Low
% Moisture: 3
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

SDG No: S1
Lab Sample ID: 89040DL
Lab File ID: J7655
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/kg	Q
74-87-3	Chloromethane	21	U
74-83-9	Bromomethane	21	U
75-01-4	Vinyl Chloride	21	U
75-00-3	Chloroethane	4	JD
75-09-2	Methylene Chloride	7	JD
67-64-1	Acetone	28	D
75-15-0	Carbon Disulfide	21	U
75-35-4	1,1-Dichloroethene	21	U
75-34-3	1,1-Dichloroethane	22	D
540-59-0	1,2-Dichloroethene(total)	220	D
67-66-3	Chloroform	3	JD
107-06-2	1,2-Dichloroethane	5	JD
78-93-3	2-Butanone	6	JD
71-55-6	1,1,1-Trichloroethane	220	D
56-23-5	Carbon tetrachloride	21	U
75-27-4	Bromodichloromethane	21	U
7-87-5	1,2-Dichloropropane	21	U
10061-01-5	cis-1,3-Dichloropropene	21	U
79-01-6	Trichloroethene	370	D
124-48-1	Dibromochloromethane	21	U
79-00-5	1,1,2-Trichloroethane	21	U
71-43-2	Benzene	2	JD
10061-02-6	trans-1,3-Dichloropropene	21	U
75-25-2	Bromoform	21	U
108-01-1	4-Methyl-2-Pentanone	11	JD
591-78-6	2-Hexanone	21	U
127-18-4	Tetrachloroethene	59	D
79-34-5	1,1,2,2-Tetrachloroethane	21	U
108-88-3	Toluene	120	D
108-90-7	Chlorobenzene	6	JD
100-41-4	Ethylbenzene	7	JD
100-42-5	Styrene	21	U
1330-20-7	M+P-Xylene	33	D
1330-20-7	O-Xylene	27	D

FORM I-CLP-VOA

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S35

SDG No: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 5.0 gr
Level: Low
% Moisture: 4
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

Lab Sample ID: 69041
Lab File ID: J7662
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/kg	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	6	J
67-64-1	Acetone	50	
75-15-0	Carbon Disulfide	2	J
75-35-4	1,1-Dichloroethene	3	J
75-34-3	1,1-Dichloroethane	26	
540-59-0	1,2-Dichloroethene(total)	160	
67-66-3	Chloroform	5	J
107-06-2	1,2-Dichloroethane	7	J
78-93-3	2-Butanone	10	J
71-55-6	1,1,1-Trichloroethane	~~370~~	E
56-23-5	Carbon tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
7-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	~~630~~	E
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	3	J
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-01-1	4-Methyl-2-Pentanone	55	
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	170	
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	~~380~~	E
108-90-7	Chlorobenzene	8	J
100-41-4	Ethylbenzene	26	
100-42-5	Styrene	10	U
1330-20-7	M+P-Xylene	130	
1330-20-7	O-Xylene	64	

FORM I-CLP-VOA

SEND LATER

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S35DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 2.5 gr
Level: Low
% Moisture: 4
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

SDG No: S1
Lab Sample ID: 69041DL
Lab File ID: J7656
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	21	U
74-83-9	Bromomethane	21	U
75-01-4	Vinyl Chloride	21	U
75-00-3	Chloroethane	21	U
75-09-2	Methylene Chloride	3	JD
67-64-1	Acetone	18	JD
75-15-0	Carbon Disulfide	21	U
75-35-4	1,1-Dichloroethene	21	U
75-34-3	1,1-Dichloroethane	5	JD
540-59-0	1,2-Dichloroethene(total)	36	D
67-66-3	Chloroform	21	U
107-06-2	1,2-Dichloroethane	21	U
78-93-3	2-Butanone	21	U
71-55-6	1,1,1-Trichloroethane	83	D
56-23-5	Carbon tetrachloride	21	U
75-27-4	Bromodichloromethane	21	U
7-87-5	1,2-Dichloropropane	21	U
10061-01-5	cis-1,3-Dichloropropene	21	U
79-01-6	Trichloroethene	160	D
124-48-1	Dibromochloromethane	21	U
79-00-5	1,1,2-Trichloroethane	21	U
71-43-2	Benzene	21	U
10061-02-6	trans-1,3-Dichloropropene	21	U
75-25-2	Bromoform	21	U
108-01-1	4-Methyl-2-Pentanone	5	JD
591-78-6	2-Hexanone	21	U
127-18-4	Tetrachloroethene	37	D
79-34-5	1,1,2,2-Tetrachloroethane	21	U
108-88-3	Toluene	68	D
108-90-7	Chlorobenzene	2	JD
100-41-4	Ethylbenzene	5	JD
100-42-5	Styrene	21	U
1330-20-7	M+P-Xylene	28	D
1330-20-7	O-Xylene	18	JD

FORM I-CLP-VOA

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S36

SDG No: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 1.0 gr
Level: Low
% Moisture: 11
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

Lab Sample ID: 69042
Lab File ID: J7863
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	56	U
74-83-9	Bromomethane	56	U
75-01-4	Vinyl Chloride	56	U
75-00-3	Chloroethane	6	J
75-09-2	Methylene Chloride	15	J
67-64-1	Acetone	52	J
75-15-0	Carbon Disulfide	56	U
75-35-4	1,1-Dichloroethene	56	U
75-34-3	1,1-Dichloroethane	92	
540-59-0	1,2-Dichloroethene(total)	940	
67-66-3	Chloroform	18	J
107-06-2	1,2-Dichloroethane	23	J
78-93-3	2-Butanone	7	J
71-55-6	1,1,1-Trichloroethane	~~1400~~	E
56-23-5	Carbon tetrachloride	56	U
75-27-4	Bromodichloromethane	56	U
7-87-5	1,2-Dichloropropane	56	U
10061-01-5	cis-1,3-Dichloropropene	56	U
79-01-6	Trichloroethene	~~2100~~	E
124-48-1	Dibromochloromethane	56	U
79-00-5	1,1,2-Trichloroethane	56	U
71-43-2	Benzene	8	J
10061-02-6	trans-1,3-Dichloropropene	56	U
75-25-2	Bromoform	56	U
108-01-1	4-Methyl-2-Pentanone	81	
591-78-6	2-Hexanone	56	U
127-18-4	Tetrachloroethene	530	
79-34-5	1,1,2,2-Tetrachloroethane	56	U
108-88-3	Toluene	460	
108-90-7	Chlorobenzene	31	J
100-41-4	Ethylbenzene	43	J
100-42-5	Styrene	56	U
1330-20-7	M+P-Xylene	66	
1330-20-7	O-Xylene	170	

3800

3,000

FORM I-CLP-VOA

9.3 ppm
93%

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S36DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 11
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 69042DL
Lab File ID: Q8650
Date Received: 3/22/96
Date Analyzed: 3/22/96
Dilution Factor: 1.0
Soil Aliquot Volume: 100 ul

CAS NO.	COMPOUND	Conc Units ug/kg	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	1400	U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	1400	U
75-35-4	1,1-Dichloroethene	1400	U
75-34-3	1,1-Dichloroethane	1400	U
540-59-0	1,2-Dichloroethene(total)	570	JD
67-66-3	Chloroform	1400	U
107-06-2	1,2-Dichloroethane	1400	U
78-93-3	2-Butanone	1400	U
71-55-6	1,1,1-Trichloroethane	3800	D
56-23-5	Carbon tetrachloride	1400	U
75-27-4	Bromodichloromethane	1400	U
7-87-5	1,2-Dichloropropane	1400	U
10061-01-5	cis-1,3-Dichloropropene	1400	U
79-01-6	Trichloroethene	3000	D
124-48-1	Dibromochloromethane	1400	U
79-00-5	1,1,2-Trichloroethane	1400	U
71-43-2	Benzene	1400	U
10061-02-6	trans-1,3-Dichloropropene	1400	U
75-25-2	Bromoform	1400	U
108-01-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	1300	JD
79-34-5	1,1,2,2-Tetrachloroethane	1400	U
108-88-3	Toluene	1700	D
108-90-7	Chlorobenzene	1400	U
100-41-4	Ethylbenzene	220	JD
100-42-5	Styrene	1400	U
1330-20-7	M+P-Xylene	780	JD
1330-20-7	O-Xylene	770	JD

FORM I-CLP-VOA

3-152

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0965-08-6

SITE NAME: Rochester Fire Academy

SAMPLERS (SIGNATURE): J. Boyles

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Air	REMARKS
								ORDER #
SS-33	3/22/96	8:40	✓		< #10	1	X	TREATED 69039
SS-34	3/22/96	8:40	✓		> #10 < 1/4"	1	X	SAMPLES 69040
SS-35	3/22/96	8:40	✓		> 1/4"	1	X	69041
SS-36	3/22/96	8:40	✓		CONTROL	1	X	69042

RELINQUISHED BY (SIGNATURE): J. Boyles	DATE/TIME: 3/22 11:34	RECEIVED BY (SIGNATURE): Jack Bissell GSC	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE): JA Gardner	DATE/TIME: 3 22 96 1330	REMARKS:	

Distribution: Original accompanies shipment, copy to coordinator field files

General Testing Corporation

A Full Service Environmental Laboratory
Affiliated With Columbia Analytical Services, Inc.

Fax Cover Sheet

DATE: 3-26-96

TO: Jeanne Asquith
Kathy Unger

FROM: Cindy Toomey

PHONE: _____

FAX: 828-0431, *02

PHONE: (716) 454-3760

FAX: (716) 454-1245

RE: Fire Academy

CC: _____

Number of pages including cover sheet: 1

Message

710 Exchange Street • Rochester, NY 14608 • Tele: (716) 454-3760 • Fax: (716) 454-1245
65 Trinity Place • Hackensack, NJ 07601 • Tele: (201) 488-5242 • Fax: (201) 488-6368
435 Lawrence Bell Drive • Amherst, NY 14221 • Tele: (716) 634-0454 • Fax: (716) 634-9019

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S34DL

SDG No: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 1.0 gr
Level: Low
% Moisture: 3
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

Lab Sample ID: 69040DL
Lab File ID: J7663
Date Received: 3/22/96
Date Analyzed: 3/23/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	52	U
74-83-9	Bromomethane	52	U
75-01-4	Vinyl Chloride	52	U
75-00-3	Chloroethane	52	U
75-09-2	Methylene Chloride	6	JD
67-64-1	Acetone	31	JD
75-15-0	Carbon Disulfide	52	U
75-35-4	1,1-Dichloroethene	52	U
75-34-3	1,1-Dichloroethane	5	JD
540-59-0	1,2-Dichloroethene(total)	43	JD
67-66-3	Chloroform	52	U
107-06-2	1,2-Dichloroethane	52	U
78-93-3	2-Butanone	52	U
71-55-6	1,1,1-Trichloroethane	120	D
56-23-5	Carbon tetrachloride	52	U
75-27-4	Bromodichloromethane	52	U
7-87-5	1,2-Dichloropropane	52	U
10061-01-5	cis-1,3-Dichloropropene	52	U
79-01-6	Trichloroethene	210	D
124-48-1	Dibromochloromethane	52	U
79-00-5	1,1,2-Trichloroethane	52	U
71-43-2	Benzene	52	U
10061-02-6	trans-1,3-Dichloropropene	52	U
75-25-2	Bromoform	52	U
108-01-1	4-Methyl-2-Pentanone	52	U
591-78-6	2-Hexanone	52	U
127-18-4	Tetrachloroethene	52	U
79-34-5	1,1,2,2-Tetrachloroethane	52	U
108-88-3	Toluene	93	D
108-90-7	Chlorobenzene	52	U
100-41-4	Ethylbenzene	8	JD
100-42-5	Styrene	52	U
1330-20-7	M+P-Xylene	43	JD
1330-20-7	O-Xylene	29	JD

FORM I-CLP-VOA

General Testing Corporation

A Full Service Environmental Laboratory
Affiliated With Columbia Analytical Services, Inc.

Fax Cover Sheet

DATE: 3/22/96

TO: Malcolm Pirrie / Jeanne Asquith — PHONE: 828-1300 — FAX: 828-0431

FROM: Kathy Wager — PHONE: (716) 454-3760 — FAX: (716) 454-1245

RE: Fire Academy

CC:

Number of pages including cover sheet:

Message

Results for 4 Samples Received 3/21/96
96-3-152 SDG - S-1

710 Exchange Street • Rochester, NY 14606 • Tele: (716) 454-3760 • Fax: (716) 454-1245
85 Trinity Place • Hackensack, NJ 07601 • Tele: (201) 488-5242 • Fax: (201) 488-6386
435 Lawrence Bell Drive • Amherst, NY 14221 • Tele: (716) 634-0454 • Fax: (716) 634-9019

03-152 03-~~269~~ 3/21/96

MALCOLM PIRNIE, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 0965 ~~0965~~ 03 -08-6

SITE NAME: ROCHESTER FIRE ACADEMY

SAMPLERS (SIGNATURE): JOE BOYLES

	STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	01-1	REMARKS
69033	S-1	3/21/96	9am	X		QA/QC	1	X	— UNTREATED SAMPLE!
69035	S-2	3/21/96	8:40	X		< no. 10 SIEVE	1	X	
69037	S-3	3/21/96	8:45	X		< no. 10 < ~~no. 4~~ 4	1	X	
69038	S-4	3/21/96	8:50	X		> ~~no. 4~~ 4	1	X	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
Joseph R Boyles	3/21/96 11:08	L Wagner	L Wagner	3/21/96 12:30	Dick Cowen

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME	REMARKS
		Sandra	3/21/96 1740	

Distribution: Original accompanies shipment, copy to coordinator field files

General Testing Corporation

A Full Service Environmental Laboratory

Effective 10/30/95

GTC LIST OF QUALIFIERS

(The basis of this proposal are the EPA-CLP Qualifiers)

U - Indicates compound was analyzed for but was not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. For further explanation see case narrative / cover letter.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

N - Spiked sample recovery not within control limits.
(Flag the entire batch - Inorganic analysis only)

* - Duplicate analysis not within control limits.
(Flag the entire batch - Inorganic analysis only)

- Also used to qualify Organics QC data outside limits.

D - Spike diluted out.

S - Reported value determined by Method of Standard Additions. (MSA)

X - As specified in the case narrative.

GTC Lab ID # for State Certifications

NY ID # in Rochester: 10145
NY ID # in Hackensack: 10801
NY ID # in Massachusetts: M-NY032

NJ ID # in Rochester: 73331
NJ ID # in Hackensack: 02317

1A

VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: 321S1

SDG No: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 19
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

Lab Sample ID: 89033
Lab File ID: Q8645
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor 1.0
Soil Aliquot Volume: 20 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	7700	U
74-83-9	Bromomethane	7700	U
75-01-4	Vinyl Chloride	7700	U
75-00-3	Chloroethane	7700	U
75-09-2	Methylene Chloride	7700	U
67-64-1	Acetone	7700	U
75-15-0	Carbon Disulfide	7700	U
75-35-4	1,1-Dichloroethene	7700	U
75-34-3	1,1-Dichloroethane	7700	U
540-59-0	1,2-Dichloroethene(total)	9500	
67-66-3	Chloroform	7700	U
107-06-2	1,2-Dichloroethane	7700	U
78-93-3	2-Butanone	7700	U
71-55-6	1,1,1-Trichloroethane	470000	E
56-23-5	Carbon tetrachloride	7700	U
75-27-4	Bromodichloromethane	7700	U
7-87-5	1,2-Dichloropropane	7700	U
10061-01-5	cis-1,3-Dichloropropene	7700	U
79-01-6	Trichloroethene	320000	E
124-48-1	Dibromochloromethane	7700	U
79-00-5	1,1,2-Trichloroethane	7700	U
71-43-2	Benzene	7700	U
10061-02-6	trans-1,3-Dichloropropene	7700	U
75-25-2	Bromoform	7700	U
108-01-1	4-Methyl-2-Pentanone	7700	U
591-78-6	2-Hexanone	7700	U
127-18-4	Tetrachloroethene	97000	
79-34-5	1,1,2,2-Tetrachloroethane	7700	U
108-88-3	Toluene	110000	
108-90-7	Chlorobenzene	2000	J
100-41-4	Ethylbenzene	8900	
100-42-5	Styrene	7700	U
1330-20-7	m+p-Xylene	14000	
1330-20-7	o-Xylene	16000	

150,000

290,000

699.4 ppm

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: 321S1DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 19
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 69033DL
Lab File ID: Q8646
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor: 2.0
Soil Aliquot Volume: 10 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	31000	U
74-83-9	Bromomethane	31000	U
75-01-4	Vinyl Chloride	31000	U
75-00-3	Chloroethane	31000	U
75-09-2	Methylene Chloride	31000	U
67-64-1	Acetone	31000	U
75-15-0	Carbon Disulfide	31000	U
75-35-4	1,1-Dichloroethene	31000	U
75-34-3	1,1-Dichloroethane	31000	U
540-59-0	1,2-Dichloroethene(total)	31000	U
67-66-3	Chloroform	31000	U
107-06-2	1,2-Dichloroethane	31000	U
78-93-3	2-Butanone	31000	U
71-55-6	1,1,1-Trichloroethane	150000	D
56-23-5	Carbon tetrachloride	31000	U
75-27-4	Bromodichloromethane	31000	U
7-87-5	1,2-Dichloropropane	31000	U
10061-01-5	cis-1,3-Dichloropropene	31000	U
79-01-6	Trichloroethene	290000	D
124-48-1	Dibromochloromethane	31000	U
79-00-5	1,1,2-Trichloroethane	31000	U
71-43-2	Benzene	31000	U
10061-02-6	trans-1,3-Dichloropropene	31000	U
75-25-2	Bromoform	31000	U
108-01-1	4-Methyl-2-Pentanone	31000	U
591-78-6	2-Hexanone	31000	U
127-18-4	Tetrachloroethene	90000	D
79-34-5	1,1,2,2-Tetrachloroethane	31000	U
108-88-3	Toluene	100000	D
108-90-7	Chlorobenzene	31000	U
100-41-4	Ethylbenzene	31000	U
100-42-5	Styrene	31000	U
1330-20-7	m+p-Xylene	16000	J
1330-20-7	o-Xylene	20000	J

FORM I-CLP-VOA

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S2

SDG No: S1

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 10
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

Lab Sample ID: 69035
Lab File ID: Q8643
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor: 1.0
Soil Aliquot Volume: 100 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	1400	U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	1400	U
75-35-4	1,1-Dichloroethene	1400	U
75-34-3	1,1-Dichloroethane	1400	U
540-59-0	1,2-Dichloroethene(total)	4200	
67-66-3	Chloroform	1400	U
107-06-2	1,2-Dichloroethane	1400	U
78-93-3	2-Butanone	1400	U
71-55-6	1,1,1-Trichloroethane	13000	
56-23-5	Carbon tetrachloride	1400	U
75-27-4	Bromodichloromethane	1400	U
7-87-5	1,2-Dichloropropane	1400	U
10061-01-5	cis-1,3-Dichloropropene	1400	U
79-01-6	Trichloroethene	16000	
124-48-1	Dibromochloromethane	1400	U
79-00-5	1,1,2-Trichloroethane	1400	U
71-43-2	Benzene	1400	U
10061-02-6	trans-1,3-Dichloropropene	1400	U
75-25-2	Bromoform	1400	U
108-01-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	5700	
79-34-5	1,1,2,2-Tetrachloroethane	1400	U
108-88-3	Toluene	4200	
108-90-7	Chlorobenzene	1400	U
100-41-4	Ethylbenzene	530	J
100-42-5	Styrene	1400	U
1330-20-7	m+p-Xylene	1700	
1330-20-7	o-Xylene	3200	

FORM I-CLP-VOA

48.53 ppm

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S4

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 9
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 69038
Lab File ID: Q8642
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor: 1.0
Soil Aliquot Volume: 100 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	1400	U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	1400	U
75-35-4	1,1-Dichloroethene	1400	U
75-34-3	1,1-Dichloroethane	1400	U
540-59-0	1,2-Dichloroethene(total)	830	J
67-66-3	Chloroform	1400	U
107-06-2	1,2-Dichloroethane	1400	U
78-93-3	2-Butanone	1400	U
71-55-6	1,1,1-Trichloroethane	6500	
56-23-5	Carbon tetrachloride	1400	U
75-27-4	Bromodichloromethane	1400	U
7-87-5	1,2-Dichloropropane	1400	U
10061-01-5	cis-1,3-Dichloropropene	1400	U
79-01-6	Trichloroethene	8700	
124-48-1	Dibromochloromethane	1400	U
79-00-5	1,1,2-Trichloroethane	1400	U
71-43-2	Benzene	1400	U
10061-02-6	trans-1,3-Dichloropropene	1400	U
75-25-2	Bromoform	1400	U
108-01-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	1400	U
127-18-4	Tetrachloroethene	5200	
79-34-5	1,1,2,2-Tetrachloroethane	1400	U
108-88-3	Toluene	4800	
108-90-7	Chlorobenzene	1400	U
100-41-4	Ethylbenzene	710	J
100-42-5	Styrene	1400	U
1330-20-7	m+p-Xylene	2700	
1330-20-7	o-Xylene	2200	

FORM I-CLP-VOA

31.44 ppm

31,440
31.4 ppm

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S3

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 1.0 gr
Level: Low
% Moisture: 12
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: ul

SDG No: S1
Lab Sample ID: 69037
Lab File ID: J7648
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor: 1.0
Soil Aliquot Volume: ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q	
74-87-3	Chloromethane	57	U	
74-83-9	Bromomethane	57	U	
75-01-4	Vinyl Chloride	57	U	
75-00-3	Chloroethane	8	J	
75-09-2	Methylene Chloride	22	J	
67-64-1	Acetone	17	J	
75-15-0	Carbon Disulfide	57	U	
75-35-4	1,1-Dichloroethene	11	J	
75-34-3	1,1-Dichloroethane	110		
540-59-0	1,2-Dichloroethene(total)	~~1200~~	E	5000
67-66-3	Chloroform	20	J	
107-06-2	1,2-Dichloroethane	27	J	
78-93-3	2-Butanone	57	U	
71-55-6	1,1,1-Trichloroethane	~~1800~~	E	8100
56-23-5	Carbon tetrachloride	57	U	
75-27-4	Bromodichloromethane	57	U	
7-87-5	1,2-Dichloropropane	57	U	
10061-01-5	cis-1,3-Dichloropropene	57	U	
79-01-6	Trichloroethene	~~2900~~	E	16000
124-48-1	Dibromochloromethane	57	U	
79-00-5	1,1,2-Trichloroethane	57	U	
71-43-2	Benzene	9	J	
10061-02-6	trans-1,3-Dichloropropene	57	U	
75-25-2	Bromoform	57	U	
108-01-1	4-Methyl-2-Pentanone	57	U	
591-78-6	2-Hexanone	57	U	
127-18-4	Tetrachloroethene	850		
79-34-5	1,1,2,2-Tetrachloroethane	57	U	
108-88-3	Toluene	190		
108-90-7	Chlorobenzene	37	J	
100-41-4	Ethylbenzene	38	J	
100-42-5	Styrene	57	U	
1330-20-7	m+p-Xylene	27	J	
1330-20-7	o-Xylene	250		

FORM I-CLP-VOA

30.6 ppm

1A
VOLATILE ORGANICS ANALYSIS SHEET

NYSDEC SAMP NO: S3DL

Lab Name: General Testing Corp
Lab Code: 10145
Matrix: Soil
Sample vol: 4.0 gr
Level: Med
% Moisture: 12
Gc Column: Rtx-502 ID 0.53mm
Soil Extract Volume: 10000 ul

SDG No: S1
Lab Sample ID: 69037DL
Lab File ID: Q8644
Date Received: 3/21/96
Date Analyzed: 3/22/96
Dilution Factor: 1.0
Soil Aliquot Volume: 100 ul

CAS NO.	COMPOUND	Conc Units ug/Kg	Q
74-87-3	Chloromethane	1400	U
74-83-9	Bromomethane	1400	U
75-01-4	Vinyl Chloride	1400	U
75-00-3	Chloroethane	1400	U
75-09-2	Methylene Chloride	1400	U
67-64-1	Acetone	1400	U
75-15-0	Carbon Disulfide	1400	U
75-35-4	1,1-Dichloroethene	1400	U
75-34-3	1,1-Dichloroethane	5000	D
540-59-0	1,2-Dichloroethene(total)	1400	U
67-66-3	Chloroform	1400	U
107-06-2	1,2-Dichloroethane	1400	U
78-93-3	2-Butanone	8100	D
71-55-6	1,1,1-Trichloroethane	1400	U
56-23-5	Carbon tetrachloride	1400	U
75-27-4	Bromodichloromethane	1400	U
7-87-5	1,2-Dichloropropane	1400	U
10061-01-5	cis-1,3-Dichloropropene	16000	D
79-01-6	Trichloroethene	1400	U
124-48-1	Dibromochloromethane	1400	U
79-00-5	1,1,2-Trichloroethane	1400	U
71-43-2	Benzene	1400	U
10061-02-6	trans-1,3-Dichloropropene	1400	U
75-25-2	Bromoform	1400	U
108-01-1	4-Methyl-2-Pentanone	1400	U
591-78-6	2-Hexanone	4800	D
127-18-4	Tetrachloroethene	1400	U
79-34-5	1,1,2,2-Tetrachloroethane	3700	D
108-88-3	Toluene	1400	U
108-90-7	Chlorobenzene	510	JD
100-41-4	Ethylbenzene	1400	U
100-42-5	Styrene	1500	D
1330-20-7	m+p-Xylene	2300	D
1330-20-7	o-Xylene		

FORM I-CLP-VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S27

Name:Columbia Analytical Contract:MPirnie

Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70573

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8735

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 23 Date Analyzed: 4/08/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1600.	U
74-83-9	Bromomethane	1600.	U
75-01-4	Vinyl chloride	1600.	U
75-00-3	Chloroethane	1600.	U
75-09-2	Methylene chloride	1600.	U
67-64-1	Acetone	1600.	U
75-15-0	Carbon Disulfide	1600.	U
75-35-4	1,1-Dichloroethene	1600.	U
75-34-3	1,1-Dichloroethane	1600.	U
156-60-5	trans-1,2-Dichloroethene	1600.	U
67-66-3	Chloroform	1600.	U
107-06-2	1,2-Dichloroethane	1600.	U
78-93-3	2-Butanone	1600.	U
156-59-2	cis-1,2-Dichloroethene	5300.	
71-55-6	1,1,1-Trichloroethane	12000.	
56-23-5	Carbon tetrachloride	1600.	U
75-27-4	Bromodichloromethane	1600.	U
78-87-5	1,2-Dichloropropane	1600.	U
10061-01-5	cis-1,3-Dichloropropene	1600.	U
79-01-6	Trichloroethene	16000.	
124-48-1	Dibromochloromethane	1600.	U
79-00-5	1,1,2-Trichloroethane	1600.	U
71-43-2	Benzene	1600.	U
10061-02-6	trans-1,3-Dichloropropene	1600.	U
75-25-2	Bromoform	1600.	U
108-10-1	4-Methyl-2-Pentanone	1600.	U
591-78-6	2-Hexanone	1600.	U
127-18-4	Tetrachloroethene	3500.	
79-34-5	1,1,2,2-Tetrachloroethane	1600.	U
108-88-3	Toluene	3500.	
108-90-7	Chlorobenzene	1600.	U
100-41-4	Ethylbenzene	390.	J
100-42-5	Styrene	1600.	U
108-38-3	(m+p)Xylene	1600.	
95-47-6	o-Xylene	1800.	

44.09 ppm

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

S27

) Name:Columbia Analytical Contract:MPirnie

) Code:10145 Case No.: SAS No.: SDG No.:S27

rix: (soil/water) SOIL Lab Sample ID:70573

ple wt/vol: 4.00 (g/ml) G Lab File ID: Q8735

el: (low/med) MED Date Received: 4/01/96

oisture: not dec. 23 Date Analyzed: 4/08/96

Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

l Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

ber TICs Found: 10 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.09	3600.	J
2.		Unknown Hydrocarbon	21.38	6100.	J
3.		Unknown Hydrocarbon	22.01	4500.	J
4.		Unknown Hydrocarbon	23.28	5800.	J
5.		Unknown Hydrocarbon	24.38	4300.	J
6.		Unknown Aromatic Hydrocarbon	24.57	3300.	J
7.		Unknown Aromatic Hydrocarbon	24.78	6200.	J
8.		Unknown Hydrocarbon	26.34	2300.	J
9.		Unknown aromatic Hydrocarbon	26.89	2500.	J
10.		Unknown	33.30	3900.	J
11.					
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S28

Name:Columbia Analytical Contract:MPirnie

Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70574

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8724

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 32 Date Analyzed: 4/05/96

Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1800.	U
74-83-9	Bromomethane	1800.	U
75-01-4	Vinyl chloride	1800.	U
75-00-3	Chloroethane	1800.	U
75-09-2	Methylene chloride	1800.	U
67-64-1	Acetone	1800.	U
75-15-0	Carbon Disulfide	1800.	U
75-35-4	1,1-Dichloroethene	1800.	U
75-34-3	1,1-Dichloroethane	1800.	U
156-60-5	trans-1,2-Dichloroethene	1800.	U
67-66-3	Chloroform	1800.	U
107-06-2	1,2-Dichloroethane	1800.	U
78-93-3	2-Butanone	2800.	
156-59-2	cis-1,2-Dichloroethene	3500.	
71-55-6	1,1,1-Trichloroethane	1800.	U
56-23-5	Carbon tetrachloride	1800.	U
75-27-4	Bromodichloromethane	1800.	U
78-87-5	1,2-Dichloropropane	1800.	U
10061-01-5	cis-1,3-Dichloropropene	6200.	
79-01-6	Trichloroethene	1800.	U
124-48-1	Dibromochloromethane	1800.	U
79-00-5	1,1,2-Trichloroethane	1800.	U
71-43-2	Benzene	1800.	U
10061-02-6	trans-1,3-Dichloropropene	1800.	U
75-25-2	Bromoform	1800.	U
108-10-1	4-Methyl-2-Pentanone	1800.	U
591-78-6	2-Hexanone	1800.	U
127-18-4	Tetrachloroethene	1800.	
79-34-5	1,1,2,2-Tetrachloroethane	1800.	U
108-88-3	Toluene	710.	J
108-90-7	Chlorobenzene	1800.	U
100-41-4	Ethylbenzene	1800.	U
100-42-5	Styrene	1800.	U
108-38-3	(m+p)Xylene	440.	J
95-47-6	o-Xylene	670.	J

16.17 ppm

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

S28

Name:Columbia Analytical Contract:MPirnie

Code:10145 Case No.: SAS No.: SDG No.:S27

Lab Sample ID:70574

Lab File ID: Q8724

Date Received: 4/01/96

Date Analyzed: 4/05/96

Dilution Factor: 1.0

Soil Aliquot Volume: 100.0 (uL)

:ix: (soil/water) SOIL

ple wt/vol: 4.00 (g/ml) G

el: (low/med) MED

oisture: not dec. 32

Column:RTX-502 ID: 0.53 (mm)

l Extract Volume:10000.00 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

ber TICs Found: 10

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.14	4700.	J
2.		Unknown Hydrocarbon	21.37	5400.	J
3.		Unknown Hydrocarbon	21.99	5100.	J
4.		Unknown Hydrocarbon	23.50	2000.	J
5.		Unknown Hydrocarbon	24.36	5300.	J
6.		Unknown aromatic Hydrocarbon	24.57	2500.	J
7.		Unknown	24.79	4000.	J
8.		Unknown	26.36	2100.	J
9.		Unknown Hydrocarbon	27.09	1700.	J
0.		Unknown	33.31	3300.	J
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S29

ab Name:Columbia Analytical Contract:MPirnie

ab Code:10145 Case No.: SAS No.: SDG No.:S27

atrix: (soil/water) SOIL Lab Sample ID:70575

ample wt/vol: 4.00 (g/ml) G Lab File ID: Q8729

evel: (low/med) MED Date Received: 4/01/96

Moisture: not dec. 6 Date Analyzed: 4/05/96

C Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

oil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1300.	U
74-83-9	Bromomethane	1300.	U
75-01-4	Vinyl chloride	1300.	U
75-00-3	Chloroethane	1300.	U
75-09-2	Methylene chloride	1300.	U
67-64-1	Acetone	1300.	U
75-15-0	Carbon Disulfide	1300.	U
75-35-4	1,1-Dichloroethene	1300.	U
75-34-3	1,1-Dichloroethane	1300.	U
156-60-5	trans-1,2-Dichloroethene	1300.	U
67-66-3	Chloroform	1300.	U
107-06-2	1,2-Dichloroethane	1300.	U
78-93-3	2-Butanone	2000.	
156-59-2	cis-1,2-Dichloroethene	4300.	
71-55-6	1,1,1-Trichloroethane	1300.	U
56-23-5	Carbon tetrachloride	1300.	U
75-27-4	Bromodichloromethane	1300.	U
78-87-5	1,2-Dichloropropane	1300.	U
10061-01-5	cis-1,3-Dichloropropene	11000.	
79-01-6	Trichloroethene	1300.	U
124-48-1	Dibromochloromethane	1300.	U
79-00-5	1,1,2-Trichloroethane	1300.	U
71-43-2	Benzene	1300.	U
50061-02-6	trans-1,3-Dichloropropene	1300.	U
75-25-2	Bromoform	1300.	U
108-10-1	4-Methyl-2-Pentanone	1300.	U
591-78-6	2-Hexanone	1700.	
127-18-4	Tetrachloroethene	1300.	U
79-34-5	1,1,2,2-Tetrachloroethane	2400.	
108-88-3	Toluene	1300.	U
108-90-7	Chlorobenzene	210.	J
100-41-4	Ethylbenzene	1300.	U
100-42-5	Styrene		
		1400.	
108-38-3	(m+p)Xylene	730.	J
95-47-6	o-Xylene		

2374 PPM

00012

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

S29

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70575

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8729

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 6 Date Analyzed: 4/05/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs Found: 10

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.17	2200.	J
2.		Unknown Hydrocarbon	21.36	4200.	J
3.		Unknown Hydrocarbon	21.96	2100.	J
4.		Unknown Hydrocarbon	23.23	1800.	J
5.		Unknown Hydrocarbon	24.33	2300.	J
6.		Unknown aromatic Hydrocarbon	24.71	1500.	J
7.		Unknown	33.29	14000.	J
8.		Unknown	33.87	1200.	J
9.		Unknown	34.44	2100.	J
10.		Unknown	34.72	4000.	J
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EPA SAMPLE NO.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S30

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70576

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8723

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 27 Date Analyzed: 4/05/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1700.	U
74-83-9	Bromomethane	1700.	U
75-01-4	Vinyl chloride	1700.	U
75-00-3	Chloroethane	1700.	U
75-09-2	Methylene chloride	1700.	U
67-64-1	Acetone	1700.	U
75-15-0	Carbon Disulfide	1700.	U
75-35-4	1,1-Dichloroethene	1700.	U
75-34-3	1,1-Dichloroethane	1700.	U
156-60-5	trans-1,2-Dichloroethene	1700.	U
67-66-3	Chloroform	1700.	U
107-06-2	1,2-Dichloroethane	1700.	U
78-93-3	2-Butanone	1700.	U
156-59-2	cis-1,2-Dichloroethene	4300.	
71-55-6	1,1,1-Trichloroethane	8700.	
56-23-5	Carbon tetrachloride	1700.	U
75-27-4	Bromodichloromethane	1700.	U
78-87-5	1,2-Dichloropropane	1700.	U
10061-01-5	cis-1,3-Dichloropropene	1700.	U
79-01-6	Trichloroethene	12000.	
124-48-1	Dibromochloromethane	1700.	U
79-00-5	1,1,2-Trichloroethane	1700.	U
71-43-2	Benzene	1700.	U
50061-02-6	trans-1,3-Dichloropropene	1700.	U
75-25-2	Bromoform	1700.	U
108-10-1	4-Methyl-2-Pentanone	580.	J
591-78-6	2-Hexanone	1700.	U
127-18-4	Tetrachloroethene	2600.	
79-34-5	1,1,2,2-Tetrachloroethane	1700.	U
108-88-3	Toluene	2800.	
108-90-7	Chlorobenzene	1700.	U
100-41-4	Ethylbenzene	370.	J
100-42-5	Styrene	1700.	U
108-38-3	(m+p)Xylene	1100.	J
95-47-6	o-Xylene	1400.	J

33.85 ppm

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: S30

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70576

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8723

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 27 Date Analyzed: 4/05/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs Found: 10

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.09	2800.	J
2.		Unknown Hydrocarbon	21.36	3900.	J
3.		Unknown Hydrocarbon	21.99	3500.	J
4.		Unknown Hydrocarbon	23.28	2900.	J
5.		Unknown Hydrocarbon	24.38	3600.	J
6.		Unknown aromatic Hydrocarbon	24.57	2300.	J
7.		Unknown aromatic Hydrocarbon	24.78	4500.	J
8.		Unknown	26.32	2400.	J
9.		Unknown	33.33	15000.	J
10.		Unknown	34.84	5100.	J
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S31

) Name:Columbia Analytical Contract:MPirnie

) Code:10145 Case No.: SAS No.: SDG No.:S27

:rix: (soil/water) SOIL Lab Sample ID:70577

mple wt/vol: 4.00 (g/ml) G Lab File ID: Q8734

vel: (low/med) MED Date Received: 4/01/96

Moisture: not dec. 33 Date Analyzed: 4/08/96

Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

il Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	1900.	U
74-83-9	Bromomethane	1900.	U
75-01-4	Vinyl chloride	1900.	U
75-00-3	Chloroethane	1900.	U
75-09-2	Methylene chloride	1900.	U
67-64-1	Acetone	1900.	U
75-15-0	Carbon Disulfide	1900.	U
75-35-4	1,1-Dichloroethene	1900.	U
75-34-3	1,1-Dichloroethane	1900.	U
156-60-5	trans-1,2-Dichloroethene	1900.	U
67-66-3	Chloroform	1900.	U
107-06-2	1,2-Dichloroethane	1900.	U
78-93-3	2-Butanone	2400.	
156-59-2	cis-1,2-Dichloroethene	3100.	
71-55-6	1,1,1-Trichloroethane	1900.	U
56-23-5	Carbon tetrachloride	1900.	U
75-27-4	Bromodichloromethane	1900.	U
78-87-5	1,2-Dichloropropane	1900.	U
10061-01-5	cis-1,3-Dichloropropene	5600.	
79-01-6	Trichloroethene	1900.	U
124-48-1	Dibromochloromethane	1900.	U
79-00-5	1,1,2-Trichloroethane	1900.	U
71-43-2	Benzene	1900.	U
50061-02-6	trans-1,3-Dichloropropene	1900.	U
75-25-2	Bromoform	1900.	U
108-10-1	4-Methyl-2-Pentanone	1900.	U
591-78-6	2-Hexanone	1100.	J
127-18-4	Tetrachloroethene	1900.	U
79-34-5	1,1,2,2-Tetrachloroethane	880.	J
108-88-3	Toluene	1900.	U
108-90-7	Chlorobenzene	1900.	U
100-41-4	Ethylbenzene	1900.	U
100-42-5	Styrene		
		310.	J
108-38-3	(m+p)Xylene	490.	J
95-47-6	o-Xylene		

13.8% PM

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

S31

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70577

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8734

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 33 Date Analyzed: 4/08/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 100.0 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs Found: 8

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.22	2300.	J
2.		Unknown Hydrocarbon	21.41	5100.	J
3.		Unknown Hydrocarbon	22.01	3100.	J
4.		Unknown Hydrocarbon	24.36	2400.	J
5.		Unknown Hydrocarbon	26.30	1500.	J
6.		Unknown Hydrocarbon	27.05	1000.	J
7.		Unknown aromatic Hydrocarbon	27.84	950.	J
8.		Unknown	33.24	1500.	J
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

S32

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70578

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8728

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 9 Date Analyzed: 4/05/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 20.0 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	6900.	U
74-83-9	Bromomethane	6900.	U
75-01-4	Vinyl chloride	6900.	U
75-00-3	Chloroethane	6900.	U
75-09-2	Methylene chloride	6900.	U
67-64-1	Acetone	6900.	U
75-15-0	Carbon Disulfide	6900.	U
75-35-4	1,1-Dichloroethene	6900.	U
75-34-3	1,1-Dichloroethane	6900.	U
156-60-5	trans-1,2-Dichloroethene	6900.	U
67-66-3	Chloroform	6900.	U
107-06-2	1,2-Dichloroethane	6900.	U
78-93-3	2-Butanone	2300.	J
156-59-2	cis-1,2-Dichloroethene	98000.	
71-55-6	1,1,1-Trichloroethane	6900.	U
56-23-5	Carbon tetrachloride	6900.	U
75-27-4	Bromodichloromethane	6900.	U
78-87-5	1,2-Dichloropropane	6900.	U
10061-01-5	cis-1,3-Dichloropropene	33000.	
79-01-6	Trichloroethene	6900.	U
124-48-1	Dibromochloromethane	6900.	U
79-00-5	1,1,2-Trichloroethane	6900.	U
71-43-2	Benzene	6900.	U
50061-02-6	trans-1,3-Dichloropropene	6900.	U
75-25-2	Bromoform	6900.	U
108-10-1	4-Methyl-2-Pentanone	6900.	U
591-78-6	2-Hexanone	24000.	
127-18-4	Tetrachloroethene	6900.	U
79-34-5	1,1,2,2-Tetrachloroethane	31000.	
108-88-3	Toluene	6900.	U
108-90-7	Chlorobenzene	2900.	J
100-41-4	Ethylbenzene	6900.	U
100-42-5	Styrene		
108-38-3	(m+p)Xylene	17000.	
95-47-6	o-Xylene	9100.	

217.3 ppm

1E

EPA SAMPLE NO.

S32

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name:Columbia Analytical Contract:MPirnie

Lab Code:10145 Case No.: SAS No.: SDG No.:S27

Matrix: (soil/water) SOIL Lab Sample ID:70578

Sample wt/vol: 4.00 (g/ml) G Lab File ID: Q8728

Level: (low/med) MED Date Received: 4/01/96

% Moisture: not dec. 9 Date Analyzed: 4/05/96

GC Column:RTX-502 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:10000.00 (uL) Soil Aliquot Volume: 20.0 (uL)

Number TICs Found: 10 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		Unknown Hydrocarbon	20.10	9100.	J
2.		Unknown Hydrocarbon	21.37	11000.	J
3.		Unknown	21.99	10000.	J
4.	526-73-8	Benzene, 1,2,3-trimethyl-	22.97	11000.	JN
5.		Unknown Hydrocarbon	23.28	6700.	J
6.	526-73-8	Benzene, 1,2,3-trimethyl-	24.14	7400.	JN
7.		Unknown	24.36	7300.	J
8.		Unknown aromatic Hydrocarbon	24.74	12000.	J
9.		Unknown	33.32	39000.	J
10.		Unknown	34.73	12000.	J
11.					
12.					
13.					
14.					
15.					
16.					
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MALCOLM PIRNIE

APPENDIX B

STUDY SCOPE

March 14, 1996

Mr. Mark Gregor
Environmental Specialist
Department of Environmental Services
30 Church Street
Rochester, New York 14614

Re: Bench Scale Soil Volatilization Study

Dear Mark:

We have enclosed the final draft of the bench-scale soil volatilization study scope. We have incorporated NYSDEC comments based on our conversation with Amarinderjit Nagi and Bob Cozzi last week.

We have also attached a breakdown of the budget for the attached study scope. The budget illustrates that the labor associated with the attached scope of work totals $8000.00 and that analytical costs could range from $12,000.00 to $17,000.00 depending on the number of samples analyzed. Malcolm Pirnie negotiated extremely favorable analytical unit rates with the laboratory in order to keep the costs of the study down. Additionally, all physical soils testing described as part of this study is being performed at no cost to the City. We will also perform videotaping of each study step as well as project management and coordination of this study at no cost to the City. We consider these efforts to be Malcolm Pirnie's contribution to the study.

Based on your verbal authorization to proceed, we have collected the bulk sample from the site today and will perform the initial sample mixing and characterization as described in the attached scope. Assuming the sample contains sufficient VOCs we will initiate the study in accordance with the attached scope on Monday March 18, 1996. As we have discussed, results from the first round of the study (Step 3 of the attached scope) will be discussed with you and the NYSDEC prior to initiating any further study steps. If you have any further questions or comments regarding the scope, budget or proposed schedule or approach, please contact us immediately.

Very truly yours,

MALCOLM PIRNIE, INC.

Paul H. Werthman, P.E.
Vice President

Anne Marie C. McManus, P.E.
Associate

0965-086
plb/ACM03116.L1

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

STUDY OBJECTIVES

The overall objectives of this laboratory study are to illustrate the rate of volatilization of volatile organic contaminants from South Disposal Area soils and to demonstrate that the target cleanup concentration can be achieved. The study is designed to illustrate the impact of the variables of particle size and temperature on the rate of volatilization.

PROCEDURE

1. Sample Collection

A. Obtain a representative sample from the on-site stockpile. Special attention should be taken to ensure the soil is representative by collecting from various places within the stockpile.

B. The samples should then be combined and thoroughly mixed. This may entail breaking apart the bigger clods of soil with a spade or shovel. As soon as the material is sufficiently homogenous, a representative sample will be collected for volatile organic analysis, particle size distribution ASTM D422, moisture content ASTM D2216, and Atterberg limits ASTM D4318 with the remainder returned into pails. The pails should be packed full, thoroughly sealed, placed in a cooler with ice and transported to Malcolm Pirnie's Soils Testing Laboratory. If it is not possible to adequately mix the soil in the field due to the frozen condition of the soil, the material will be packed as tightly as possible into buckets for transportation to the lab. Following receipt at the lab, the material will be removed from the buckets and warmed to room temperature for easier mixing and characterization. Six five-gallon pails of material should be sufficient to satisfy laboratory requirements.

2. Sample Preparation/Conditioning

A. At the soils lab, following mixing, the soil will be split into three piles. One pile will be placed in uncovered stainless pans. The remaining piles will be returned to the buckets for cool storage. The sample will then be air dried at 68°F (+/-4° F). Room temperature and relative humidity will be recorded periodically for the duration of the test. The drying process will continue until the soil moisture content is below the plastic limit (i.e., it crumbles rather than molds). The time at which moisture content samples are collected to establish this condition will be recorded. To facilitate air drying, a mechanical fan will circulate air across the

sample and the sample will be manually turned using a spatula every 30 to 60 minutes during normal laboratory operating hours to periodically expose all particles to the ambient air. The samples will be turned at least every 30 minutes early in the drying process.

B. At the conclusion of the initial drying period, the material will be crushed using a rubber mallet. Debris or rock larger than 1-inch will be discarded Soil clumps larger than 1-inch will be broken down further. The crushed pieces will be dry-sieved on two sieves, the 1/4" and No. 10 sieves. Material retained on each of the sieves will be placed in separate pans with the remainder (<No. 10 sieve) in a third pan (two pans of each size fraction will be prepared in order to have enough quantity for sampling). An aliquot of each pan will be collected to establish a dried and crushed particle size distribution for each size fraction. Following sieving, no further crushing or intentional particle size reduction will be performed.

C. A portion of the ¼-inch size fraction will be prepared as a control. The control sample will be placed outdoors and the air temperature will be recorded regularly to document the conditions to which the sample is exposed. This sample will be manually turned on the same frequency as the study samples.

3. ***Baseline Enhanced Volatilization***

A. Enhanced volatilization (using the same manual turning of the samples as described previously) will resume on the segregated material at ambient room temperature and on the control sample. At the beginning of this volatilization period, and at each subsequent hour for 8 hours, and at 12 and 24 hours, two composite samples of the soil will be taken from each sample fraction plus the control sample. The first sample will be used to perform screening headspace analysis (using an Hnu photoionization detector), as well as, moisture content determination. The second sample will be retained for possible quantitiative VOC analysis. Not all of the samples will be quantitatively analyzed for volatile organics.

B. Initially, the samples taken at the beginning and at the end of the first 24-hour cycle will be tested. Testing will be expedited (24-hour turnaround) to facilitate the analytical decision-making process and to expedite completion of the testing program. Only if the initial results show a measurable drop in VOCs will additional samples within the 24-hour cycle be analyzed. If the initial results illustrate a significant decrease in VOC concentration within 24 hours (i.e., to near or below 10 ppm), the qualitative headspace results will be used to decide which, if any, of the intermediate samples collected should be analyzed to better define the rate of volatilization. Quantitative samples will be analyzed up to the point where the VOC concentration drops below 10 ppm.

C. A plot will be generated from the accumulated data of soil VOC concentrations vs. time for each size fraction. Another plot will be generated detailing the drying process (Moisture Content vs. Time).

D. If initial results do not illustrate a significant decrease in VOC content after 24 hours at ambient temperatures, the test will be continued for up to five days with samples for moisture content and VOC content measured at every 24-hour interval.

4. Enhanced Volatilization at Elevated Temperature

Another round of preparation and testing identical to the first round will occur on a fresh sample of each size fraction (the next 1/3 of each bucket), but at an elevated temperature of 120°F - unless the testing at ambient temperature shows VOC concentrations less than 10 ppm are achieved within less than one hour for any given size fraction. Should a temperature of 120°F fail to volatilize the organics, a third round of testing would be performed at 220°F only on that particle size fraction with measurable VOCs remaining after one hour from the 120°F test.

5. Sampling and Analytical QA/QC

A chain-of-custody record will be maintained from the time of sample collection. Immediately following sample collection, each sample container will be marked with the following information:

- Sample Code
- Project Number
- Date/Time
- Sample Type
- Sampler's Initials

The sample code will indicate the site location, media sampled, and sample station.

After sample identification information has been recorded, the sample will be prepared for shipment in accordance with ASTM D421 and hand-delivered to Malcolm Pirnie's Soils Testing Laboratory. Each sample label will be covered with waterproof clear plastic tape to preserve its integrity. Samples will be recorded and tracked under strict chain-of-custody protocols. In the field, each sample will be sealed and checked for proper labeling. Samples will then be packed into coolers with ice and shipped to the laboratory. The Chain-of-Custody form will be signed and dated by the person who collected the samples, the person the samples were relinquished to for transport to the laboratory, and the laboratory sample controller/custodian who receives the samples. Sample handling will be performed in accordance with ASTM D4220. Samples will be analyzed for physical characteristics in accordance with ASTM methodologies; ASTM D2216- moisture content, ASTM D421, 422- particle size analysis. Volatile organics content will be established using USEPA Method 91-1 for TCL volatile organics. One blind duplicate sample will be submitted with each

round of samples submitted to the laboratory. The laboratory will perform one matrix spike and one matrix spike duplicate analysis for each 20 samples. Matrix spikes will be carried through the entire analytical process from initial sample preparation to final analyses. Soil physical characteristics testing will be performed by Malcolm Pirnie's AASHTO-certified Soils Testing Laboratory. Analytical testing will be performed by General Testing.

MALCOLM PIRNIE

APPENDIX D

ENHANCED VOLATILIZATION DATA

INITIAL DRYING PERIOD 3/19/96 (1)

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

SAMPLE NO.:_____ PAN NUMBERS:_____
PROJECT NO.: 0965-08-6

PUT INTO PANS @ ~8:05

AIR DRY STEP	1st HALF Hour	2nd	3rd	4	5	6	7	8	9	10	11
Time	8:37	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:40	13:00	13:30
Temperature of Room	69°	69°	68°	68°	67°	67°	66°	66°	66°	66°	66°
Humidity	35%	35%	35%	35%	35%	38%	40%	40%	39%	39%	39%
Moisture Content											
Weight Material											
M.C.*		S-2		S-3		S-4		S-5		S-6	
AFTER DRY SIFTING STEP											
Weights:											
>1" sieve											
>1/4" sieve											
>no. 10 sieve											
<no. 10 sieve											
>1/4" sieve control											

PAN	WEIGHT	PAN	WEIGHT
X1	1031.34	U1	1019.0
E4	1341.52	K2	1151.6
B4	1335.0	Z2	1033.0
E-4	1331.0	J3	1158.0
H-2	1034.0	H1	1015.3

122.5 lbs TOTAL SAMPLE 5 PANS

INITIAL DRYING PERIOD

(2)

3/19/96

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

SAMPLE NO.:_____ PAN NUMBERS:_____
PROJECT NO.:_____

AIR DRY STEP	12	13	14	15	16						
Time	14:00	14:30	15:00	15:30	16:00						
Temperature of Room	66°	67°	66°	66°	66°						
Humidity	39%	40%	41%	41%	41%						
Moisture Content											
Weight Material											
AFTER DRY SIFTING STEP											
Weights:											
>1" sieve											
>1/4" sieve											
>no. 10 sieve											
<no. 10 sieve											
>1/4" sieve control											

ROCHESTER F.A. 7 4

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

SAMPLE NO.:_____
PROJECT NO.:_____

PAN NUMBER:_____
VOLATILIZATION TEMP:_____

VOC SAMPLE COLLECTION

COLLECTION EVENT NUMBER	DATE	TIME	TEMPERATURE DEG F	RELATIVE HUMIDITY %	HNU READING JAR HEADSPACE <½Hr ppm	MOISTURE CONTENT %	TOTAL VOCs ppm	SAMPLER'S INITIALS
~~S-3 *~~	~~3/21/96~~	~~8:45~~	~~66~~	~~41~~				
S-4	3/21/96	8:50	66	41	8	0		
S-7	3/21/96	9:50	69	41	17.2	1		
S-10	3/21/96	10:50	66	40	18.3	2		
S-13	3/21/96	11:50	66	40	16.0 !	3		
S-16	"	12:45	66	40	15.4 !	4		
S-19	"	13:45	"	"	8.6	5		
S-22	"	14:45	"	"	4.8	6		
S-25	"	15:45	68	40	14.4	7		
S-29	"	16:40	68	40	7.0	8		
S-32		20:40	68	40	5.2	12		
S-35	3/22/96	8:40	68	41	3.8	24		
S-39	3/23/96	8:55	~~70~~ 66	35	0.4			
S-43	3/24/96	9:40	70	35	1.2			
S-47	3/25/96	13:30	70	35	0.8			

* ~~INCLUDES SAMPLING CONTROL PAN~~ B

! @ 13:30

>#10<

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

SAMPLE NO.: >#10 <1/4"
PROJECT NO.: 0965-08-6

PAN NUMBER: _____
VOLATILIZATION TEMP: _____

VOC SAMPLE COLLECTION ALL

	COLLECTION EVENT NUMBER	DATE	TIME	TEMPERATURE DEG F	RELATIVE HUMIDITY %	HNU READING JAR HEADSPACE <1/4" ppm	MOISTURE CONTENT %	TOTAL VOCs ppm	SAMPLER'S INITIALS
*	S-3	3/21/96	8:45	66	41	29	0		
	S-6	"	9:50	~~66~~ 67	41	24	1		
	S-9	"	10:50	66	40	15.5	2		
	S-12	"	11:50	66	40	19.8*	3		
	S-15	"	12:45	66	40	16.3	4		
	S-18	"	13:45	66	40	13.2	5		
	S-21	"	14:45	66	40	~~8.8~~ 9.2	6		
	S-24	"	15:45	68	40	8.8	7		
	S-28	"	16:40	68	40	6.2	8		
	S-31		20:40	68	40	8.0	12		
	S-34	3/22/96	8:40	68	41	4.8	24		
	S-38	3/23/96	8:55	~~72~~ 66	35	0.6			
	S-42	3/24/96	9:00	70	35	0.4			
	S-46	3/25/96	13:30	70	35	0.5			

* INITIAL SAMPLES FROM CONTROL PAN ALSO TAKEN @ 13:30

<#10

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

0965-08-

SAMPLE NO.: <#10
PROJECT NO.: 0965-08-6

PAN NUMBER:_____
VOLATILIZATION TEMP:_____

VOC SAMPLE COLLECTION

COLLECTION EVENT NUMBER	DATE	TIME	TEMPERATURE DEG F	RELATIVE HUMIDITY %	HNU READING JAR HEADSPACE <1/2 Hr. ppm	MOISTURE CONTENT %	TOTAL VOCs ppm	SAMPLER'S INITIALS
S-2	3/21/96	8:40	64	41	3.1	0		
S-5	"	9:45	67	41	2.1			
S-8	"	10:50	66	40	13.2			
S-11	"	11:50	66	40	18.0			
S-14	"	12:45	66	40	15.4			
S-17	"	13:45	66	40	10.6			
S-20	"	14:45	66	40	9.0			
S-23	"	15:45	66	40	7.2			
S-27	"	16:40	68	40	7.4			
S-30	"	20:40	68	40	4.6			
S-33	3/22/96	8:40	68	41	1.6	2.1		
S-37	3/23/96	8:55	66	35	0.4			
S-41	3/24/96	7:00	70	35	0.8			
S-45	3/25/96	15:30	70	35	0.2			

1 TAKEN @ 13:30

CONTROL

(>#10 < 1/4")

ROCHESTER FIRE ACADEMY
SOUTH DISPOSAL AREA SOILS
BENCH-SCALE SOIL VOLATILIZATION STUDY

SAMPLE NO.: >#10 < 1/4"
PROJECT NO.: 0965-08-6

PAN NUMBER:_____
VOLATILIZATION TEMP:_____

VOC SAMPLE COLLECTION

COLLECTION EVENT NUMBER	DATE	TIME	TEMPERATURE DEG F	RELATIVE HUMIDITY %	HNU READING JAR HEADSPACE ppm	MOISTURE CONTENT %	TOTAL VOCs ppm	SAMPLER'S INITIALS
INITIAL SAMPLE IS INCLUDED IN THE ENHANCED VOL. SAMPLE								
	3/21/96	12:00	3°C					
S-26	3/24/96	16:10	0°C		5.2[1]			
S-36	3/22/96	7:00	-1°C		11.0[2]			
S-40	3/23/96	855	10°C		3.6			
S-40	3/24/96	9:00	13°C		4.3			
S-48	3/25/96	11:05	26°C		5.6			

1 COLD (16:20)

2 @ 11:15

WATER CONTENT DETERMINATION

Project No.: 0965-08-6 Lab ID#:

Project Name: ROCHESTER FIRE ACID Tested By: B Date: 3/26/96

Location: MPE-LAB Checked By: JM

Remarks: MOISTURE CONTENTS FROM ENHANCED VOLATILIZATION

Sample Number	S-2	S-3	S-4	S-5
Container No. (cup)	240	64	246	151
W_{wc} = Wt. of cup + wet soil	170.53	175.16	199.88	192.95
W_{dc} = Wt. of cup + dry soil	155.46	158.23	182.75	176.30
W_c = Wt. of cup	28.07	35.97	28.81	28.45
W_d = Wt. of dry soil				
Wt. of water				
Water Content, w%				
AVG Water Content	11.83	13.85	10.74	11.26

Sample Number	S-6	S-7	S-8	S-9
Container No. (cup)	168	255	209	171
W_{wc} = Wt. of cup + wet soil	176.93	216.22	157.46	174.71
W_{dc} = Wt. of cup + dry soil	157.38	196.75	144.87	158.64
W_c = Wt. of cup	28.36	28.42	28.25	28.57
W_d = Wt. of dry soil				
Wt. of water				
Water Content, w%	13.05	11.57	10.84	12.42
AVG Water Content				

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-08-6 Lab ID#:

Project Name: ROCHESTER FIRE ACID Tested By: B Date: 3/26/96

Location: MPI-LAB Checked By: JM

Remarks: ENHANCED VOLATILIZATION

Sample Number	S-10		S-11		S-12		S-13	
Container No. (cup)	228		150		248		7	
W_{wc} = Wt. of cup + wet soil	172.30		144.52		158.97		198.00	
W_{dc} = Wt. of cup + dry soil	158.36		133.87		144.76		182.71	
W_c = Wt. of cup	28.71		28.01		27.52		27.57	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	11.14	10.71	10.06		12.12		9.8	

Sample Number	S-14		S-15		S-16		S-17	
Container No. (cup)	93		234		161		31	
W_{wc} = Wt. of cup + wet soil	176.23		156.29		207.79		175.66	
W_{dc} = Wt. of cup + dry soil	163.69		142.92		191.26		164.09	
W_c = Wt. of cup	27.63		23.42		28.61		28.09	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	9.22		11.67		10.16		8.51	

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-08-6
Lab ID#:
Project Name: ROCHESTER FIRE ACAD
Tested By: B
Date: 3/26/96
Location: MPI-LAB
Checked By: JM
Remarks: ENHANCED VOLATILIZATION

Sample Number	S-18		S-19		S-20		S-21	
Container No. (cup)	96		77		216		241	
W_{wc} = Wt. of cup + wet soil	171.28		174.16		164.90		164.85	
W_{dc} = Wt. of cup + dry soil	156.57		160.87		155.25		151.76	
W_c = Wt. of cup	27.56		27.63		28.67		28.10	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	11.40		9.96		7.62		10.59	

Sample Number	S-22		S-23		S-24		S-25	
Container No. (cup)	222		218		204		239	
W_{wc} = Wt. of cup + wet soil	205.33		169.91		206.01		199.35	
W_{dc} = Wt. of cup + dry soil	190.8[illegible]		161.3[illegible]		1[illegible]		[illegible]	
W_c = Wt. of cup	28.81		28.33		28.45		27.73	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	8.91		6.45		10.14		6.02	

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-08-6 Lab ID#:

Project Name: ROCHESTER FIRE RCAD Tested By: JB Date: 3/26/96

Location: MPI-LAB Checked By: JM

Remarks: ENHANCED VOLATILIZATION

Sample Number	S-26		S-27		S-28		S-29	
Container No. (cup)	249		107		117		178	
W_{wc} = Wt. of cup + wet soil	211.47		149.97		174.03		190.77	
W_{dc} = Wt. of cup + dry soil	139.36		142.62		179.07		179.82	
W_c = Wt. of cup	28.49		27.72		28.12		28.17	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	13.74		6.34		9.91		7.23	

Sample Number	S-30		S-31		S-32		S-33	
Container No. (cup)	170		32		143		149	
W_{wc} = Wt. of cup + wet soil	162.64		166.62		219.22		142.79	
W_{dc} = Wt. of cup + dry soil	156.90		155.40		207.80		140.52	
W_c = Wt. of cup	28.01		27.65		28.90		28.81	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	4.45		8.75		6.38		2.01	

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-08-6 Lab ID#: 3

Project Name: ROCHESTER FIRE ROAD Tested By: [illegible] Date: 3/26/96

Location: MPI-LAB Checked By: [illegible] JM

Remarks: ENHANCED VOLATILIZATION

Sample Number	S-34	S-35	S-36	S-37
Container No. (cup)	174	69	177	36
W_{wc} = Wt. of cup + wet soil	192.10	187.00	109.06	92.86
W_{dc} = Wt. of cup + dry soil	134.[illegible]2	180.63	99.22	91.[illegible]
W_c = Wt. of cup	28.99	28.50	28.74	27.55
W_d = Wt. of dry soil				
Wt. of water				
Water Content, w%				
AVG Water Content	4.60	4.19	13.00	1.71

Sample Number	S-38	S-39	S-40	S-41
Container No. (cup)	130	144	196	129
W_{wc} = Wt. of cup + wet soil	39.05	118.38	83.7[illegible]	141.09
W_{dc} = Wt. of cup + dry soil	37.[illegible]	116.3[illegible]	73.07	137.40
W_c = Wt. of cup	28.73	28.09	28.57	28.27
W_d = Wt. of dry soil				
Wt. of water				
Water Content, w%				
AVG Water Content	1.96	1.77	11.65	1.52

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-08-6 Lab ID#:

Project Name: ROCHESTER FIRE ACID Tested By: JS Date: 3/26/96

Location: MPI-LAB Checked By: JM

Remarks: ENHANCED VOLATILIZATION

Sample Number	S-42		S-43		S-44		S-45	
Container No. (cup)	215		200		41		219	
W_{wc} = Wt. of cup + wet soil	149.72		181.00		115.28		123.74	
W_{dc} = Wt. of cup + dry soil	147.90		178.71		111.71		122.37	
W_c = Wt. of cup	28.75		28.75		27.71		27.91	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	1.53		1.53		4.02		1.54	

Sample Number	S-46		S-47		S-48			
Container No. (cup)	81		109		8			
W_{wc} = Wt. of cup + wet soil	159.32		182.03		124.52			
W_{dc} = Wt. of cup + dry soil	152.62		171.46		118.58			
W_c = Wt. of cup	27.37		28.33		27.89			
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%								
AVG Water Content	1.46		1.70		6.55			

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$

WATER CONTENT DETERMINATION

Project No.: 0965-02-6 Lab ID#:

Project Name: ROCHESTER ICE ACADEMY Tested By: JB Date: 3/19/96

Location: Checked By: WM

Remarks: ORIGINAL (INITIAL) DRYING PERIOD

ORIGINAL
1ST BULK SAMPLE

Sample Number	S-1 3/15/96		S-2 3/19/96		S-3		S-4	
Container No. (cup)	55		107		249		170	
W_{wc} = Wt. of cup + wet soil	1524.09		143.28		170.64		159.62	
W_{dc} = Wt. of cup + dry soil	1251.22		119.65		142.70		133.39	
W_c = Wt. of cup	162.40		27.67		28.26		28.42	
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%	25.1		25.69		24.4		24.95	
AVG Water Content								

Sample Number	S-5		S-6		S-7			
Container No. (cup)	178		117		32			
W_{wc} = Wt. of cup + wet soil	136.34		184.51		192.71			
W_{dc} = Wt. of cup + dry soil	159.07		157.04		164.22			
W_c = Wt. of cup	28.45		28.13		27.67			
W_d = Wt. of dry soil								
Wt. of water								
Water Content, w%	20.88		21.31		20.86			
AVG Water Content								

$$\frac{W_{wc} - W_{dc}}{W_{dc} - W_c} = \frac{\text{Wt. of Water}}{\text{Wt. of Dry Soil}} = w\%$$