Enseco

ANALYTICAL DATA REPORT
FOR
THE NEW JERSEY DEPARTMENT
OF ENVIRONMENTAL PROTECTION
GEOENGINEERING, INC.

Project Name: L.E. Carpenter
Project No.: 5600
Samples received on October 24, 1988

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345991

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One

Project Inventory

GeoEngineering, Inc.
Project Name: L.E. Carpenter
Date Sampled: October 20, 1988
Erco Booking Log No.: 1460
Date Samples Received: October 24, 1988

Client ID	Erco ID	Description
5-5600	1460-01	Aqueous/Volatile Organic Compounds
2-5600	1460-02	Aqueous/Volatile Organic Compounds
3-5600	1460-03	Aqueous/Volatile Organic Compounds
4-5600	1460-04	Aqueous/Volatile Organic Compounds
1-5600	1460-05	Aqueous/Volatile Organic Compounds
TB-5600	1460-06	Aqueous/Volatile Organic Compounds

Enseco - Erco Laboratory

Sample Analysis Instrumentation Key for Organics

ID	Manufacturer	Model	Data System
GC/MS #S-1	Finnigan	4530	INCOS
GC/MS #S-2	Finnigan	4615B	INCOS
GC/MS #S-3	Finnigan	4530	INCOS
GC/MS #V1*	Hewlett Packard	5996	RTE-6
GC/MS #V2*	Hewlett Packard	5996	RTE-6
GC/MS #V3*	Hewlett Packard	5996	RTE-6
GC/MS #V4*	Hewlett Packard	5985	RTE-6
GC/MS #V5*	Hewlett Packard	MSD	RTE-6
GC/HECD #1	Perkin-Elmer/Tracor	3920/700	HP-1000
GC/HECD #2	Tracor/Tracor	560/700A	HP-1000
GC/HECD #3	Varian/Tracor	3700/700A	HP-1000
GC/PID #1	Perkin-Elmer/HNU	3920/52-02	HP-1000
GC/PID #3	Varian/HNU	3700/52-02	HP-1000
GC/ECD #2	Hewlett Packard	5840	Beckman/HP-1000
GC/ECD #7	Hewlett Packard	5880	Beckman/HP-1000
GC/ECC #9	Hewlett Packard	5880	Beckman/HP-1000
GC/FPD #10	Hewlett Packard	5890	--
GC/ECD #11	Hewlett Packard	5890	--
GC/ECD #12	Hewlett Packard	5890	--
GC/ECD #13	Hewlett Packard	5890	--
IR1	Perkin-Elmer	701N	--

*Purge-and-trap units manufactured by Tekmar - Model #LSC2/ALS

SUMMARY OF METHODS

The analytical EPA Methods 608 (Pesticides/PCBs), 624 (Volatile Organics) and 625 (Base/Neutrals and Acids) are designed to analyze water, sediment, and soil for the organic compounds on the Hazardous Substance List (HSL).

Volatile Organic Compounds

Analyses are conducted using purge and trap gas chromatographic/mass spectrometer (GC/MS) procedure in accordance with EPA Method 624. For sediment/soil samples, the purge device is heated.

Extractable Organic Compounds

Base/Neutrals and Acids (Semivolatiles)

The analyses are conducted in accordance with EPA Method 625. The method involves solvent extraction of the matrix, using a separatory funnel for waters and a sonicator for solids, concentration, and analysis by a GC/MS.

Pesticide/PCBs

The analysis of certain organochloride pesticides and polychlorinated biphenyls is conducted in accordance with EPA Method 608. The method involves solvent extraction of the matrix, concentration, and analysis. The extract is screened on a gas chromatograph/electron capture detector (GC/ECD) using a packed column. The sample is quantitated and confirmed on a GC/ECD using a second packed column.

QUALITY ASSURANCE/QUALITY CONTROL

As an indication of the overall quality of the data generated by Enseco - Erco Laboratory for this report, the following controls have been provided (when applicable).

Reagent or analytical blanks are analyzed to assess the level of contamination which exists in the analytical system. An analytical blank, analyzed with every batch of samples, consists of reagents specific to the method. This blank is carried through every aspect of the procedure, including preparation, cleanup, and analysis. Ideally, the concentration of an analyte in the blank is below the reporting limit for that analyte. However, some common laboratory solvents and metals are difficult to eliminate to the part-per-billion levels commonly reported in environmental analyses. Therefore, analytical data are corrected for blank contamination before they are reported to the client.

Laboratory control samples (LCS) are used to monitor the laboratory's day-to-day performance of routine analytical methods. An LCS consists of a standard, control matrix which is spiked with a group of target compounds representative of the method analytes. The LCS is analyzed with environmental samples to provide evidence that the laboratory is performing the method within accepted QC guidelines.

An LCS has been established for most routine analytical methods. Reagent water is used as the control matrix for the analysis of aqueous samples. The LCS compounds are spiked into reagent water and carried through the appropriate steps of the analysis. As stated in SW-846 (third edition), a universal blank matrix does not exist for solid samples and therefore no matrix is used. The LCS for solid samples consists of the LCS compounds spiked into a reagent blank and carried through the appropriate steps of the analysis. The data thus obtained are used to set the LCS control limits. As sufficient laboratory data become available, the control limits are redefined based upon the most recent six months of LCS data. Control limits for accuracy are based on the historical average recovery of the LCS plus or minus three standard deviation units.

Surrogates are organic compounds that are similar to the analytes of interest in chemical behavior but which are not normally found in environmental samples. Enseco routinely adds surrogates to samples requiring GS/MS analysis and reports these surrogate recoveries to the client. These surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Results are reported in terms of percent recovery.

ANALYTICAL RESULTS

The method number provided on each data report sheet refers to a publication originating from a regulatory or standard-setting organization. In general, the methods employed are those specified by the U.S. Environmental Protection Agency and other state and federal agencies. In cases where an approved regulatory method does not exist, a method developed by Enseco will be employed to meet the specific needs of the client. The methods commonly employed by Enseco are based on methods from the following references.

U.S. Environmental Protection Agency. 1983. Methods for chemical analysis of water and wastes. EPA-600/4-79-020. Cincinnati, OH, March.

U.S. Environmental Protection Agency. 1984. Test methods for evaluating solid waste, physical/chemical methods. (SW-846); Washington, D.C. April.

U.S. Environmental Protection Agency. 1986. Methods for the determination of organic compounds in finished drinking water and raw source water. Cincinnati, OH, September.

"Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," 40 CFR, Part 136; Federal Register, Vol. 49, No. 209 (1984).

American Public Health Association, American Water Works Association, Water Pollution Control Federation. 1985. Standard methods for the examination of water and wastewater, 16th Edition. Washington, D.C., April.

Current EPA Contract Laboratory Program (CLP) protocols for the analysis of organic and inorganic hazardous substances including chlorinated dioxins and furans.

Two

Enseco

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: GeoEngineering, Inc.

Matrix: Aqueous

Authorized: 10/24/88 Received: 10/24/88

		Surrogate Compound (%)		
Erco ID	Client ID	d_4-1,2,-Dichloro-ethane	d_8-Toluene	p-Bromofluoro-benzene
1460-01	5-5600	104	100	99
1460-02	2-5600	104	91	107
1460-03	3-5600	104	99	100
1460-04	4-5600	105	97	104
1460-05	1-5600	96	98	97
1460-06	TB-5600	104	100	108
7234B	Erco Procedural Blank - Water	98	99	102
BV233B	Erco Procedural Blank - Water	98	102	104
U132B	Erco Procedural Blank - Water	95	97	99
7256B	Erco Procedural Blank - Water	101	99	96
7269B	Erco Procedural Blank - Water	101	110	111
QC Advisory Limits:		76-114%	88-110%	86-115%

Reported by Ci Approved by WHC

METHOD BLANK SUMMARY

Case No. GeoEngineering Region — Contractor Ensaco-Erco Laboratory Contract No. —

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	Reporting Limit.
7234B	10/25/88	VOA	AQUEOUS	LOW	V1	—	None detected.	—	—	—
BN233B	10/25/88	VOA	AQUEOUS	LOW	V5	75-09-2	Methylene Chloride	2.1	µg/L	25
U132B	10/26/88	VOA	AQUEOUS	LOW	V3	—	None detected	—	—	—
7256B	10/26/88	VOA	AQUEOUS	LOW	V1	75-09-2	Methylene Chloride	3.8	µg/L	25
7269B	10/27/88	VOA	AQUEOUS	LOW	V1	—	None detected.	—	—	—

Comments:

5A
VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Name: ENSECO INC | ERCO LAB Contract: GeoEngineering

Code: _____ Case No.: 1422 DJ SAS No.: _____ SDG No.: _____

File ID: 5901 BFB Injection Date: 10-05-88

BFB Injection Time: 08:50

Instrument ID: V1

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) PACK

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.8
75	30.0 - 60.0% of mass 95	59.1
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	81.4
175	5.0 - 9.0% of mass 174	5.7 (7.0)1
176	Greater than 95.0%, but less than 101.0% of mass 174	78.8 (96.8)1
177	5.0 - 9.0% of mass 176	5.7 (7.2)2

1-Value is % mass 174. 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	5901	10-05-88	08:50
02					
03		50 PPB	5902	10-05-88	10:56
04		20 PPB	5903	10-05-88	12:30
05		100 PPB	5904	10-05-88	13:33
06		200 PPB	5906	10-05-88	16:41
07		150 PPB	5907	10-05-88	18:59
08					
09					
10					
11					
12					
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14					
15					
16					
17					
18					
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22					

5A
VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB) Geo Engineering

Lab Name: ENSECO INC/ERCO LAB Contract: _____

Lab Code: _____ Case No.: ~~T420~~ DB SAS No.: _____ SDG No.: _____

Lab File ID: T473 BFB Injection Date: 9/21/88

Instrument ID: V3 BFB Injection Time: 10:08

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) PACK

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	26.5
75	30.0 - 60.0% of mass 95	57.1
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	85.8
175	5.0 - 9.0% of mass 174	6.2 (7.3)1
176	Greater than 95.0%, but less than 101.0% of mass 174	82.7 (96.4)1
177	5.0 - 9.0% of mass 176	5.3 (6.4)2

1-Value is % mass 174. 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	T473	9/21/88	10:08
02		50 ppb STD	T475		11:44
03		20 ppb STD	T476		13:26
04		100 ppb STD	T477		14:17
05		150 ppb STD	T478		15:18
06		200 ppb STD	T479		16:10
07					
08					
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22					

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Enseco Inc / GRCO Lab Contract: GeoEngineering

Lab Code: _____ Case No.: ~~1420~~ SAS No.: _____ SDG No.: _____

Lab File ID: BV224 BFB Injection Date: 10/25/88

Instrument ID: GCMS V5 BFB Injection Time: 08:58

Matrix: (soil/water) water Level: (low/med) low Column: (pack/cap) pack

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	20.9
75	30.0 - 60.0% of mass 95	53.6
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	6.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	100
175	5.0 - 9.0% of mass 174	7.8 (7.8)1
176	Greater than 95.0%, but less than 101.0% of mass 174	95.2 (95.3)1
177	5.0 - 9.0% of mass 176	7.6 (8.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	BV224	10/25/88	08:58
02		50 ppb	BV225		10:11
03		100 ppb	BV227		12:32
04		150 ppb	BV228		13:52
05		200 ppb	BV229		14:51
06		20 ppb	BV230		17:28
07					
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5A
VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Fosco Inc/Erco Lab Contract: Geo Engineering

Lab Code: _____ Case No.: 1460 SAS No.: _____ SDG No.: _____

Lab File ID: 7232 BFB Injection Date: 10/25/88

Instrument ID: GCMS V1 BFB Injection Time: 09:59

Matrix: (soil/water) water Level: (low/med) low Column: (pack/cap) pack

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	19.6
75	30.0 - 60.0% of mass 95	57.1
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	8.5
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	83.5
175	5.0 - 9.0% of mass 174	6.6 (7.9)1
176	Greater than 95.0%, but less than 101.0% of mass 174	83.6 (100)1
177	5.0 - 9.0% of mass 176	5.7 (6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	7232	10/25	09:59
02		50ppb	7233		10:35
03		prep. blank	7234		11:47
04					
05	5-5600	1460-01	7240		17:11
06	4-5600	1460-04	7244		20:40
07					
08					
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21					
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5A
VOLATILE ORGANIC GC/MS TUNING AND MASS
CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Ensco Inc / Erco Lab Contract: GeoEngineering

Lab Code: _____ Case No.: ~~T422~~ DB SAS No.: _____ SDG No.: _____

Lab File ID: 7254 BFB Injection Date: 10/26/88

Instrument ID: GCMS V1 BFB Injection Time: 20:13

Matrix: (soil/water) water Level: (low/med) low Column: (pack/cap) pack

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.6
75	30.0 - 60.0% of mass 95	59.2
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	7.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	82.6
175	5.0 - 9.0% of mass 174	6.2 (7.6)1
176	Greater than 95.0%, but less than 101.0% of mass 174	81.5 (98.7)1
177	5.0 - 9.0% of mass 176	6.1 (7.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	~~7246~~ 7254	10/26/88	20:13
02		50 ppb	7255		20:49
03		pdb blank	7256		21:48
04					
05	3-5600	1460-03	7257		23:25
06					
07					
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VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Enseco Inc / Erco Lab Contract: GeoEngineering

Lab Code: _____ Case No.: ~~7420~~ SAS No.: _____ SDG No.: _____

Lab File ID: 7267 BFB Injection Date: 10/27/88

Instrument ID: GCMS V1 BFB Injection Time: 09:35

Matrix: (soil/water) water Level: (low/med) low Column: (pack/cap) ~~CAP~~ PACK

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	23.2
75	30.0 - 60.0% of mass 95	59.0
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	5.3
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	88.6
175	5.0 - 9.0% of mass 174	4.6 (5.2)1
176	Greater than 95.0%, but less than 101.0% of mass 174	85.4 (96.3)1
177	5.0 - 9.0% of mass 176	6.7 (7.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	7267	10/27/88	09:35
02		50ppb	7268		10:27
03		pack blank	7269		11:41
04					
05	2-5600	14600-02	7273		18:26
06					
07					
08					
09					
10					
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16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Enseco Inc / Erco Lab Contract: GeoEngineering

Lab Code: _____ Case No.: ~~1420~~ DA SAS No.: _____ SDG No.: _____

Lab File ID: U130 BFB Injection Date: 10/26/88

Instrument ID: GCMS V3 BFB Injection Time: 10:09

Matrix: (soil/water) Water Level: (low/med) low Column: (pack/cap) pack

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	28.0
75	30.0 - 60.0% of mass 95	59.6
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	6.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	81.2
175	5.0 - 9.0% of mass 174	7.1 (8.7)1
176	Greater than 95.0%, but less than 101.0% of mass 174	81.5 (100)1
177	5.0 - 9.0% of mass 176	4.1 (5.1)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	U130	10/26/88	10:09
02		50ppb	CL 11/14/88 U131		10:51
03		prep blank	U132		11:46
04					
05	14 1-5600	1460-05	U138	10/26/88	16:52
06	CL 11/14/88				
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Enseco Inc / ERCO Lab Contract: Geo Engineering

Lab Code: _____ Case No.: ~~T420~~ 05 SAS No.: _____ SDG No.: _____

Lab File ID: BV231 BFB Injection Date: 10/25/88

Instrument ID: GCMS V5 BFB Injection Time: 18:36

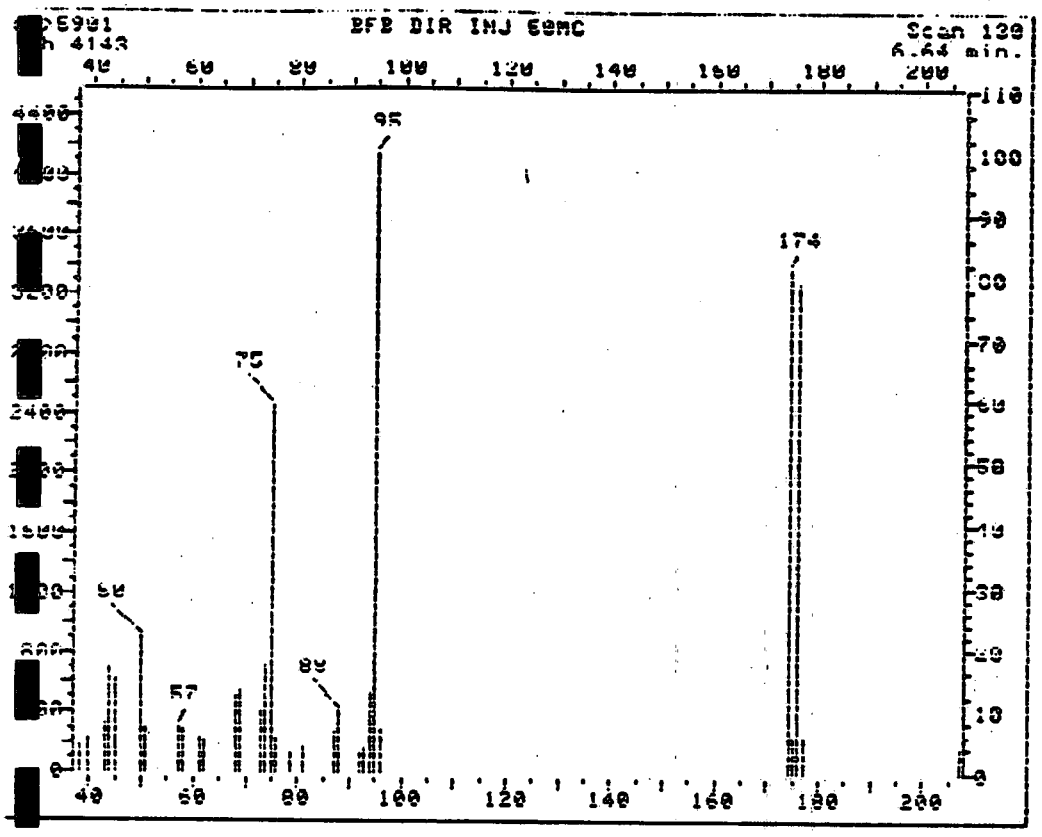
Matrix:(soil/water) Water Level:(low/med) low Column:(pack/cap) ~~Cap~~ PACK

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	24.4
75	30.0 - 60.0% of mass 95	52.4
95	Base peak, 100% relative abundance	100
96	5.0 - 9.0% of mass 95	7.0
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	95.9
175	5.0 - 9.0% of mass 174	7.6 (7.9)1
176	Greater than 95.0%, but less than 101.0% of mass 174	92.9 (96.9)1
177	5.0 - 9.0% of mass 176	7.4 (8.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01		BFB	BV231	10/25	18:36
02		50ppb	BV232	↓	19:28
03		proc blank	BV233	↓	20:31
04					
05	TB5600	1460-06	BV237	10/26/88	00:22
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					



V1

data file header from : >5901

le: BFB DIR INJ 50MC 8/12 10/5 Operator: BILL · MS 10/05/88 08:50
sc :
#: 1 MS model: 96 SW/HW rev.: 1A ALS # : 0
thod file: BFB1 Tuning file: MI2401 No. of extra records: 2
urce temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	1.0	11.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	1.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

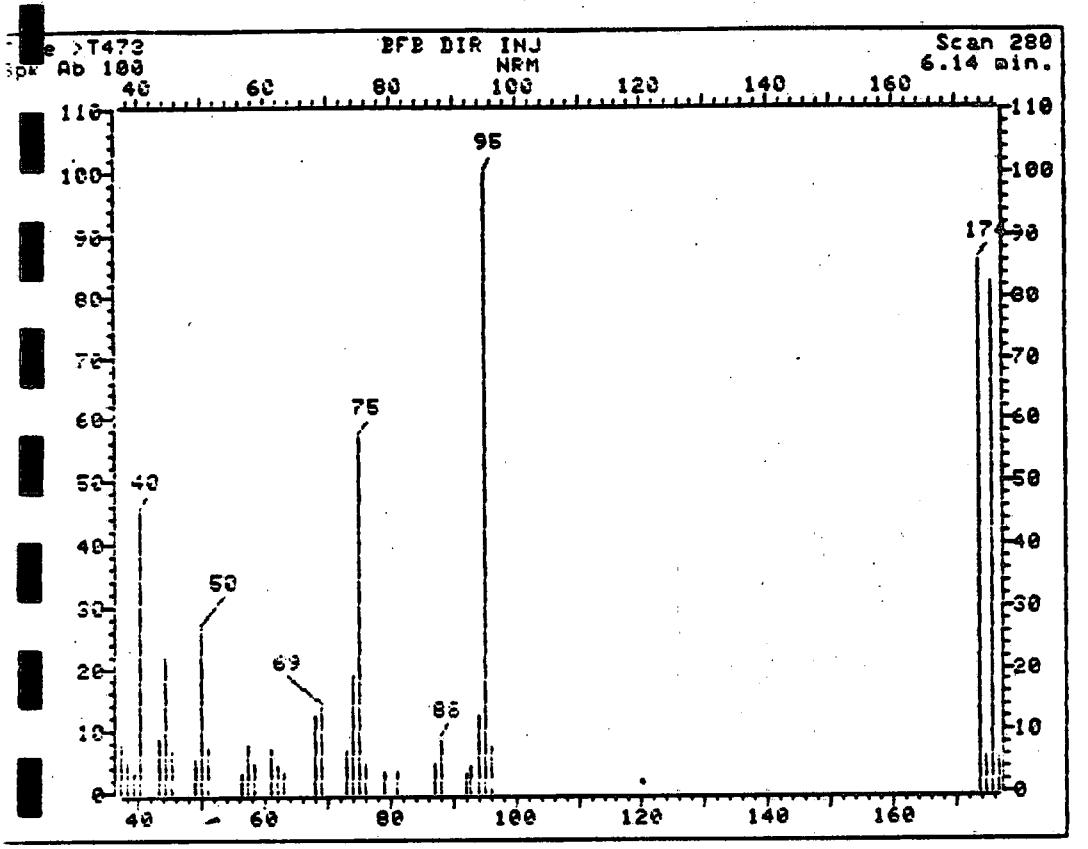
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	21.84	21.84	Ok
75	30-60% of mass 95	59.09	59.09	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.76	6.76	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	81.37	81.37	Ok
175	5-9% of mass 174	5.70	7.00	Ok
176	95-101% of mass 174	78.78	96.83	Ok
177	5-9% of mass 176	5.70	7.23	Ok

Injection Date: 10/05/88
Injection Time: 08:50
Data File: >5901
Scan: 130

5901 BFB DIR INJ 50MG
130 NRM

File: >5901 Scan #: 130 Retn. time: 6.64

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
50.00	4.345	52.05	7.362	73.00	9.776	87.10	6.252	96.15	6.758
59.95	5.552	57.95	6.855	74.00	17.186	88.10	9.203	174.10	81.366
42.95	7.820	61.15	5.455	75.00	59.088	91.95	3.259	175.10	5.696
[illegible].95	16.968	62.05	5.165	76.00	5.552	93.05	4.2000	176.10	78.783
[illegible].95	14.724	68.00	12.286	78.90	3.548	94.05	12.696	177.10	5.696
500.05	21.844	69.00	13.179	81.00	4.224	95.05	100.0000	202.15	4.029
[illegible].95	6.976								



data file header from : >T473

Sample: BFB DIR INJ Operator: PRINT2 MS 9/21/88 10:08

Misc :

Ins. #: 1 MS model: 96 SW/HW rev.: IA ALS # : 0

Method file: BFB3 Tuning file: MT7403 No. of extra records: 2

Source temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	.1	10.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	.1	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

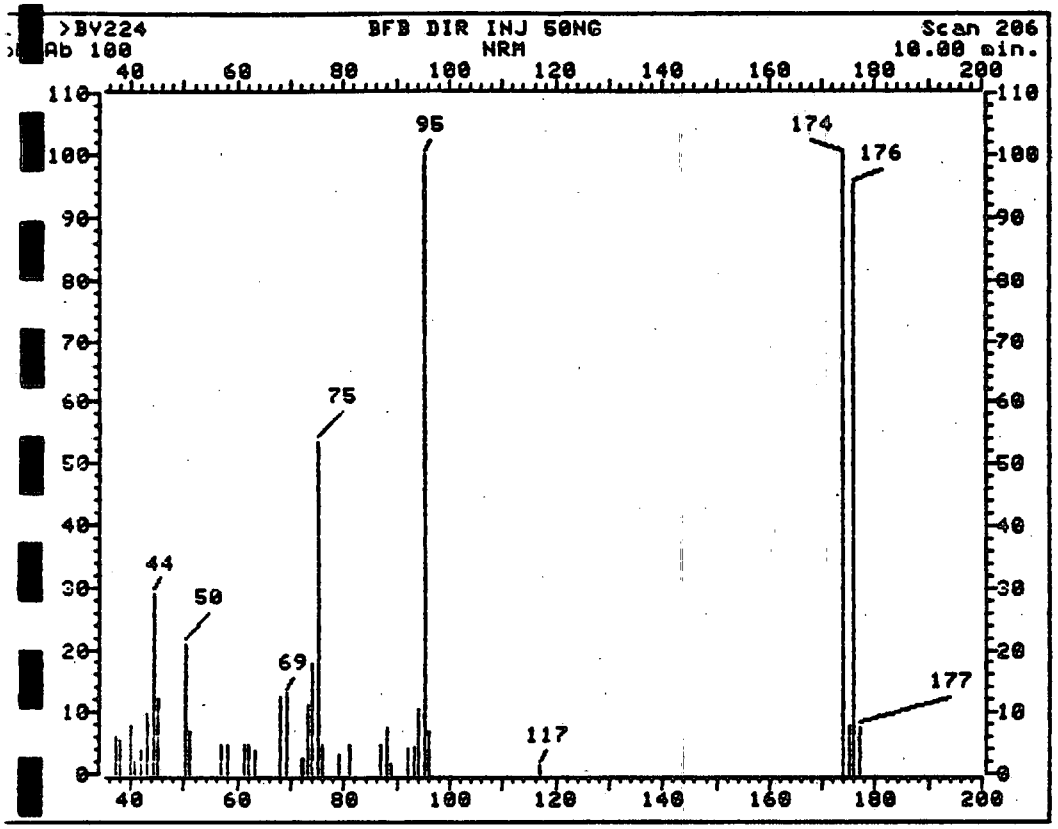
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	26.48	26.48	Ok
75	30-60% of mass 95	57.11	57.11	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.43	7.43	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	85.82	85.82	Ok
175	5-9% of mass 174	6.23	7.26	Ok
176	95-101% of mass 174	82.69	96.35	Ok
177	5-9% of mass 176	5.33	6.45	Ok

Injection Date: 09/21/88
Injection Time: 10:06
Data File: >T473
Scan: 280

>T473 BFB DIR INJ
280 NRM

File: >T473 Scan #: 280 Retn. time: 6.14

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
37.00	7.629	49.00	5.472	62.00	4.840	76.10	4.963	94.05	12.438
38.00	5.487	50.00	26.480	63.10	3.499	78.95	3.545	95.05	100.000
39.10	3.036	51.00	7.306	68.00	12.392	80.85	3.283	96.05	7.429
40.10	44.898	56.10	3.221	69.00	13.671	87.05	4.670	173.90	85.820
43.10	8.693	57.10	7.876	73.10	6.674	87.95	8.523	174.80	6.227
44.10	21.779	58.10	4.716	74.10	18.896	91.95	3.160	175.80	82.691
45.10	6.843	61.00	6.920	75.10	57.105	92.85	4.424	176.80	5.333



5

data file header from : >BV224

ample: BFB DIR INJ 50NG Operator: GREG MS 10/25/88 08:58
isc :
. #: 2 MS model: 70 SW/HW rev.: IA ALS # : 0
ethod file: BFB5 Tuning file: MT7405 No. of extra records: 2
Source temp.: 0 Analyzer temp.: 220 Transfer line temp. : 0

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	12.0	0.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	12.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

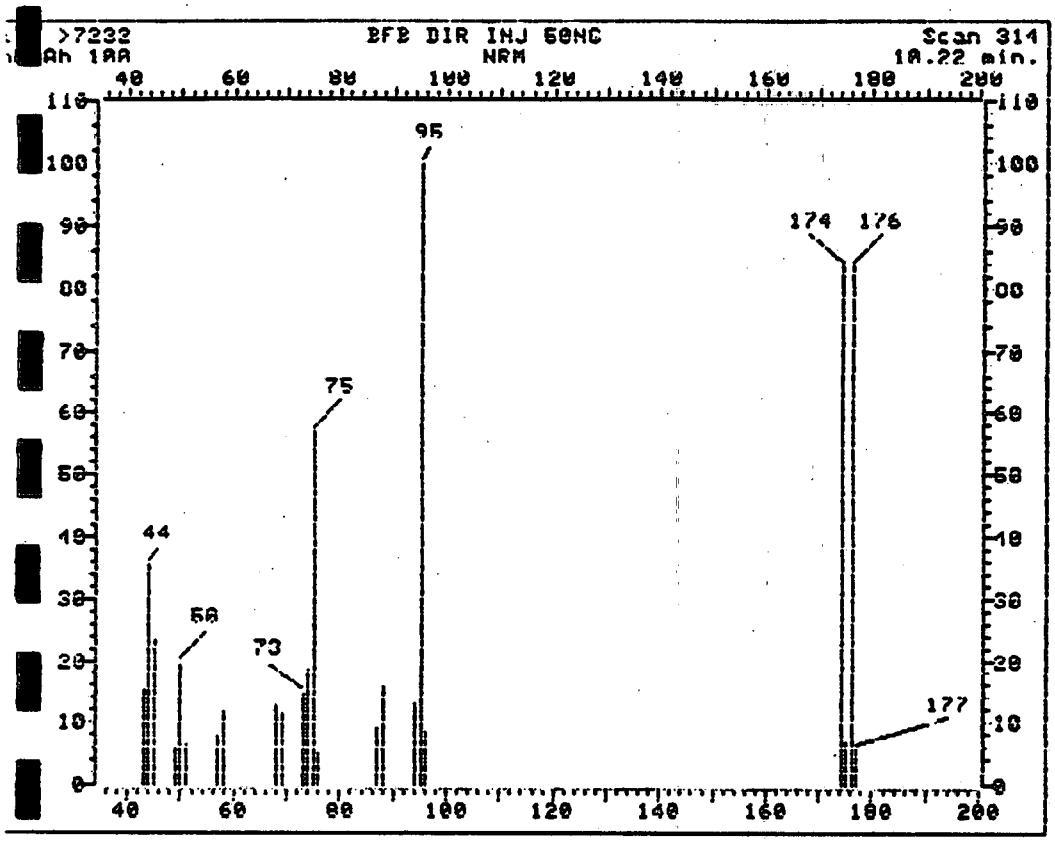
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	20.92	20.92	Ok
75	30-60% of mass 95	53.56	53.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.68	6.68	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	99.96	99.96	Ok
175	5-9% of mass 174	7.75	7.75	Ok
176	95-101% of mass 174	95.24	95.27	Ok
177	5-9% of mass 176	7.59	7.96	Ok

Injection Date: 10/25/88
Injection Time: 08:58
Data File: >BV224
Scan: 206

BV224 BFB DIR INJ 50NG
206 NRM

le: >BV224 Scan #: 206 Retn. time: 10.00

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
7.10	6.195	50.10	20.921	69.10	13.011	81.00	4.630	96.10	6.681
8.10	5.493	51.10	6.803	72.10	2.416	87.10	4.683	116.95	1.350
40.10	7.882	57.10	4.872	72.30	2.402	88.10	7.545	173.95	99.960
1.90	2.214	58.20	4.710	73.10	11.095	89.10	1.714	175.05	7.747
2.10	3.739	61.10	4.589	74.10	17.884	92.10	4.103	175.95	95.236
43.10	9.650	62.10	4.697	75.10	53.556	93.10	4.373	177.05	7.585
44.10	28.965	63.10	3.860	76.00	4.616	94.10	10.541	207.05	3.806
5.20	12.188	68.10	12.309	79.00	3.172	95.10	100.000		



GCMS VI

data file header from : >7232

ample: BFB DIR INJ 50NG Operator: KERY MS 10/25/88 09:59
isc :
. #: 1 MS model: 96 SW/HW rev.: 1A ALS # : 0
Method file: BFB1 Tuning file: MT2401 No. of extra records: 2
Source temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	1.0	11.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	1.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

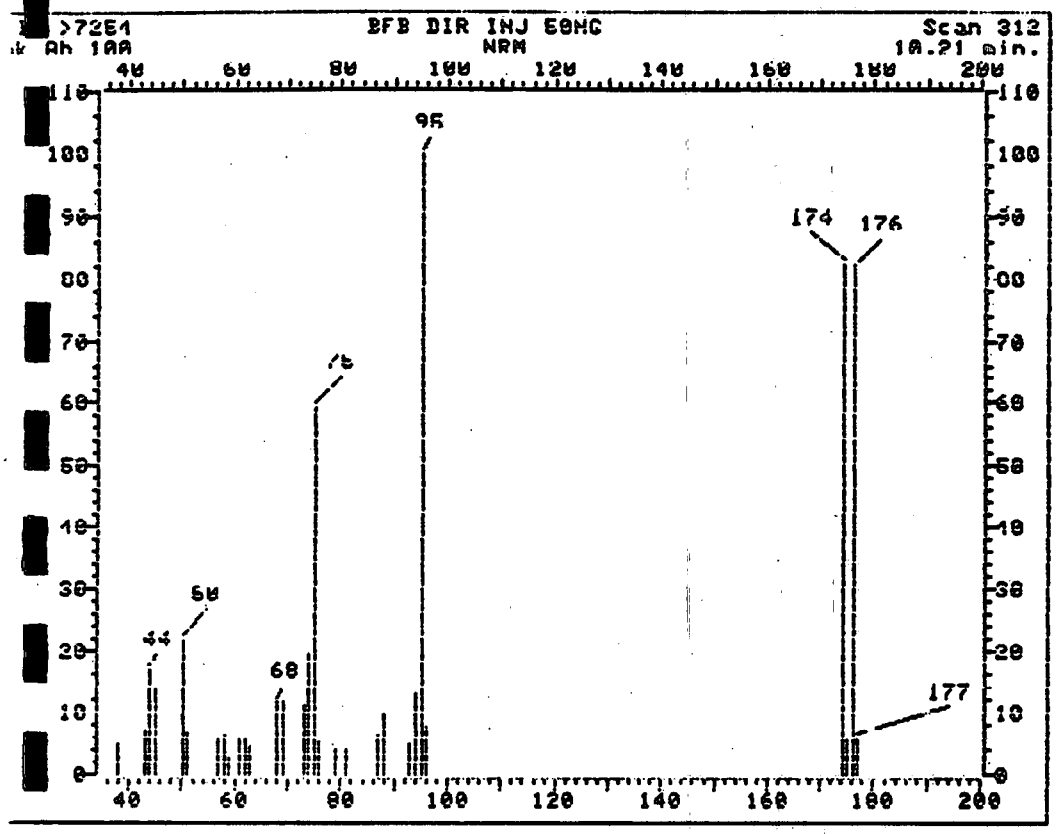
m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	19.58	19.58	Ok
75	30-60% of mass 95	57.05	57.05	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.54	8.54	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	83.52	83.52	Ok
175	5-9% of mass 174	6.61	7.91	Ok
176	95-101% of mass 174	83.60	100.10	Ok
177	5-9% of mass 176	5.72	6.84	Ok

Injection Date: 10/25/88
Injection Time: 09:59
Data File: >7232
Scan: 314 GCMS VI

>7232 BFB DIR INJ 50NG
314 NRM

File: >7232 Scan #: 314 Retn. time: 10.22

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
42.95	15.028	50.95	6.285	73.00	14.585	88.10	15.915	175.10	6.608
43.95	35.496	57.05	7.816	74.00	18.614	94.05	13.014	176.10	83.602
44.95	23.691	58.05	11.805	75.00	57.051	95.05	100.000	177.10	5.721
48.95	6.124	68.00	12.772	76.00	5.197	96.05	8.541	207.25	10.153
49.95	19.581	69.00	11.483	87.00	8.985	174.10	83.521		



GCMS V3

Data file header from : >7254

ample: BFB DIR INJ 50NG Operator: BILL MS 10/26/88 20:13

: #: 1 MS model: 96 SW/HW rev.: 1A ALS # : 0

Method file: BFB1 Tuning file: MT7401 No. of extra records: 2

urce temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	1.0	11.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	1.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	21.59	21.59	Ok
75	30-60% of mass 95	59.22	59.22	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.68	7.68	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	82.58	82.58	Ok
175	5-9% of mass 174	6.24	7.56	Ok
176	95-101% of mass 174	81.52	98.71	Ok
177	5-9% of mass 176	6.05	7.42	Ok

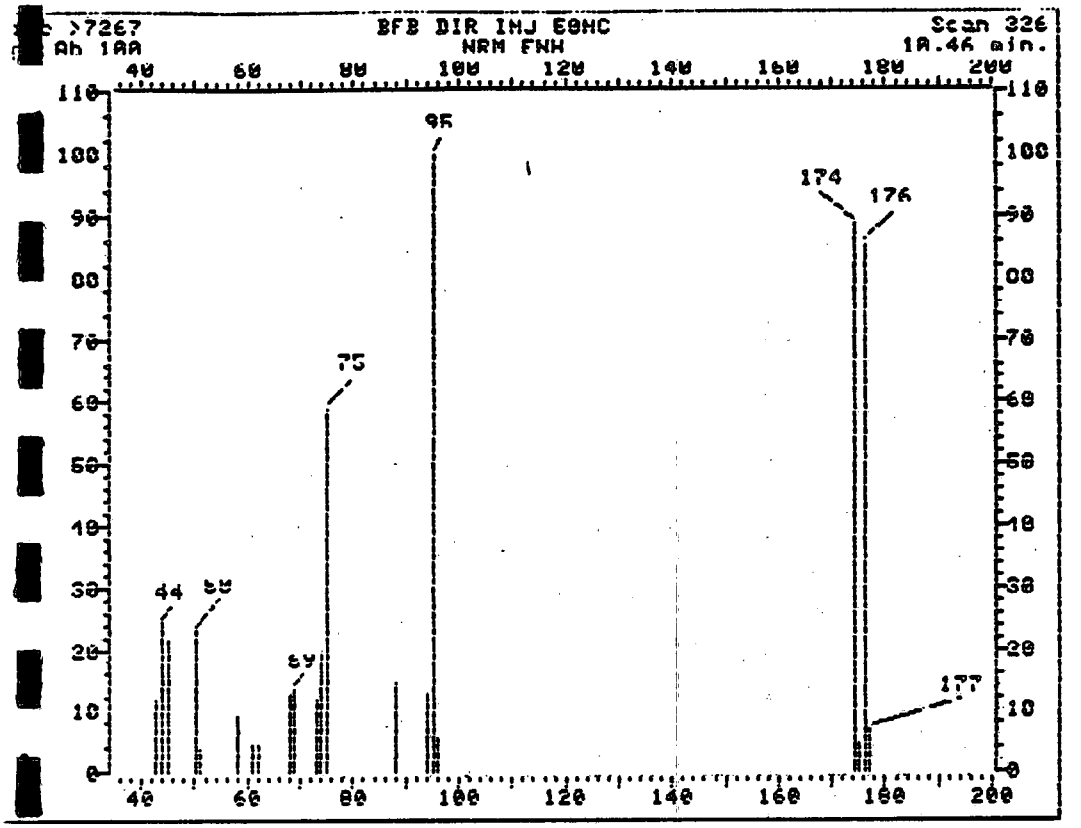
Injection Date: 10/26/88
Injection Time: 20:13
Data File: >7254
Scan: 312

GCMS V2

>7254 BFB DIR INJ 50NG
312 NRM

File: >7254 Scan #: 312 Retn. time: 10.21

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
38.00	4.979	58.05	6.388	69.00	11.635	80.90	4.178	96.05	7.675
43.05	7.335	59.05	2.866	73.00	11.195	82.00	6.558	174.10	82.584
43.95	16.954	61.05	5.854	74.10	19.529	88.10	9.959	175.10	6.242
45.05	13.845	62.05	6.218	75.00	59.218	93.05	5.028	176.10	81.516
48.05	21.593	62.95	4.785	76.00	5.514	94.05	13.141	177.10	6.048
50.95	6.874	68.00	11.683	78.90	3.959	95.05	100.000	207.25	4.129
57.05	5.757								



GCMS V1

data file header from : >7267

Sample: BFB DIR INJ 50NG Operator: BILL MS 10/27/88 09:55
Misc :
Ins. #: 1 MS model: 96 SW/HW rev.: 1A ALS # : 0
Method file: BFB1 Tuning file: MT74001 No. of extra records: 2
Source temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	1.0	11.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	1.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	23.17	23.17	ok
75	30-60% of mass 95	58.95	58.95	ok
95	Base peak, 100% relative abundance	100.00	100.00	ok
96	5-9% of mass 95	5.31	5.31	ok
173	Less than 2% of mass 174	0.00	0.00	ok
174	Greater than 50% of mass 95	88.65	88.65	ok
175	5-9% of mass 174	4.59	5.18	ok
176	95-101% of mass 174	85.40	96.33	ok
177	5-9% of mass 176	6.67	7.81	ok

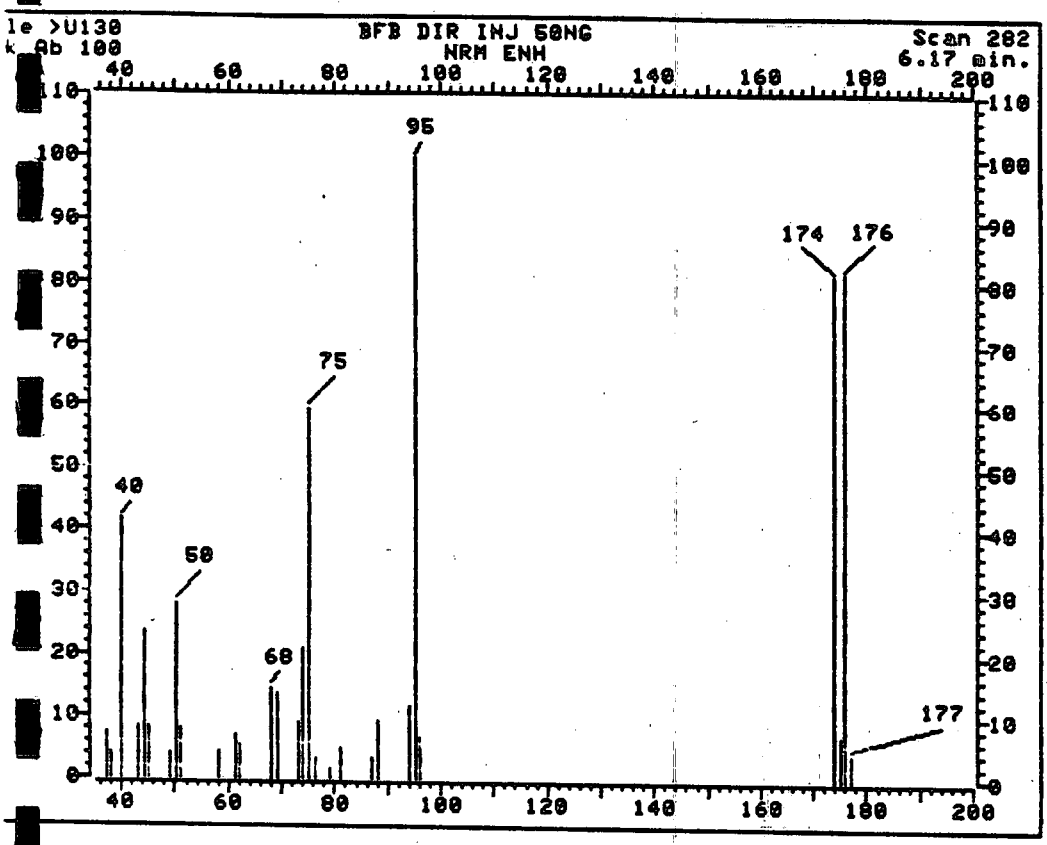
Injection Date: 10/27/88
Injection Time: 09:35
Data File: >7267
Scan: 326

GCMS V1

>7267 BFB DIR INJ 50NG
326 NRM ENH

File: >7267 Scan #: 326 Retn. time: 10.46

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
32.85	11.866	58.05	9.164	68.90	13.569	88.10	14.433	174.10	88.645
43.95	24.535	61.05	4.308	73.10	11.926	94.05	12.912	175.10	4.588
45.05	21.675	61.95	4.406	74.10	19.447	95.05	100.000	176.10	85.396
50.05	23.171	68.00	12.728	75.00	58.951	96.05	5.306	177.10	6.669
50.95	3.285								



GCMS v3

data file header from : >U130

ple: BFB DIR INJ 50NG Operator: GREG MS 10/26/88 10:09
c :
s. #: 1 MS model: 96 SW/HW rev.: IA ALS # : 0
Method file: BFB3 Tuning file: MT7403 No. of extra records: 2
urce temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	.1	10.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	.1	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	28.00	28.00	Ok
75	30-60% of mass 95	59.58	59.58	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.68	6.68	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	81.16	81.16	Ok
175	5-9% of mass 174	7.05	8.68	Ok
176	95-101% of mass 174	81.50	100.42	Ok
177	5-9% of mass 176	4.13	5.06	Ok

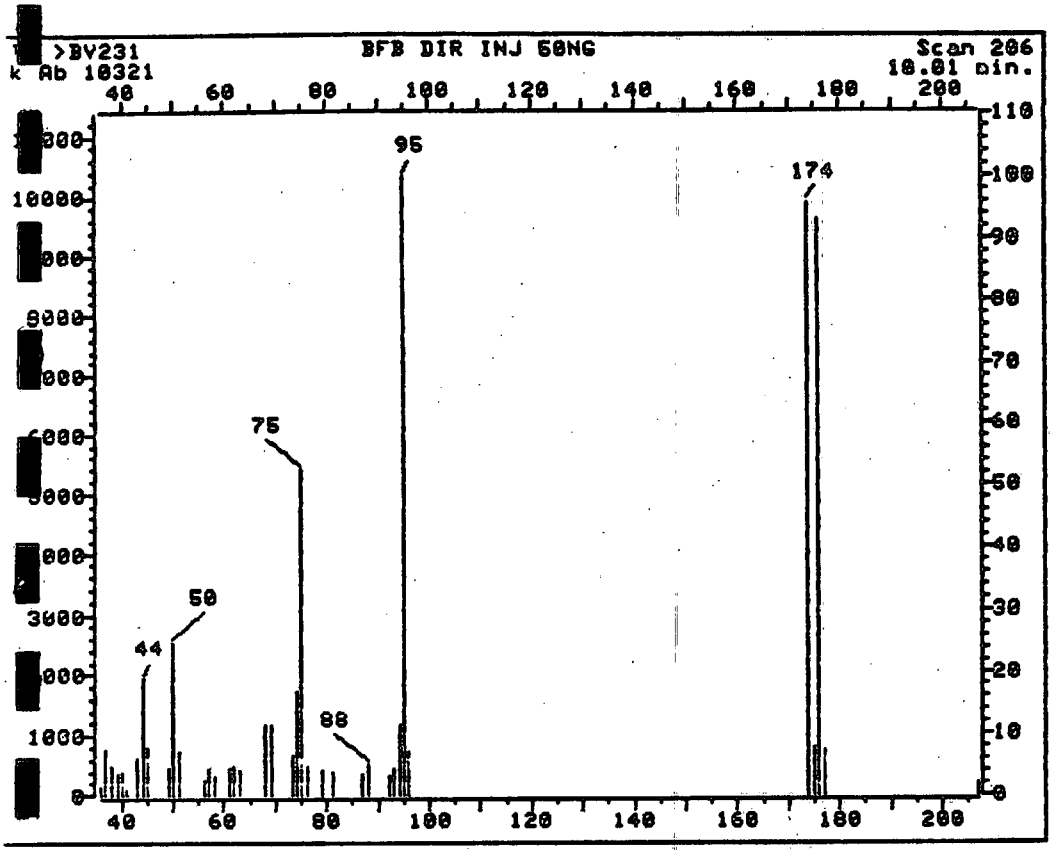
Injection Date: 10/26/88
Injection Time: 10:09
Data File: >U130
Scan: 282

GCMS V3

30 BFB DIR INJ 50NG
282 NRM ENH

ile: >U130 Scan #: 282 Retn. time: 6.17

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
37.10	7.469	49.20	4.042	68.10	14.578	78.95	1.623	96.05	6.684
38.10	4.138	50.10	28.000	69.10	13.666	80.95	5.029	174.00	81.157
4[illegible].10	41.570	51.10	8.011	73.10	8.987	87.05	3.501	175.00	7.045
49.20	8.520	58.20	4.531	74.10	20.976	88.05	9.549	176.00	81.496
54.10	23.470	61.10	7.151	75.10	59.576	94.05	11.926	177.00	4.127
[illegible].10	8.520	62.10	5.645	76.10	3.469	95.15	100.000		



GC MS ~~X~~ VS

data file header from : >BV231

ample: BFB DIR INJ 50NG Operator: GREG MS 10/25/88 18:36
c :
. #: 2 MS model: 70 SW/HW rev.: IA ALS # : 0
Method file: BFB5 Tuning file: MT7405 No. of extra records: 2
Source temp.: 0 Analyzer temp.: 220 Transfer line temp. : 0

Chromatographic temperatures :	220.	220.	0.	0.	0.
Chromatographic times, min. :	12.0	0.0	0.0	0.0	0.0
Chromatographic rate, deg/min:	12.0	0.0	0.0	0.0	0.0

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.43	24.43	Ok
75	30-60% of mass 95	52.39	52.39	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.96	6.96	Ok
173	Less than 2% of mass 174	0.00	0.00	Ok
174	Greater than 50% of mass 95	95.86	95.86	Ok
175	5-9% of mass 174	7.62	7.94	Ok
176	95-101% of mass 174	92.88	96.89	Ok
177	5-9% of mass 176	7.45	8.02	Ok

Injection Date: 10/25/88
Injection Time: 18:36
Data File: >BV231
Scan: 206

GCMS # V5
[illegible] 11/14/88

BV231 BFB DIR INJ 50NG
206 NRM

File: >BV231 Scan #: 206 Retn. time: 10.01

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
35.90	1.231	44.10	18.690	61.10	4.447	76.10	4.815	95.10	100.000
[illegible].10	1.279	45.10	7.848	62.10	4.874	79.00	3.982	96.10	6.957
[illegible].10	7.373	49.10	4.486	63.10	4.089	81.00	3.788	173.95	95.863
38.10	4.680	50.10	24.426	68.10	11.472	87.10	3.488	175.05	7.616
[illegible].20	3.352	51.10	7.141	69.10	11.530	88.10	5.000	175.95	92.879
[illegible].00	3.769	56.10	2.471	73.20	6.298	92.10	3.081	176.95	7.451
41.10	1.356	57.10	4.283	74.10	16.975	93.00	4.534	207.05	1.938
43.10	6.172	58.20	3.217	75.10	52.388	94.10	11.501		

Three

Enseco

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: GeoEngineering, Inc.

Client ID: Laboratory Control Spike

Laboratory ID: 7271LCS

Matrix: Aqueous Prepared: 10/27/88 Analyzed: 10/27/88

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	94	61 - 145%
Trichloroethene	94	71 - 120%
Benzene	90	76 - 127%
Toluene	92	76 - 125%
Chlorobenzene	95	75 - 130%

Reported by CL Approved by WHC

Enseco

PRIORITY POLLUTANT VOLATILE ORGANICS

EPA Method 624 + 624/HSL List

QUALITY CONTROL

Client Name: GeoEngineering, Inc.

Client ID: Laboratory Control Spike Dup.

Laboratory ID: 7272LCSD

Matrix: Aqueous Prepared: 10/27/88 Analyzed: 10/27/88

Parameter	% Recovery	QC Advisory Limits
1,1-Dichloroethene	97	61 - 145%
Trichloroethene	97	71 - 120%
Benzene	92	76 - 127%
Toluene	89	76 - 125%
Chlorobenzene	96	75 - 130%

Reported by CL Approved by UHC

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

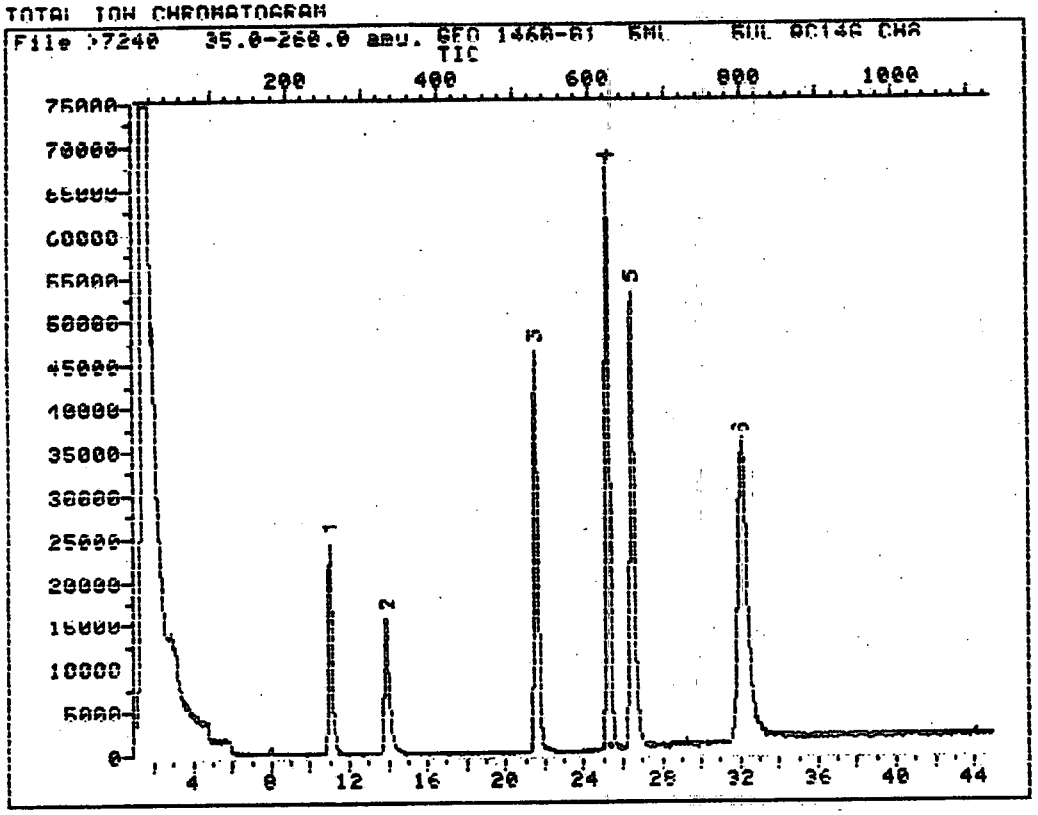
Client Name: GeoEngineering, Inc.
Client ID: 5-5600 MW-5
Laboratory ID: 1460-01
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/25/88 Analyzed: 10/25/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride	ND	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

ND = Not detected.

Reported by CL Approved by NHC

TOTAL ION CHROMATOGRAM



5,-5600, GCMS V1

Data File: >7240::DB
Name: GFO 1460-01 5ML
Misc: 5UL QC14G CHB

Quant Output File: ^7240::QT

Id File: VOA1D1::$$
Title: HSL VOLATILES:RFT 1%SP1000:45-220@8/MIN:GCMS V1:FRED/ENSFED
Last Calibration: 881025 11:33

Operator ID: BILL
Quant Time: 881025 12:52
Injected at: 881025 12:11

7239 1459-6
7238 B29-7

good

7234
7235 7236

KH

QUANT REPORT

Operator ID: BILL Quant Rev: 6 Quant Time: 881025 17:57
Output File: ^7240::QT Injected at: 881025 17:11
Data File: >7240::DB Dilution Factor: 1.000000
Name: GFO 1460-01 5ML 5-5600, GCMS V1
Misc: 5ML QC14G CHB

ID File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:FRCO/ENSECO
Last Calibration: 881025 11:33

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*CI01 Bromochloromethane	11.00	49.0	56253	50.00	UG/L	100
6)	CI030 Methylene Chloride	7.98	84.0	1378	~~.43~~	UG/L	79
4)	CS15 D4-1,2-Dichloroethane	13.91	65.0	126784	51.76	UG/L 104	95
5)	*CI10 1,4-Difluorobenzene	21.56	114.0	296357	50.00	UG/L	100
30)	*CI20 D5-Chlorobenzene	26.50	117.0	290566	50.00	UG/L	69
46)	CS05 D8-Toluene	25.26	100.0	230254	49.94	UG/L 100	97
2)	CS10 Bromofluorobenzene (BFB)	32.09	95.0	163606	49.47	UG/L 99	86

CL 11/11/88

* Compound is ISTD

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

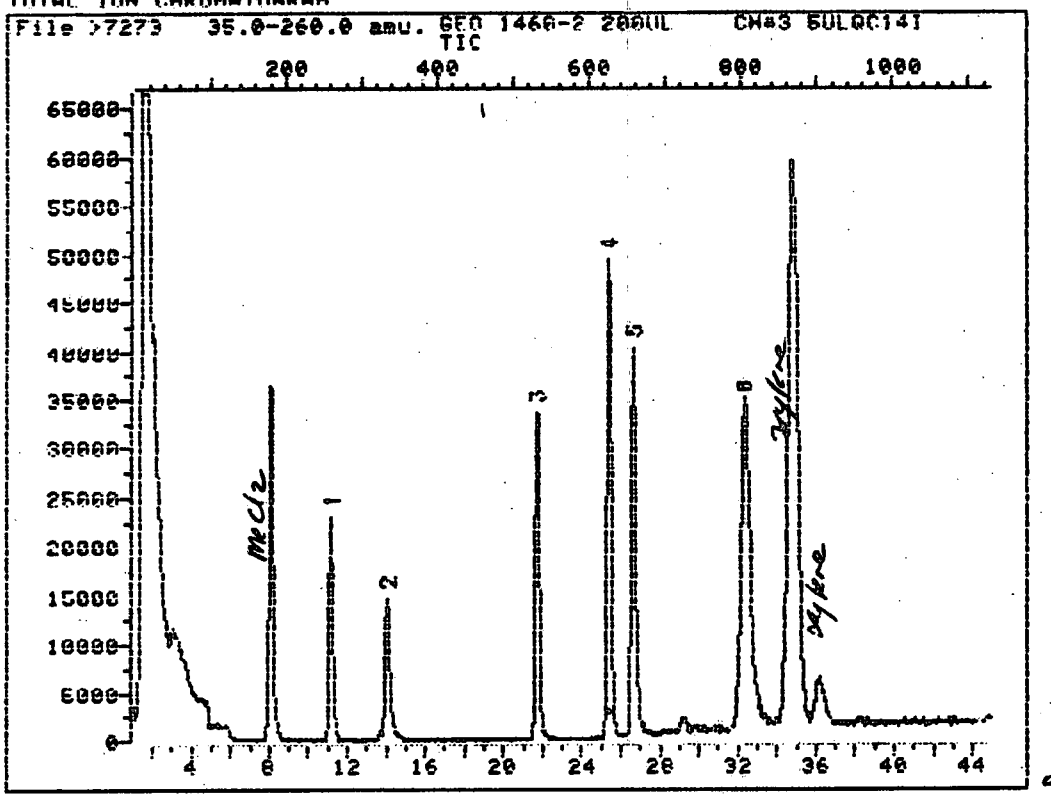
Client Name: GeoEngineering, Inc.
Client ID: 2-5600 MW-2
Laboratory ID: 1460-02
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/27/88 Analyzed: 10/27/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	250
Bromomethane	ND	µg/L	250
Vinyl chloride	ND	µg/L	250
Chloroethane	ND	µg/L	250
Methylene chloride	2,000	µg/L	620
Acetone	ND	µg/L	620
Carbon disulfide	ND	µg/L	120
1,1-Dichloroethene	ND	µg/L	120
1,1-Dichloroethane	ND	µg/L	120
1,2-Dichloroethene (total)	ND	µg/L	120
Chloroform	ND	µg/L	120
1,2-Dichloroethane	ND	µg/L	120
2-Butanone	ND	µg/L	250
1,1,1-Trichloroethane	ND	µg/L	120
Carbon tetrachloride	ND	µg/L	120
Vinyl acetate	ND	µg/L	250
Bromodichloromethane	ND	µg/L	120
1,2-Dichloropropane	ND	µg/L	120
cis-1,3-Dichloropropene	ND	µg/L	120
Trichloroethene	ND	µg/L	120
Dibromochloromethane	ND	µg/L	120
1,1,2-Trichloroethane	ND	µg/L	120
Benzene	ND	µg/L	120
trans-1,3-Dichloropropene	ND	µg/L	120
Bromoform	ND	µg/L	120
4-Methyl-2-pentanone	ND	µg/L	250
2-Hexanone	ND	µg/L	250
1,1,2,2-Tetrachloroethane	ND	µg/L	120
Tetrachloroethene	ND	µg/L	120
Toluene	42*	µg/L	120
Chlorobenzene	ND	µg/L	120
Ethylbenzene	34*	µg/L	120
Styrene	ND	µg/L	120
Xylene (total)	2,400	µg/L	120

*Trace concentrations detected below the reporting limit.
ND = Not detected.

Reported by Ci Approved by mHc

TOTAL ION CHROMATOGRAM



2-5600, GCMS V1

Data File: >7273::D7
Name: GEO 1460-2 200UL
Misc: CH#3 5ULQC141

Quant Output File: ^7273::QT

Id File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881027 11:21

FOR INTERNAL USE ONLY
Erco [illegible]

Operator ID: BILL
Quant Time: 881027 19:12
Injected at: 881027 18:26

Previous sample [illegible] 7272 Erco ID spike
Major contaminants —
Previously in [illegible] 7259 [illegible] Vectrex SFD
Major contaminants —
Carryover? ✓ [illegible]
I.S. and [illegible]
Integration [illegible]
Spectra [illegible]
All peaks [illegible] Yes [illegible] No
If no, number of [illegible]
Bilution factor 25 Calculations checked
Blank FRN 7268 Contaminants
LCS FRN ~~7269~~ 7270 LCSC FRN 7271
Expression KH 10/29/88 Date
% solid Date
Methanol blank FRN
Initials KH

good

QUANT REPORT

Operator ID: BILL Quant Rev: 6 Quant Time: 881027 19:12
Output File: ^7273::QT Injected at: 881027 18:26
Data File: >7273::D7 Dilution Factor: 1.00000
Name: GEO 1460-2 200UL 2-5600, GCMS V1
Misc: CH#3 5ULQC14I

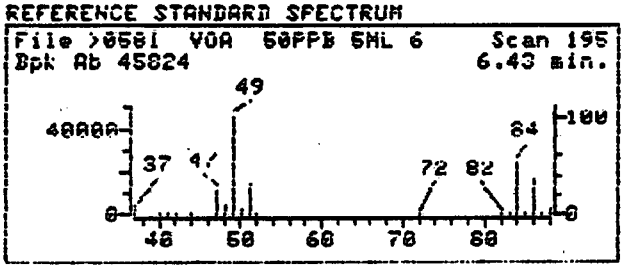
ID File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881027 11:21

		Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*CI01	Bromochloromethane	11.16	259	53584	50.00	UG/L	100
6)	C030	Methylene Chloride	8.05	179	147671	80.43	UG/L	89
14)	CS15	D4-1,2-Dichloroethane	14.07	334	121306	52.24	UG/L 104	94
15)	*CI10	1,4-Difluorobenzene	21.71	531	213397	50.00	UG/L	100
30)	*CI20	D5-Chlorobenzene	26.65	658	223118	50.00	UG/L	71
35)	C230	Toluene	25.60	631	6424	1.70	UG/L	99
36)	CS05	D8-Toluene	25.41	626	161395	45.53	UG/L 91	94
38)	C240	Ethylbenzene	29.21	724	3556	1.35	UG/L	97
39)	C250	Xylene (m)	34.80	868	339050	97.54 87.51	UG/L	91
41)	C250	Xylenes (o , p)	36.20	904	37369M	10.03	UG/L	
42)	CS10	Bromofluorobenzene (BFB)	32.32	804	140884	53.70	UG/L 107	86

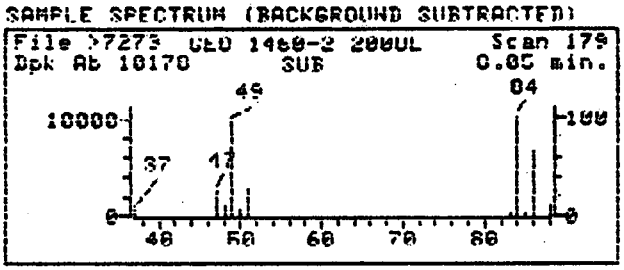
CL 11/11/88

* Compound is ISTD

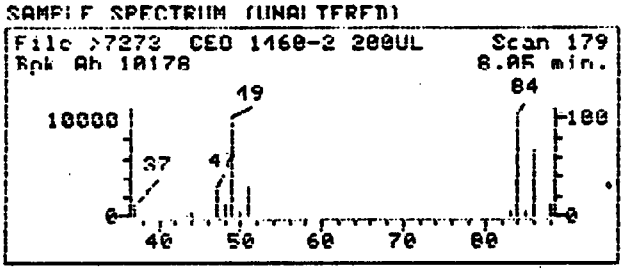
REFERENCE STANDARD SPECTRUM

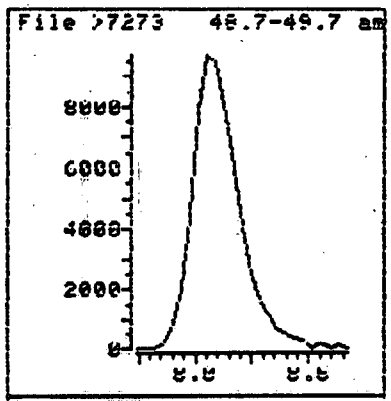


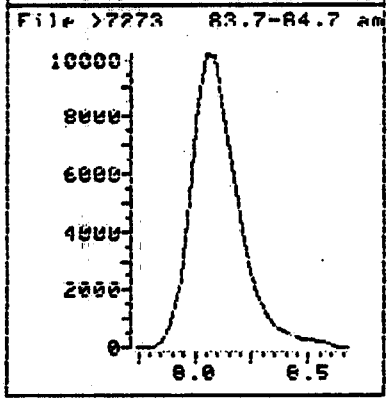
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)





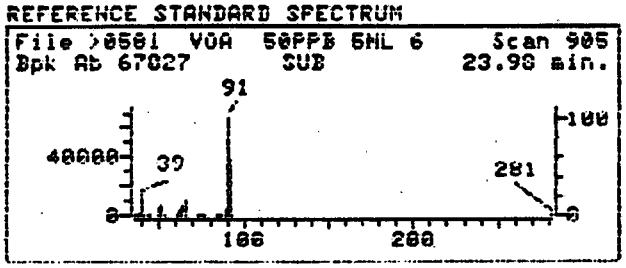


2-56α, GCMS V1

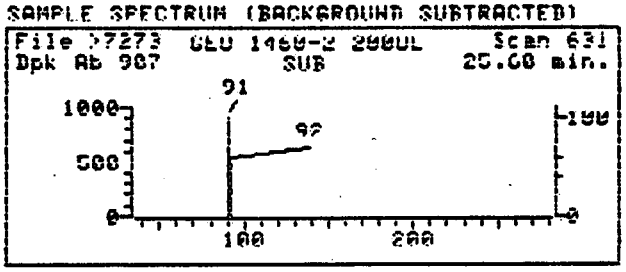
Data File: >7273::D7 Quant Output File: ^7273::Q1
Name: GEO 1460-2 200UL
Misc: CH#3 5ULQC141
Quant Time: 881027 19:12 Quant ID File: VOA101::$$
Injected at: 881027 18:26 Last Calibration: 881027 11:21

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 179
Retention Time: 8.05 min.
Quant Ion: 84.0
Area: 147671
Concentration: 80.43 UG/L
q-value: 89

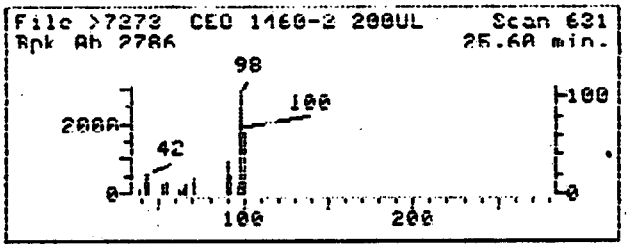
REFERENCE STANDARD SPECTRUM

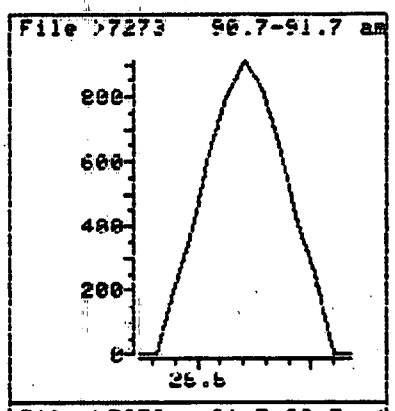


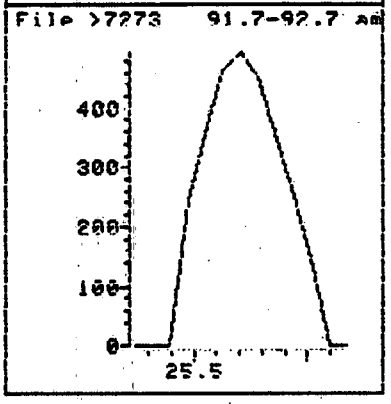
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







2-5600, GCMS V,

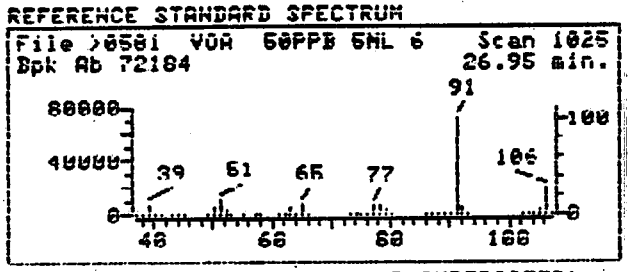
Data File: >7273::D2
Name: GEO 1460-2 200UL
Misc: CH#3 5ILQC141
Quant Time: 881022 19:12
Injected at: 881022 18:26

Quant Output File: ^7273::QT

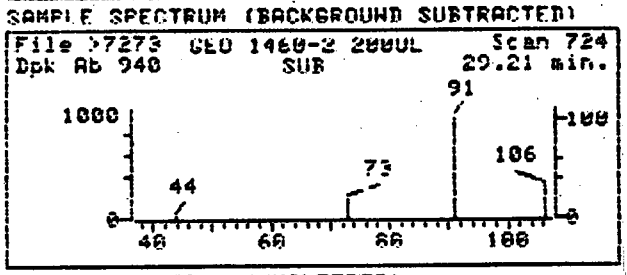
Quant ID File: VHAID1::$$
Last Calibration: 881022 11:21

Compound No: 35
Compound Name: C230 Toluene
Scan Number: 631
Retention Time: 25.60 min.
Quant Ion: 92.0
Area: 6424
Concentration: 1.70 UG/L
q-value: 99

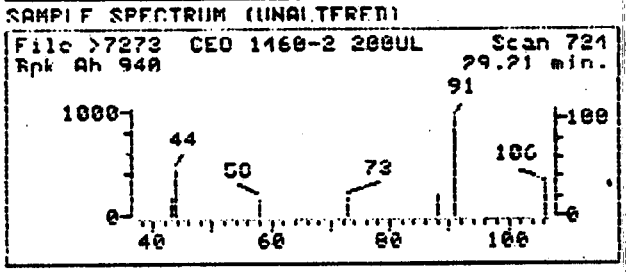
REFERENCE STANDARD SPECTRUM

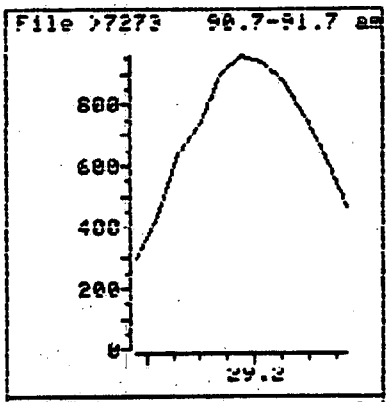


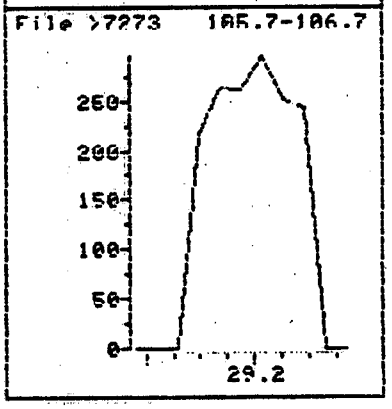
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







2-5400, GCMS V1

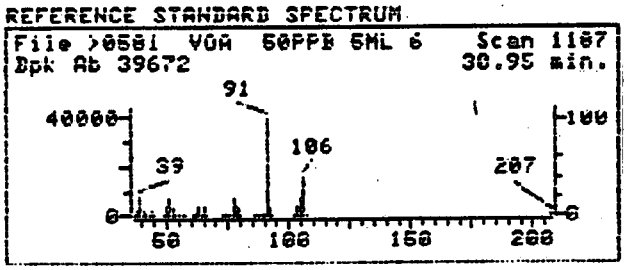
Data File: >7273::D2
Name: GEO 1460-2 200UL
Misc: CH#3 5ULQC141
Quant Time: 881022 19:12
Injected at: 881022 18:26

Quant Output File: ^7273::WT

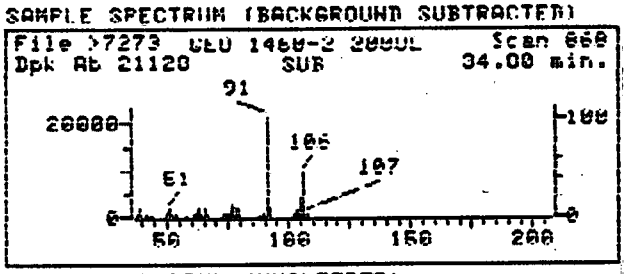
Quant ID File: VHA101::$$
Last Calibration: 881022 11:21

Compound No: 38
Compound Name: C240 Ethylbenzene
Scan Number: 724
Retention Time: 29.21 min.
Quant Ion: 106.0
Area: 3556
Concentration: 1.36 UG/L
q-value: 97

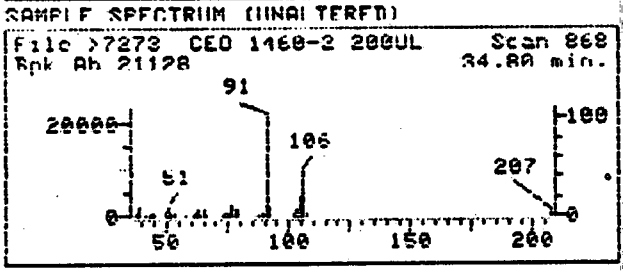
REFERENCE STANDARD SPECTRUM

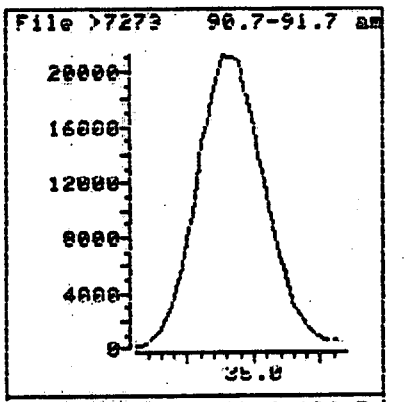


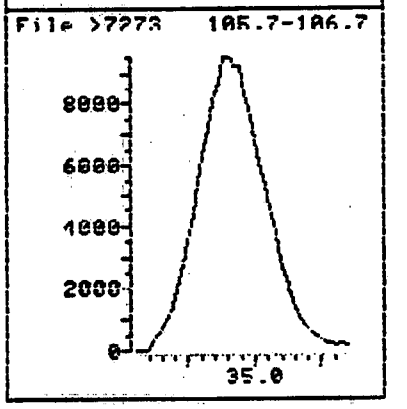
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNAUTERED)







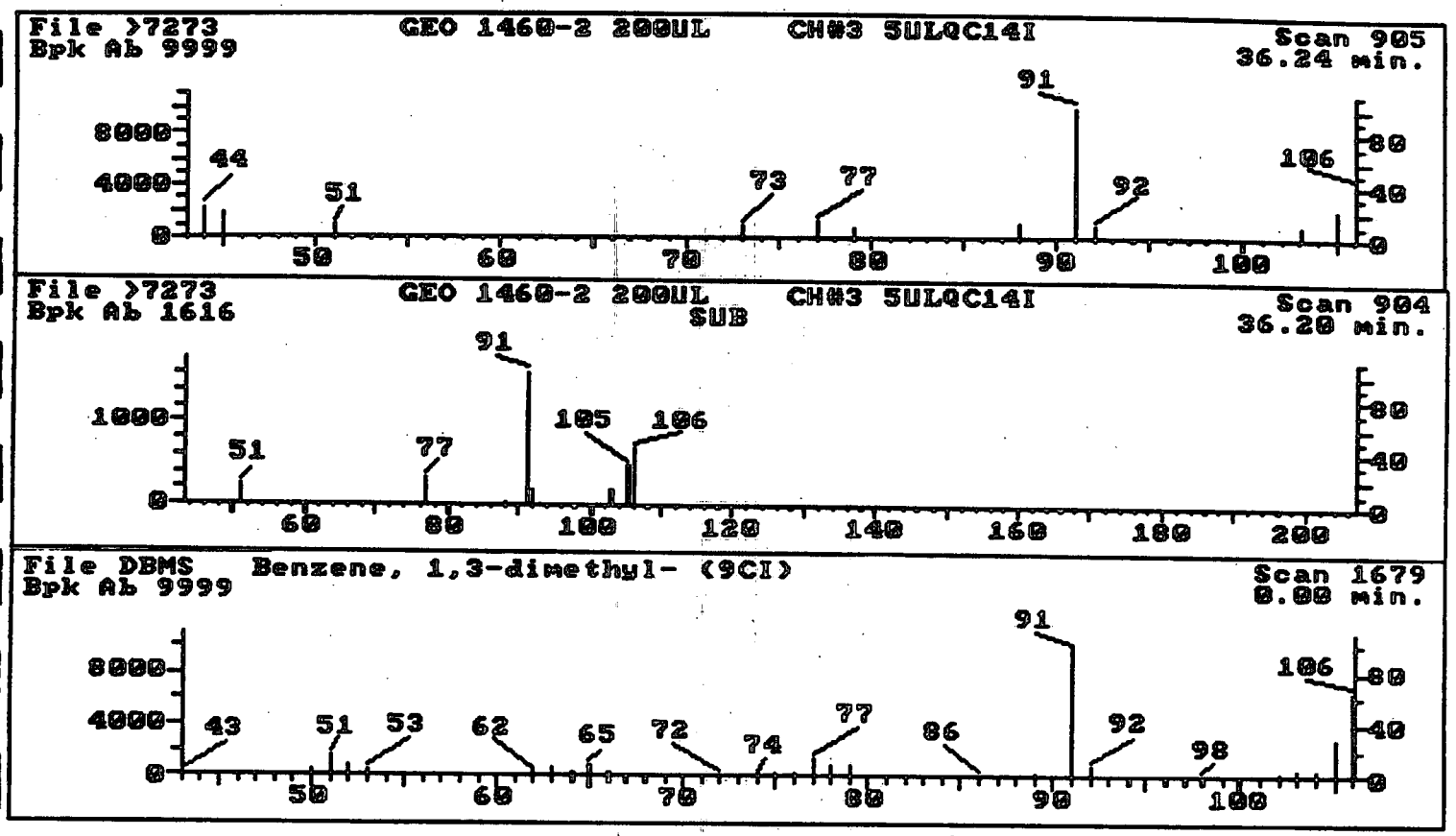
2-5600, OCMS V1

Data File: >7273::D2
Name: GEO 1460-2 200UL
Misc: CH#3 5ULQC141
Quant Time: 881027 19:12
Injected at: 881027 18:26

Quant Output File: ^7273::QT

Quant ID File: VOAID1::$$
Last Calibration: 881027 11:21

Compound No: 39
Compound Name: C250 Xylene (m)
Scan Number: 868
Retention Time: 34.80 min.
Quant Ion: 106.0
Area: 339050
Concentration: 87.51 UG/L
q-value: 91



Xylenes (o,p) 1+2 11-16-88

MS data file header from : >7273

Sample: GEO 1460-2 200UL Operator: BILL MS 10/27/88 18:26
Misc : CH#3 5ULQC14I
Sys. #: 1 MS model: 96 SW/HW rev.: IA ALS # : 0
Method file: VOA1 Tuning file: MT7401 No. of extra records: 2
Source temp.: 220 Analyzer temp.: 220 Transfer line temp. : 220

Chromatographic temperatures :	45.	220.	220.	0.	0.
Chromatographic times, min. :	3.0	18.0	2.0	0.0	0.0
Chromatographic rate, deg/min:	8.0	8.0	0.0	0.0	0.0

2-5600 GCMS V.

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

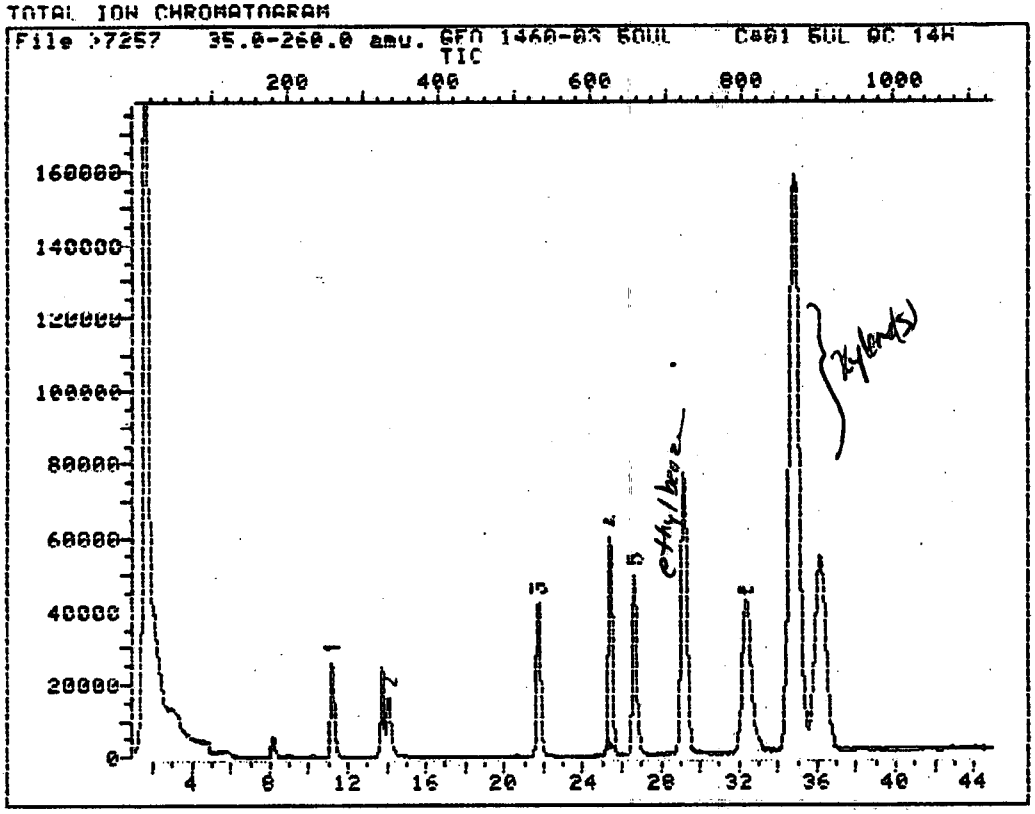
Client Name: GeoEngineering, Inc.
Client ID: 3-5600 MW-3
Laboratory ID: 1460-03
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/26/88 Analyzed: 10/26/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,000
Bromomethane	ND	µg/L	1,000
Vinyl chloride	ND	µg/L	1,000
Chloroethane	ND	µg/L	1,000
Methylene chloride	820*B	µg/L	2,500
Acetone	ND	µg/L	2,500
Carbon disulfide	ND	µg/L	500
1,1-Dichloroethene	ND	µg/L	500
1,1-Dichloroethane	ND	µg/L	500
1,2-Dichloroethene (total)	ND	µg/L	500
Chloroform	ND	µg/L	500
1,2-Dichloroethane	ND	µg/L	500
2-Butanone	ND	µg/L	1,000
1,1,1-Trichloroethane	ND	µg/L	500
Carbon tetrachloride	ND	µg/L	500
Vinyl acetate	ND	µg/L	1,000
Bromodichloromethane	ND	µg/L	500
1,2-Dichloropropane	ND	µg/L	500
cis-1,3-Dichloropropene	ND	µg/L	500
Trichloroethene	ND	µg/L	500
Dibromochloromethane	ND	µg/L	500
1,1,2-Trichloroethane	ND	µg/L	500
Benzene	ND	µg/L	500
trans-1,3-Dichloropropene	ND	µg/L	500
Bromoform	ND	µg/L	500
4-Methyl-2-pentanone	ND	µg/L	1,000
2-Hexanone	ND	µg/L	1,000
1,1,2,2-Tetrachloroethane	ND	µg/L	500
Tetrachloroethene	ND	µg/L	500
Toluene	ND	µg/L	500
Chlorobenzene	ND	µg/L	500
Ethylbenzene	6,700	µg/L	500
Styrene	ND	µg/L	500
Xylene (total)	27,000	µg/L	500

*Trace concentrations detected below the reporting limit.
B = Analyte also detected in Erco blank.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



3-5600, GCMS V1

Data File: >7252::D2
Name: GEO 1460-03 5UL
Misc: C#01 5UL QC 14H

Quant Output File: ^2252::QT

Id File: VOAID1::$$
Title: HSL VOLATILES:BET 1%SP1000:45-220@4/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881026 21:42

Operator ID: KERY
Quant Time: 881027 00:11
Injected at: 881026 23:25

FOR INTERNAL USE ONLY
Erco VOA GC/MS Lab

Previous sample FRN 7256 Erco ID _____
Major contaminants —
Previously in chamber FRN 7243 Erco ID _____
Major contaminants —
Carryover? Yes ___ No ✓ If yes, what? _____
I.S. and surrogate areas checked ✓
Integration checked _____
Spectra checked _____
All peaks accounted for? Yes ___ No _____
If no, number of unknowns _____
Dilution factor 100 Calculations checked _____
Blank FRN 7256 Contaminants MEK, 3.75
LCS FRN 7248 LCSD FRN 7249
Correction weight _____ Date _____
% solid _____ Date _____
Matrix Spike FRN _____
Initials _____

QUANT REPORT

Operator ID: KERY Quant Rev: 6 Quant Time: 881027 00:11
Output File: ^7257::QT Injected at: 881026 23:25
Data File: >7257::D7 Dilution Factor: 1.00000
Name: GEO 1460-03 5UL 3-5600, GCMS V1
Disc: C#01 5UL QC 14H

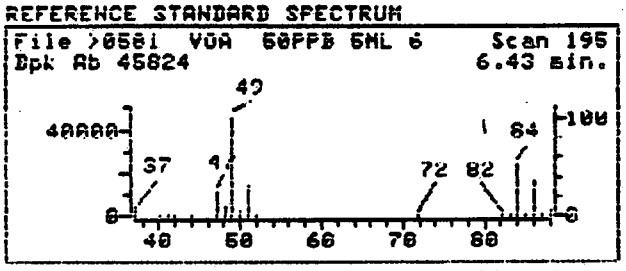
ID File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881026 21:42

		Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*CI01	Bromochloromethane	11.20	49.0	57312	50.00	UG/L	100
6)	C030	Methylene Chloride	8.17	84.0	22681	8.22	UG/L ✓	85
14)	CS15	D4-1,2-Dichloroethane	14.07	65.0	131867	51.95	UG/L 104	96
5)	*CI10	1,4-Difluorobenzene	21.71	114.0	265863	50.00	UG/L	100
0)	*CI20	D5-Chlorobenzene	26.65	117.0	255696	50.00	UG/L	73
36)	CS05	D8-Toluene	25.41	100.0	197585	49.42	UG/L 99	97
8)	C240	Ethylbenzene	29.17	106.0	204298	67.21	UG/L ✓	99
9)	C250	Xylene (m)	34.84	106.0	881634	193.19	UG/L ✓	93
41)	C250	Xylenes (o , p)	36.20	106.0	320735	72.71	UG/L ✓	94
42)	CS10	Bromofluorobenzene (BFB)	32.32	95.0	154734	50.18	UG/L 100	86

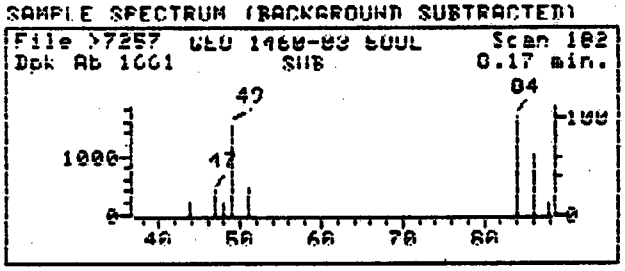
CL 11/14/88

* Compound is ISTD

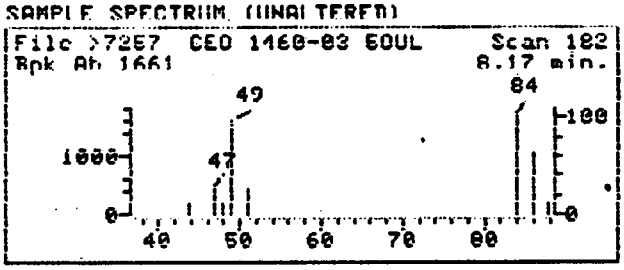
REFERENCE STANDARD SPECTRUM

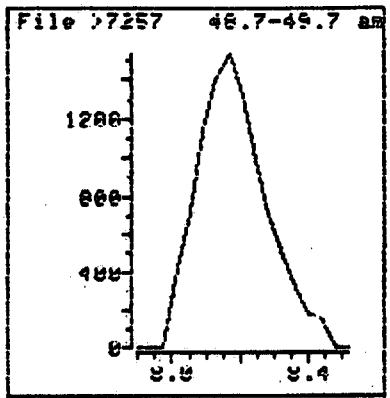


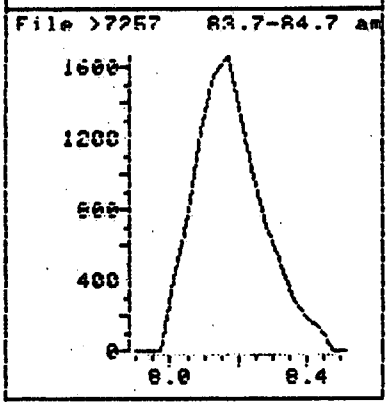
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







3-5600, GCMS U1

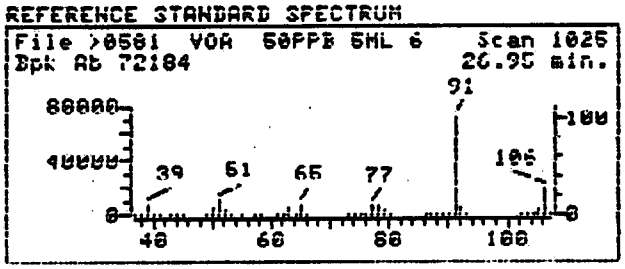
Data File: >7257::D7
Name: GEO 1460-03 50UL
Misc: C#01 5UL QC 14H
Quant Time: 881027 00:11
Injected at: 881026 23:25

Quant Output File: ^7257::Q1

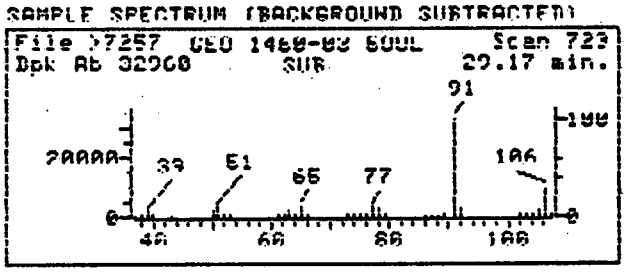
Quant ID File: VHAID1::$$
Last Calibration: 881026 21:42

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 182
Retention Time: 8.17 min.
Quant Ion: 84.0
Area: 22681
Concentration: 8.22 UG/L
q-value: 85

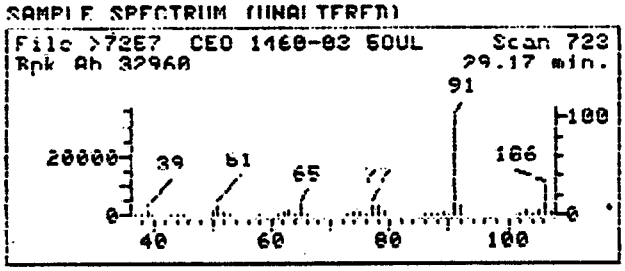
REFERENCE STANDARD SPECTRUM

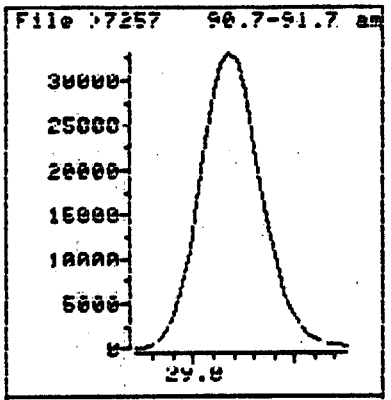


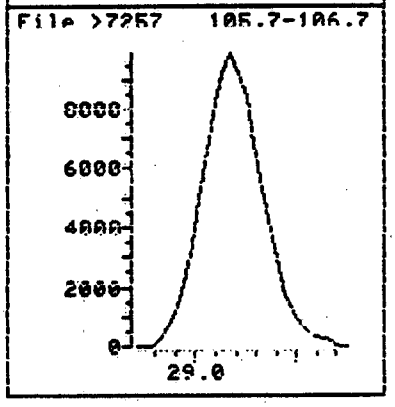
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







3-5600, GCMS V1

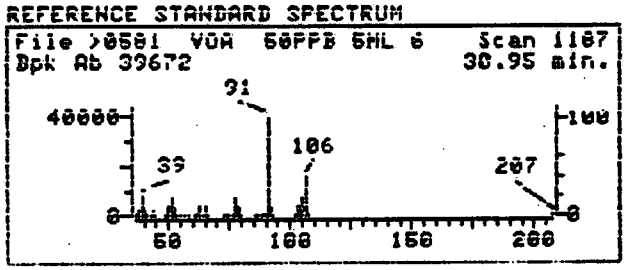
Data File: >7257::D7
Name: GEO 1460-03 50UL
Misc: C#01 5UL QC 14H
Quant Time: 881027 00:11
Injected at: 881026 23:25

Quant Output File: ^7257::QT

Quant ID File: VOAID1::$$
Last Calibration: 881026 21:42

Compound No: 38
Compound Name: C240 Ethylbenzene
Scan Number: 723
Retention Time: 29.17 min.
Quant Ion: 106.0
Area: 204298
Concentration: 67.21 UG/L
q-value: 99

REFERENCE STANDARD SPECTRUM



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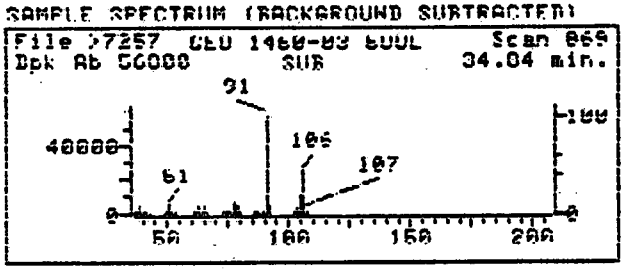

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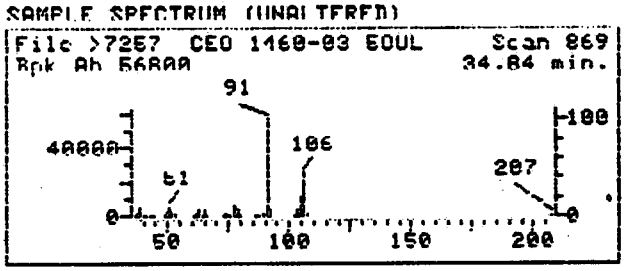
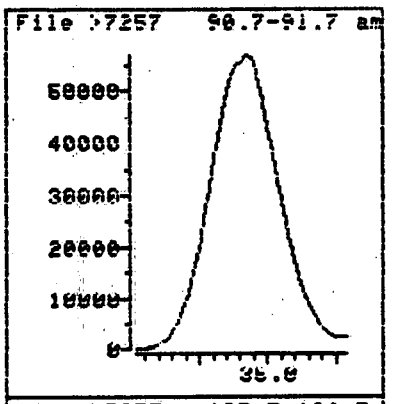
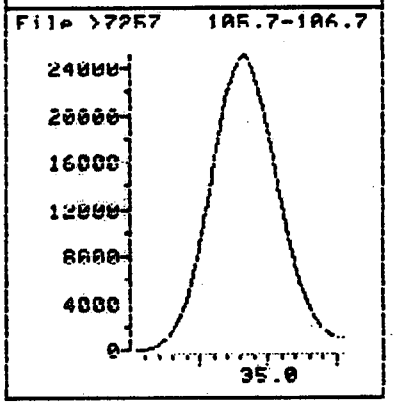






3-5600, GCMS VI

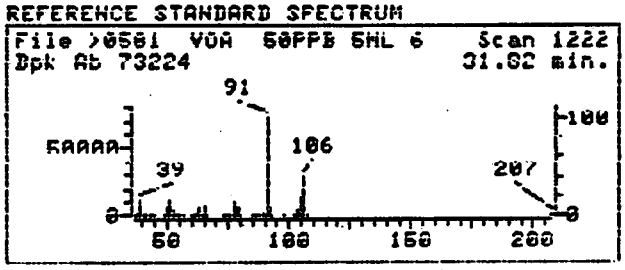
Data File: >7257::D7
Name: CEO 1460-03 SOUL
Misc: C#01 SUL QC 14H
Quant Time: 881022 00:11
Injected at: 881026 23:25

Quant Output File: ^7257::Q1

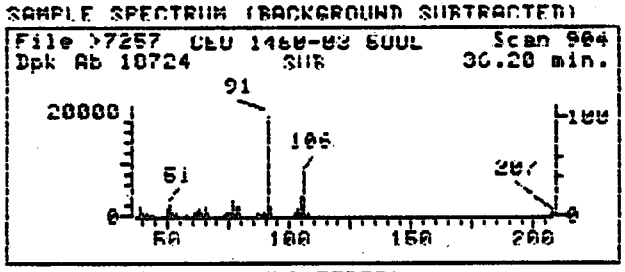
Quant ID File: VOA1D1::$$
Last Calibration: 881026 21:42

Compound No: 39
Compound Name: C2SU Xylene (m)
Scan Number: 869
Retention Time: 34.84 min.
Quant Ion: 106.0
Area: 881634
Concentration: 193.19 UG/L
q-value: 93

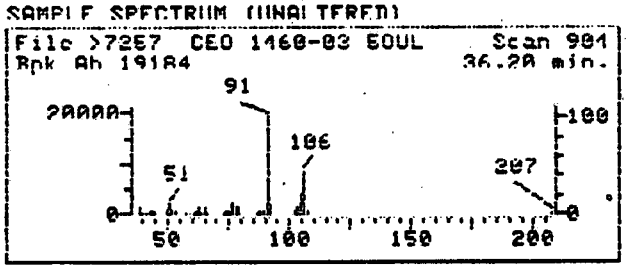
REFERENCE STANDARD SPECTRUM

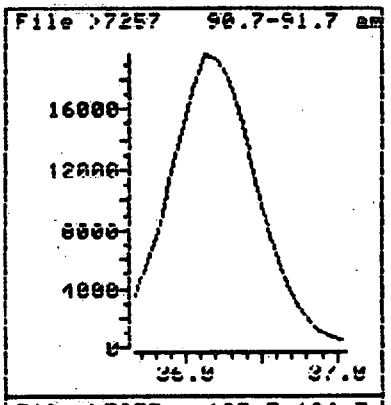


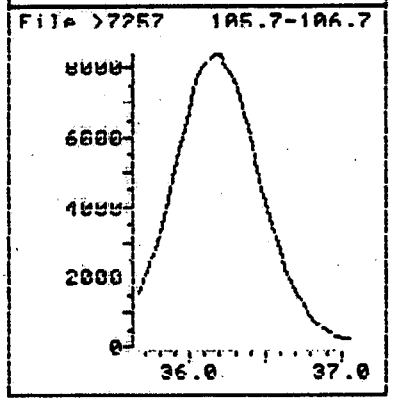
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







3.5600, GCMS VI

Data File: >7257::D7 Quant Output File: ^7257::WT
Name: GEO 1460-03 5OUL
Misc: C#01 5UL QC 14H
Quant Time: AB1027 00:11 Quant ID File: VUA1D1::$$
Injected at: AB1026 23:25 Last Calibration: AB1026 21:42

Compound No: 41
Compound Name: C25U Xylenes (o , p)
Scan Number: 9U4
Retention Time: 36.2U min.
Quant Ion: 106.0
Area: 32U735
Concentration: 22.21 UG/L
q-value: 94

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

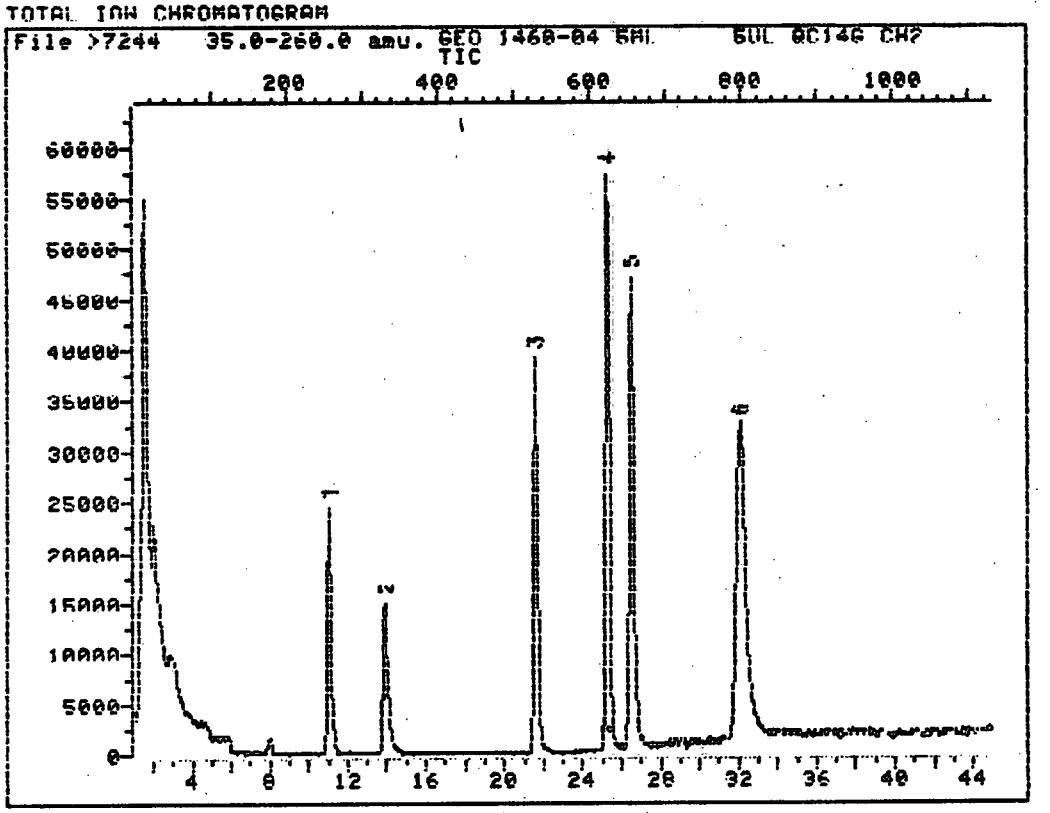
Client Name: GeoEngineering, Inc.
Client ID: 4-5600 MW-4
Laboratory ID: 1460-04
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/25/88 Analyzed: 10/25/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride ----------	4.0*	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

*Trace concentrations detected below the reporting limit.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



4-5600, GCMS V1

Data File: >7244::D8
Name: GEO 1460-04 5ML
Misc: 5UL QC14G CH2

Quant Output File: ^7244::QT

Id File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881025 11:33

Operator ID: BILL
Quant Time: 881025 21:26
Injected at: 881025 20:40

FOR INTERNAL USE ONLY
Erco VOA GC/MS Lab

Previous sample FRN 7243 Erco ID Blk
Major contaminants
Previously in chamber FRN 7222 Erco ID 1413-3
Major contaminants
Carryover? Yes ___ No ✓ If yes, what?
I.S. and surrogate areas checked
Integration checked
Spectra checked
All peaks accounted for? Yes ___ No ___
If no, number of unknowns
Dilution factor ___ Calculations checked
Blank FRN 7234 Contaminants
LCS FRN 7235 MSSD FRN 7236
Extraction weight ___ Date
Analyst ___ Date
[illegible]
Initials KLK

good

QUANT REPORT

Operator ID: BILL Quant Rev: 6 Quant Time: 881025 21:26
Output File: ^7244::QT Injected at: 881025 20:40
Data File: >7244::D8 Dilution Factor: 1.00000
Name: GEO 1460-04 5ML 4-5600, GCMS V1
Misc: 5UL QC14G CH2

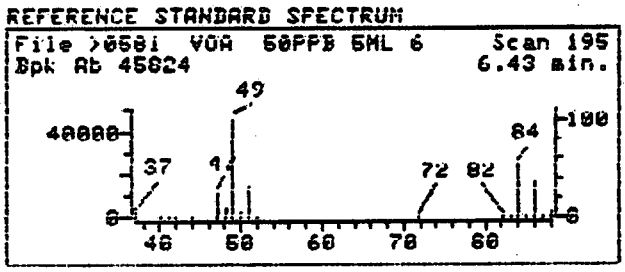
ID File: VOAID1::$$
Title: HSL VOLATILES:8FT 1%SP1000:45-220@8/MIN:GCMS V1:FRCO/ENSECO
Last Calibration: 881025 11:33

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*CI01 Bromochloromethane	11.05	49.0	54869	50.00	UG/L	100
6)	CO30 Methylene Chloride	7.98	84.0	6440	4.01	UG/L ✓	87
4)	CS15 D4-1,2-Dichloroethane	13.92	65.0	124024	52.37	UG/L 105	99
15)	*CI10 1,4-Difluorobenzene	21.60	114.0	240367	50.00	UG/L	100
30)	*CI20 D5-Chlorobenzene	26.50	117.0	253740	50.00	UG/L	72
6)	CS05 D8-Toluene	25.30	100.0	194707	48.36	UG/L 97	96
2)	CS10 Bromofluorobenzene (BFB)	32.09	95.0	149810	51.87	UG/L 104	82

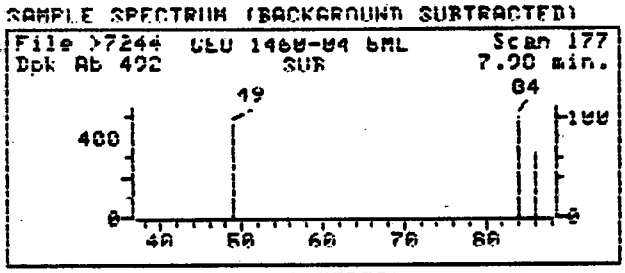
CL 11/11/88

* Compound is ISTD

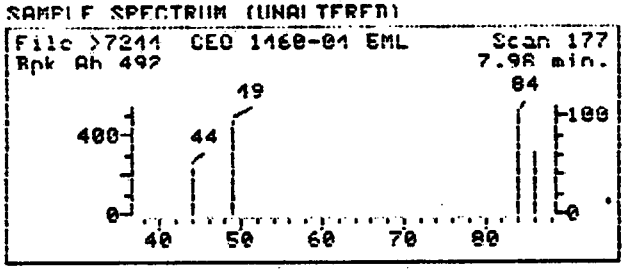
REFERENCE STANDARD SPECTRUM

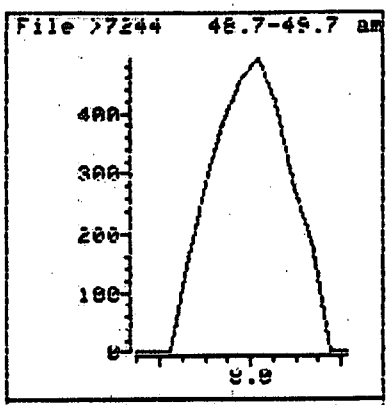


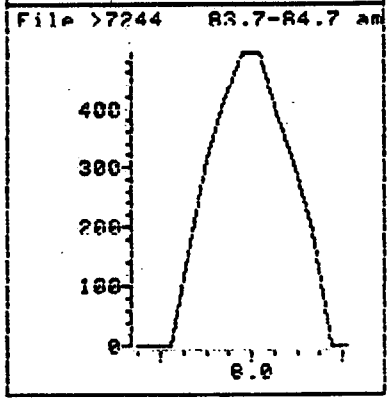
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







4-5600, GCMS V1

Data File: >7244::DB
Name: GEO 1460-04 5ML
Misc: SUB. QC14G CH2
Quant Time: 881025 21:26
Injected at: 881025 20:40

Quant Output File: ^7244::QI
Quant ID File: VHAID1::$$
Last Calibration: 881025 11:34

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 177
Retention Time: 7.98 min.
Quant Ion: 84.0
Area: 64411
Concentration: 4.01 UG/L
q-value: 87

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

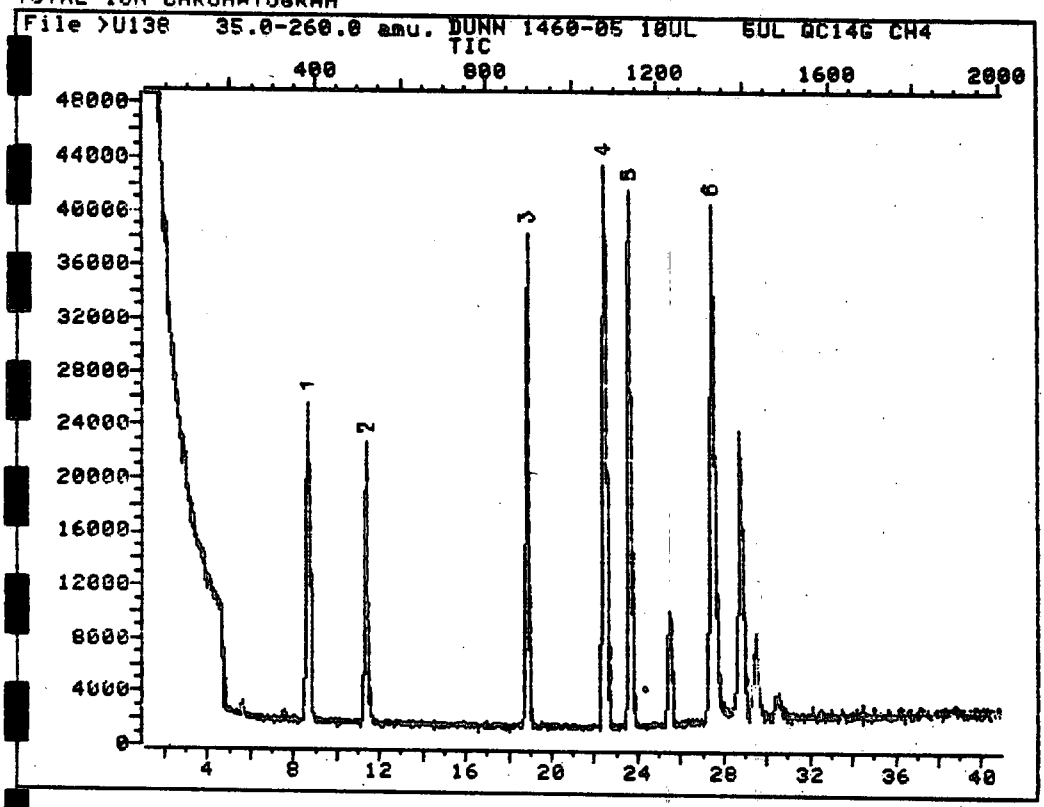
Client Name: GeoEngineering, Inc.
Client ID: 1-5600 MW-1
Laboratory ID: 1460-05
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/26/88 Analyzed: 10/26/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5,000
Bromomethane	ND	µg/L	5,000
Vinyl chloride	ND	µg/L	5,000
Chloroethane	ND	µg/L	5,000
Methylene chloride	900*	µg/L	12,000
Acetone	ND	µg/L	12,000
Carbon disulfide	ND	µg/L	2,500
1,1-Dichloroethene	ND	µg/L	2,500
1,1-Dichloroethane	ND	µg/L	2,500
1,2-Dichloroethene (total)	ND	µg/L	2,500
Chloroform	ND	µg/L	2,500
1,2-Dichloroethane	ND	µg/L	2,500
2-Butanone	ND	µg/L	5,000
1,1,1-Trichloroethane	ND	µg/L	2,500
Carbon tetrachloride	ND	µg/L	2,500
Vinyl acetate	ND	µg/L	5,000
Bromodichloromethane	ND	µg/L	2,500
1,2-Dichloropropane	ND	µg/L	2,500
cis-1,3-Dichloropropene	ND	µg/L	2,500
Trichloroethene	ND	µg/L	2,500
Dibromochloromethane	ND	µg/L	2,500
1,1,2-Trichloroethane	ND	µg/L	2,500
Benzene	ND	µg/L	2,500
trans-1,3-Dichloropropene	ND	µg/L	2,500
Bromoform	ND	µg/L	2,500
4-Methyl-2-pentanone	ND	µg/L	5,000
2-Hexanone	ND	µg/L	5,000
1,1,2,2-Tetrachloroethane	ND	µg/L	2,500
Tetrachloroethene	ND	µg/L	2,500
Toluene	ND	µg/L	2,500
Chlorobenzene	ND	µg/L	2,500
Ethylbenzene	4,000	µg/L	2,500
Styrene	ND	µg/L	2,500
Xylene (total)	17,000	µg/L	2,500

*Trace concentrations detected below the reporting limit.
ND = Not detected.

Reported by CC Approved by WHC

TOTAL ION CHROMATOGRAM



1-5600, GCMS V3

Data File: >U138::D0 Quant Output File: ^U138::QO
Name: ~~DUNN~~ 1460-05 10UL
Misc: 5UL QC14G CH4
GEO

Id File: VOAID3::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V3:ERCO/ENSECO
Last Calibration: 881026 11:38

Operator ID: GREG
Quant Time: 881026 17:34
Injected at: 881026 16:52

U137 1460-03
U124 MEOMBLE

good

U132 500
U133 U134

QUANT REPORT

Operator ID: GREG
Output File: ^U138::QO
Data File: >U138::D0
Name: DUNN 1460-05 10UL 1-5600, GCMS V3
Misc: 5UL QC14G CH4

Quant Rev: 6
Quant Time: 881026 17:34
Injected at: 881026 16:52
Dilution Factor: 1.00000

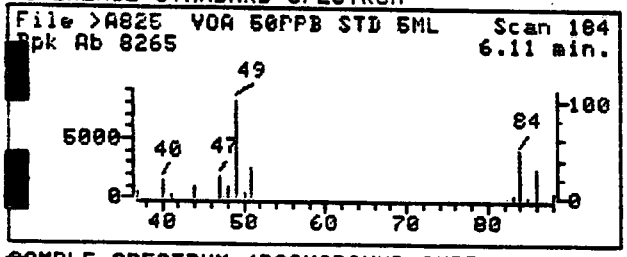
ID File: VOAID3::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V3:ERCO/ENSECO
Last Calibration: 881026 11:38

	Compound		R.T.	Q ion	Area	Conc	Units	q
	*CI01	Bromochloromethane	8.63	49.0	58861	50.00	ug/L	80
6)	C030	Methylene Chloride	5.58	84.0	2383	1.84	ug/L ✓	74
	CS15	D4-1,2-Dichloroethane	11.31	65.0	102432	47.82	ug/L 96	95
	*CI10	1,4-Difluorobenzene	18.83	114.0	136716	50.00	ug/L	100
	*CI20	D5-Chlorobenzene	23.61	117.0	114445	50.00	ug/L	81
6)	CS05	D8-Toluene	22.44	100.0	93906	49.07	ug/L 98	93
	C240	Ethylbenzene	25.44	106.0	10425	7.96	ug/L ✓	92
	C250	Xylene (m)	28.72	106.0	46363	25.15	ug/L ✓	90
0)	C245	Styrene	28.72	104.0	1071	34.22 ~~37~~	ug/L	100
	C250	Xylenes (o , p)	29.47	106.0	16201	9.07	ug/L ✓	93
	CS10	Bromofluorobenzene (BFB)	27.39	95.0	75973	48.72	ug/L 97	81

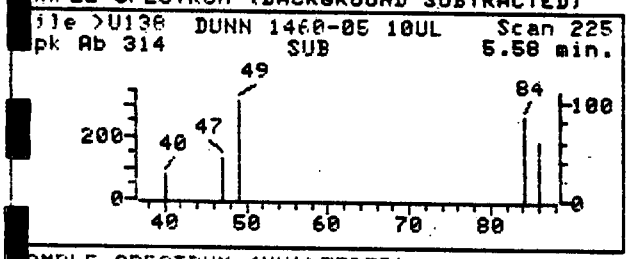
* Compound is ISTD

CL 11/11/88

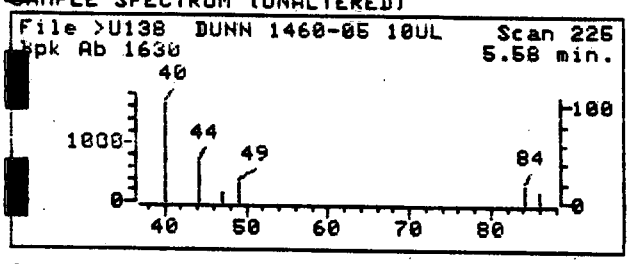
REFERENCE STANDARD SPECTRUM

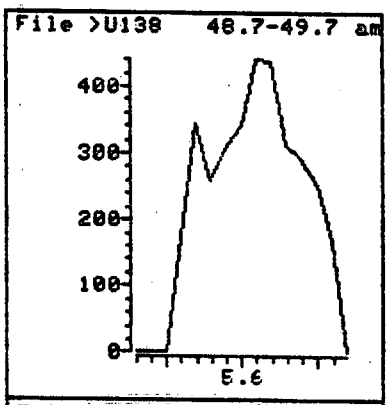


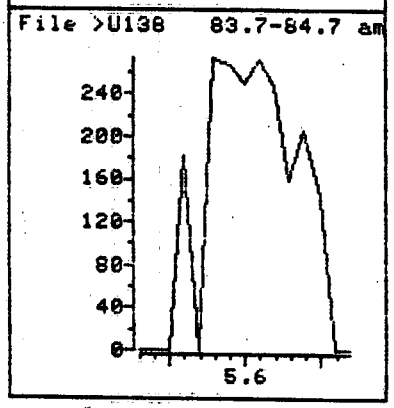
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







1-5600, GCMS U3

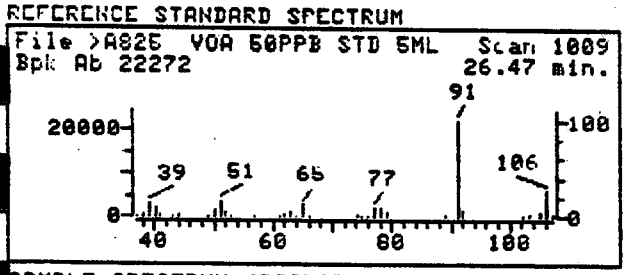
Data File: >U138::D0
Name: DUNN 1460-05 10UL
Misc: 5UL QC14G CH4
Quant Time: 881026 17:34
Injected at: 881026 16:52

Quant Output File: ^U138::Q0

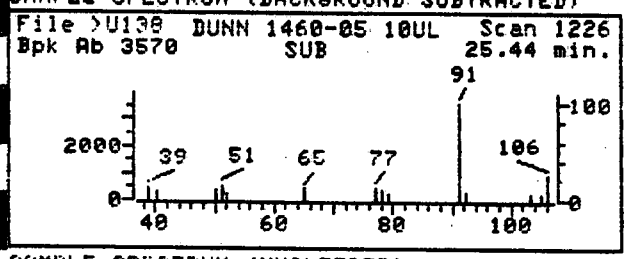
Quant ID File: VOAID3::$$
Last Calibration: 881026 11:38

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 225
Retention Time: 5.58 min.
Quant Ion: 84.0
Area: 2383
Concentration: 1.84 ug/L
q-value: 74

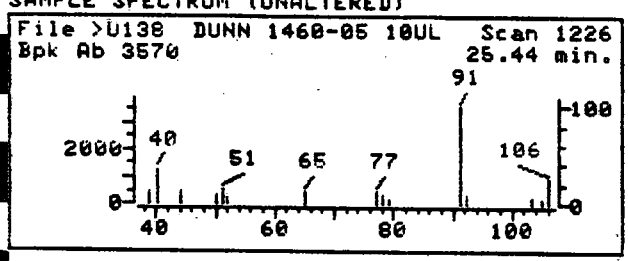
REFERENCE STANDARD SPECTRUM

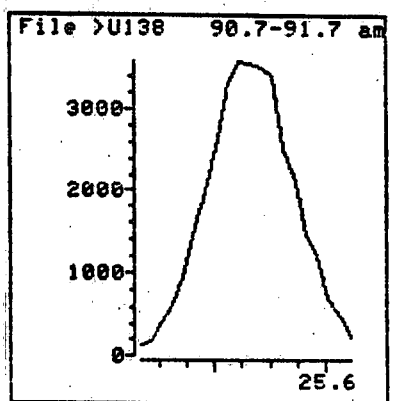


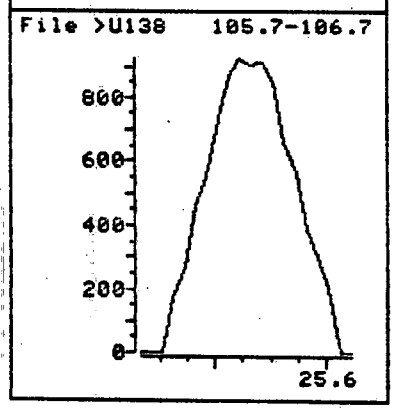
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







1-5600, GCMS 13

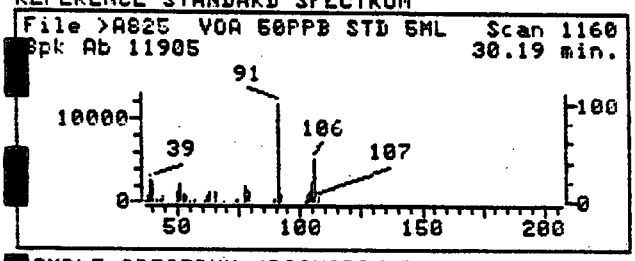
Data File: >U138::D0
Name: DUNN 1460-05 10UL
Misc: 5UL QC14G CH4
Quant Time: 881026 17:34
Injected at: 881026 16:52

Quant Output File: ^U138::Q0

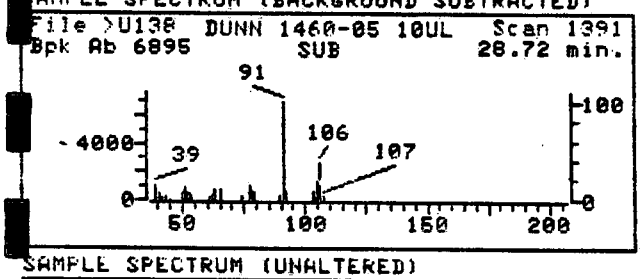
Quant ID File: VOAID3::$$
Last Calibration: 881026 11:38

Compound No: 38
Compound Name: C240 Ethylbenzene
Scan Number: 1226
Retention Time: 25.44 min.
Quant Ion: 106.0
Area: 10425
Concentration: 7.96 ug/L
q-value: 92

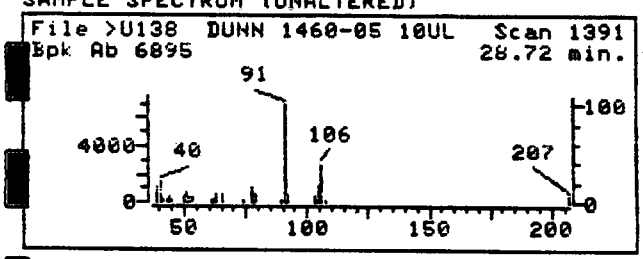
REFERENCE STANDARD SPECTRUM

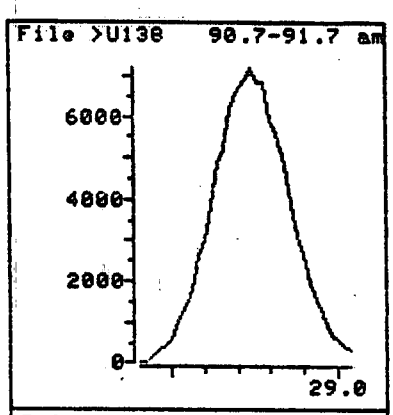


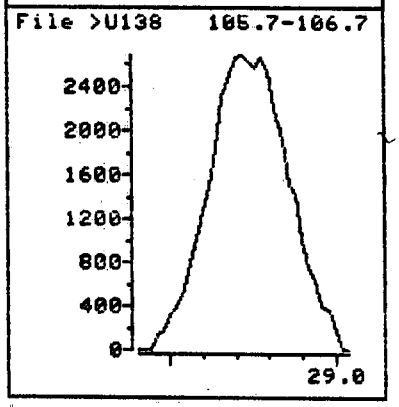
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







1-5600, GCMS U3

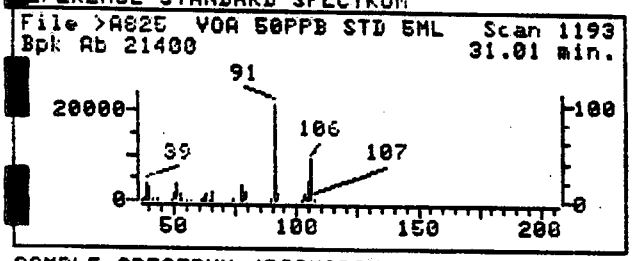
Data File: >U138::D0
Name: DUNN 1460-05 10UL
Misc: 5UL QC14G CH4
Quant Time: 881026 17:34
Injected at: 881026 16:52

Quant Output File: ^U138::Q0

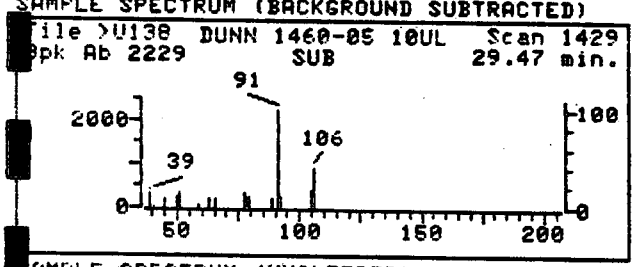
Quant ID File: VOAID3::$$
Last Calibration: 881026 11:38

Compound No: 39
Compound Name: C250 Xylene (m)
Scan Number: 1391
Retention Time: 28.72 min.
Quant Ion: 106.0
Area: 46363
Concentration: 25.15 ug/L
q-value: 90

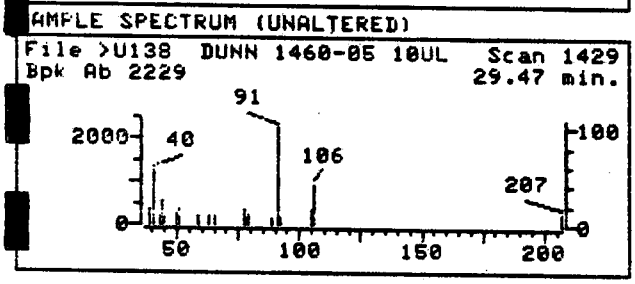
EFERENCE STANDARD SPECTRUM

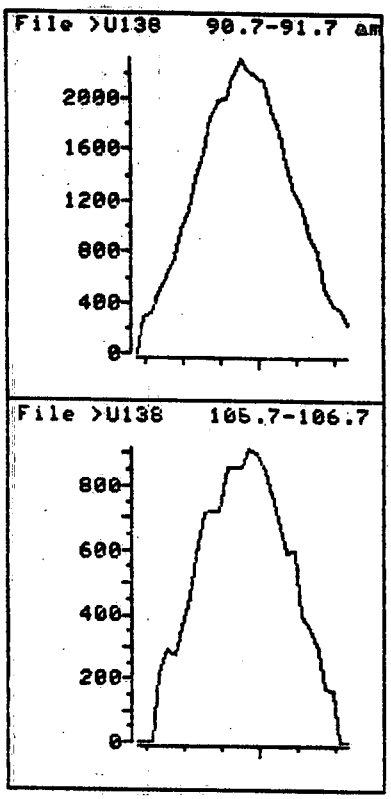


SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



AMPLE SPECTRUM (UNALTERED)





1-5600, GCMS J1

Data File: >U138::D0
Name: DUNN 1460-05 10UL
Misc: 5UL QC14G CH4
Quant Time: 881026 17:34
Injected at: 881026 16:52

Quant Output File: ^U138::Q0

Quant ID File: VOAID3::$$
Last Calibration: 881026 11:38

Compound No: 41
Compound Name: C250 Xylenes (o , p)
Scan Number: 1429
Retention Time: 29.47 min.
Quant Ion: 106.0
Area: 16201
Concentration: 9.07 ug/L
q-value: 93

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: GeoEngineering, Inc.
Client ID: TB-5600
Laboratory ID: 1460-06
Matrix: Aqueous Sampled: 10/20/88 Received: 10/24/88
Authorized: 10/24/88 Prepared: 10/26/88 Analyzed: 10/26/88

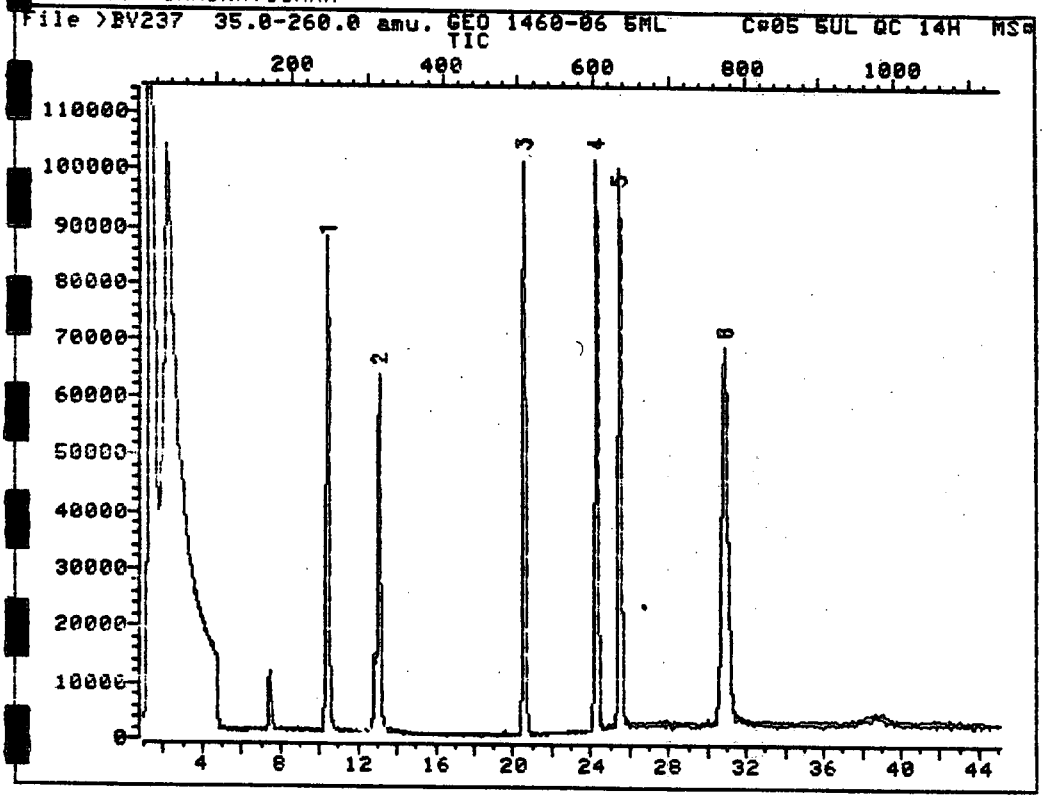
Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride ----------	7.5*B	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

*Trace concentrations detected below the reporting limit.
B = Analyte also detected in Erco blank.
ND = Not detected.

Reported by CL/AL Approved by WHC/AL

OTAL ION CHROMATOGRAM

File >BV237 35.0-260.0 amu. GEO 1460-06 5ML C#05 5UL QC 14H MS#



TB-5600, GCMS V

Data File: >BV237::D6 Quant Output File: ^BV237::QO
Name: GEO 1460-06 5ML
Misc: C#05 5UL QC 14H MS#8G

Id File: VOAID5::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V:ERCO/ENSECO
Last Calibration: 881025 21:09

Operator ID: GREG
Quant Time: 881026 01:08
Injected at: 881026 00:22

FOR INTERNAL USE ONLY
Erco VOA GC/MS Lab

Previous sample FRN BV236 Erco ID 1460-5
Major contaminants
Previously in chamber FRN BV217 Erco ID 50STD
Major contaminants
Carryover? Yes No ✓ If yes, what?
I.S. and surrogate areas checked
Integration checked
Spectra checked
All peaks accounted for? Yes
If no, number of unknowns
Dilution factor
Blank FRN BV233
LCS FRN BV235
Extraction weight
% solid
Method Blank FRN
Initials KA

good

QUANT REPORT

rator ID: GREG Quant Rev: 6 Quant Time: 881026 01:08
put File: ^BV237::QO Injected at: 881026 00:22
ata File: >BV237::D6 Dilution Factor: 1.00000
ame: GEO 1460-06 5ML TB-5000, GCMS II
c: C#05 5UL QC 14H MS#8G

File: VOAID5::$$
le: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V5:ERCO/ENSECO
t Calibration: 881025 21:09

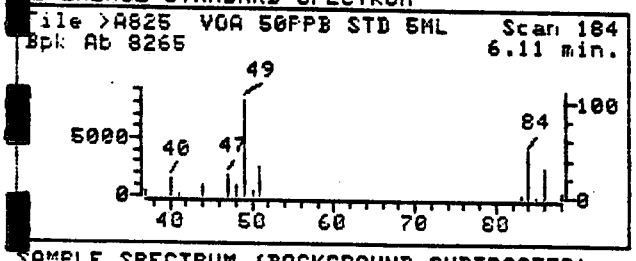
		Compound	R.T.	Scan#	Area	Conc	Units	q
	*CI01	Bromochloromethane	10.44	245	171228	50.00	ug/L	85
6)	C030	Methylene Chloride	7.46	168	28176	~~7.49~~	ug/L ✓	79
	C035	Acetone	8.08	184	3691	~~3.50~~	ug/L SNG	100
	CS15	D4-1,2-Dichloroethane	13.07	313	269099	51.94	ug/L 104	99
5)	*CI10	1,4-Difluorobenzene	20.59	507	433553	50.00	ug/L	100
0)	*CI20	D5-Chlorobenzene	25.47	633	343908	50.00	ug/L	72
	CS05	D8-Toluene	24.31	603	237647	50.20	ug/L 100	88
	CS10	Bromofluorobenzene (BFB)	30.90	773	276593	53.76	ug/L 108	97

CL 11/11/88

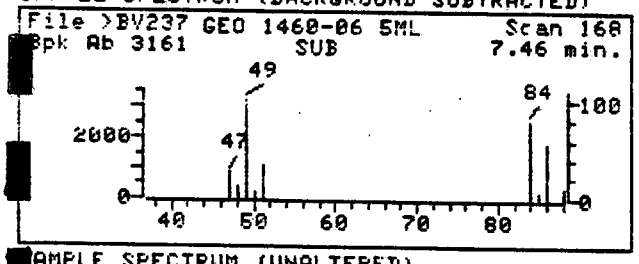
*Compound is ISTD

SNG - spectra not good

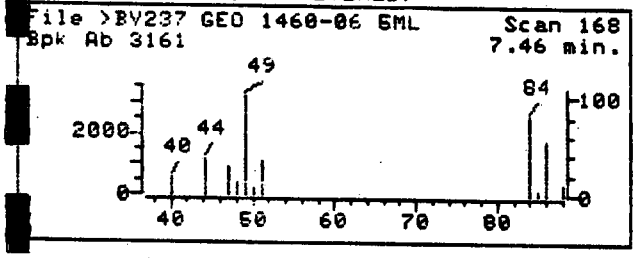
EFERENCE STANDARD SPECTRUM

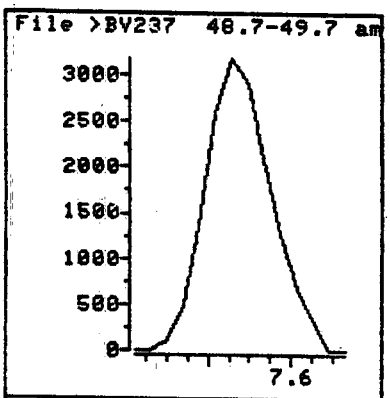


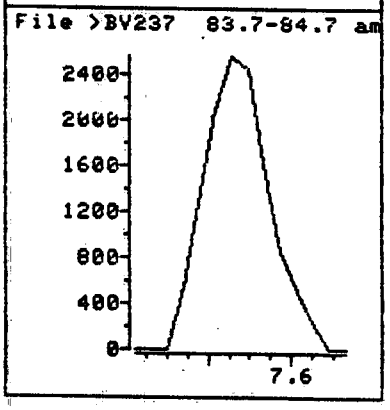
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



AMPLE SPECTRUM (UNALTERED)







TB-5600, GCMS V5

Data File: >BV237::D6
Name: GEO 1460-06 5ML
Misc: C#05 5UL QC 14H MS#8G
Quant Time: 881026 01:08
Injected at: 881026 00:22

Quant Output File: ^BV237::QO

Quant ID File: VOAID5::$$
Last Calibration: 881025 21:09

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 168
Retention Time: 7.46 min.
Quant Ion: 84.0
Area: 28176
Concentration: 7.49 ug/L
q-value: 79

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

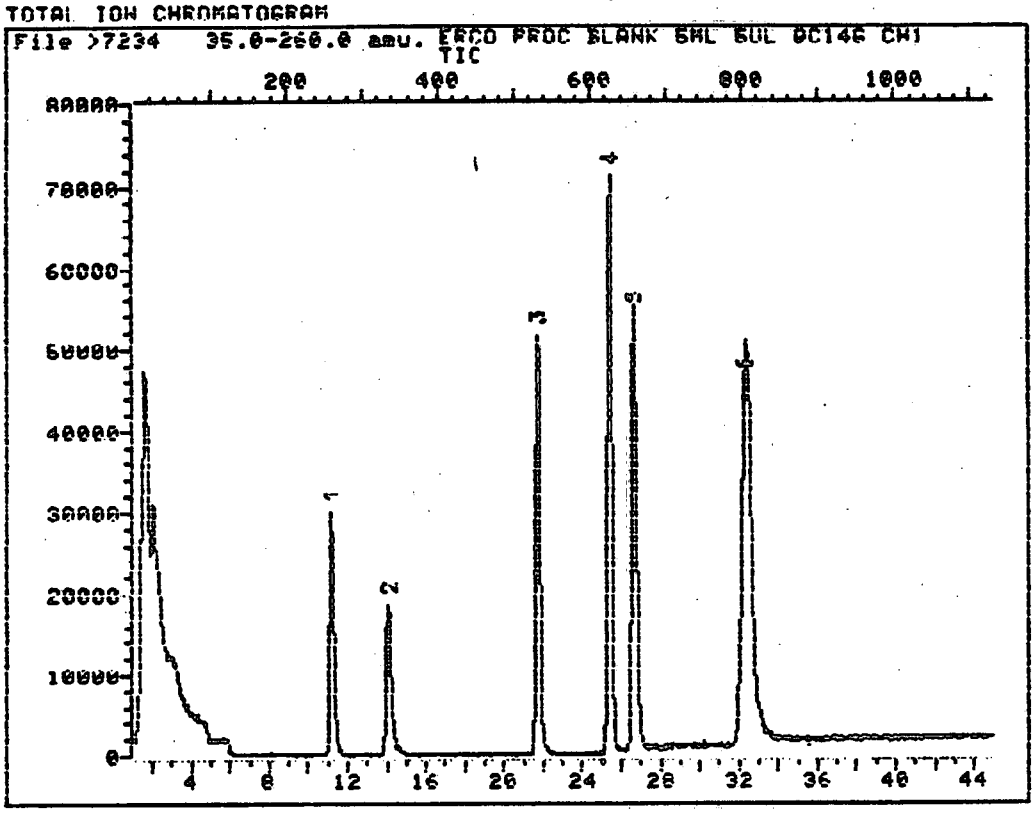
Client Name: GeoEngineering, Inc.
Client ID: Erco Procedural Blank - Water
Laboratory ID: 7234B
Matrix: Aqueous Sampled: NA Received: NA
Authorized: NA Prepared: 10/25/88 Analyzed: 10/25/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride	ND	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

NA = Not applicable.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



GCMS V1

Data File: >7234::DH
Name: ERCO PROC BLANK 5ML
Misc: 5UL QC14G CH1

Quant Output File: ^7234::QT

Id File: VOAID1::$$
Title: HSL VOLATILES:RFT 1%SP1000:45-220@8K/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881025 11:33

Operator ID: BILL
Quant Time: 881025 12:33
Injected at: 881025 11:42

QUANT REPORT

Operator ID: BILL
Output File: ^7234::QT
Data File: >7234::D8
Name: ERCO PROC BLANK 5ML
Misc: 5UL QC146 CH1

Quant Rev: 6
Quant Time: 881025 12:33
Injected at: 881025 11:47
Dilution Factor: 1.00000

ID File: VOAID1::$$
Title: HSL VOLATILES:RFT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881025 11:33

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*CI01 Bromochloromethane	11.20	49.0	71682	50.00	UG/L	100
14)	CS15 D4-1,2-Dichloroethane	14.07	65.0	151529	48.98	UG/L 98	95
15)	*CI10 1,4-Difluorobenzene	21.71	114.0	317582	50.00	UG/L	100
30)	*CI20 D5-Chlorobenzene	26.61	117.0	294690	50.00	UG/L	72
36)	CS05 D8-Toluene	25.41	100.0	230917	49.38	UG/L 99	94
42)	CS10 Bromofluorobenzene (BFB)	32.28	95.0	172008	51.28	UG/L 102	85

* Compound is ISTD

CL 11/1/88

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

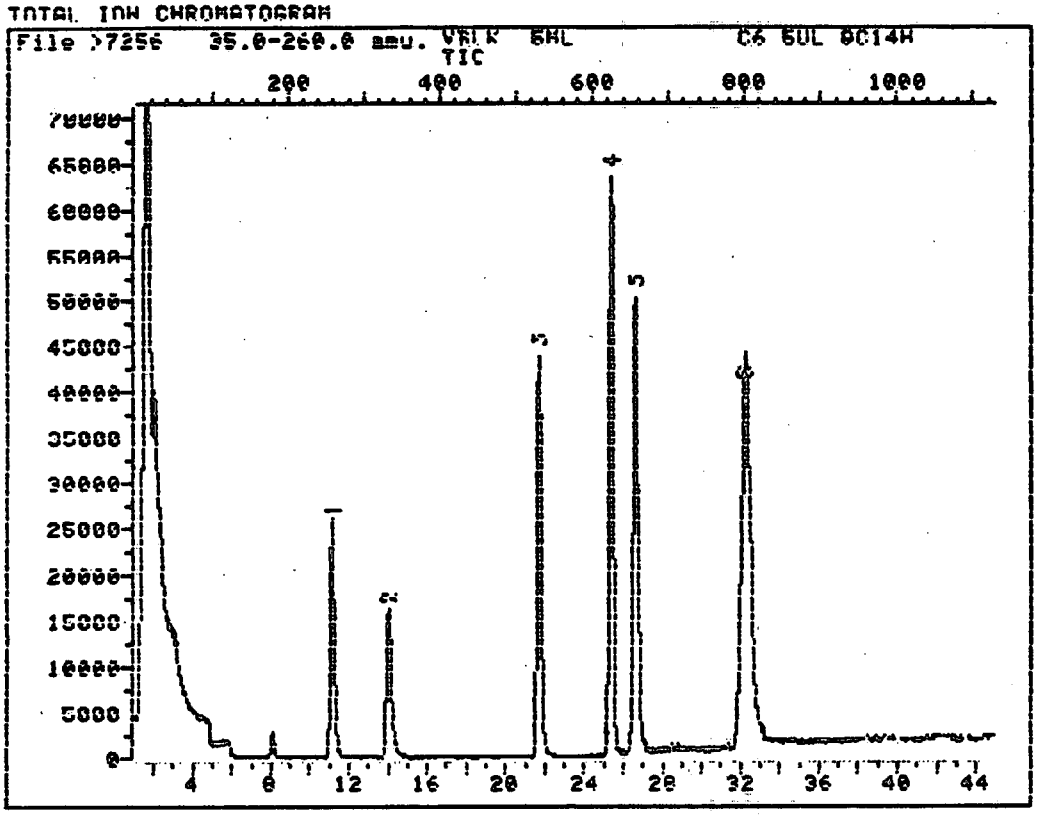
Client Name: GeoEngineering, Inc.
Client ID: Erco Procedural Blank - Water
Laboratory ID: 7256B
Matrix: Aqueous Sampled: NA Received: NA
Authorized: NA Prepared: 10/26/88 Analyzed: 10/26/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride ----------	3.8*	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

*Trace concentrations detected below the reporting limit.
NA = Not applicable.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



GCMS V1

Data File: >7256::D8 Quant Output File: ^7256::W1
Name: VBLK 5ML
Misc: C6 5UL QC14H

Id File: VOAID1::$$
Title: HSL VOLATILES:RFT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSECO
Last Calibration: 881026 21:42

Operator ID: BILL
Quant Time: 881026 22:55
Injected at: 881026 21:48

QUANT REPORT

Operator ID: BILL
Output File: ^7256::QT
Data File: >7256::DB
Name: VBLK 5ML
Misc: C6 5UL QC14H

Quant Rev: 6 Quant Time: 881026 22:55
Injected at: 881026 21:48
Dilution Factor: 1.00000

GCMS V1

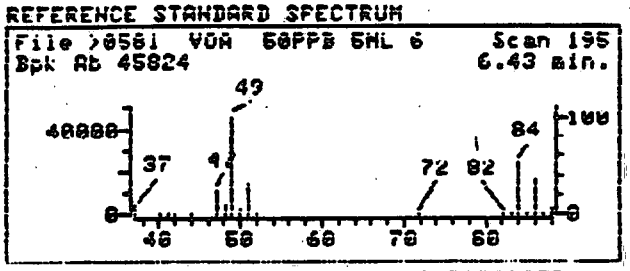
ID File: VOAID1::$$
Title: HSL VOLATILES:BFT 1%SP1000:45-220@8/MIN:GCMS V1:ERCO/ENSFCO
Last Calibration: 881026 21:42

		Compound	R.T.	Scan#	Area	Conc	Units	Q
1)	*C101	Bromochloromethane	11.16	259	61,010	50.00	UG/L	100
6)	C030	Methylene Chloride	8.09	180	11023	3.25	UG/L	82
14)	CS15	D4-1,2-Dichloroethane	13.99	332	137007	50.71	UG/L 101	97
15)	*C110	1,4-Difluorobenzene	21.68	530	223968	50.00	UG/L	100
30)	*C120	D5-Chlorobenzene	26.61	657	265532	50.00	UG/L	74
36)	CS05	D8-Toluene	25.37	625	214962	49.37	UG/L 99	95
42)	CS10	Bromofluorobenzene (BFB)	32.16	800	154255	48.17	UG/L 96	86

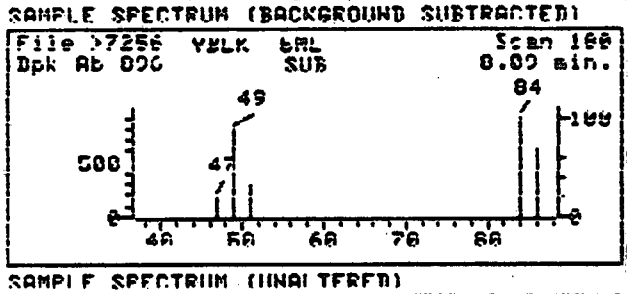
* Compound is ISTD

CL 11/1/88

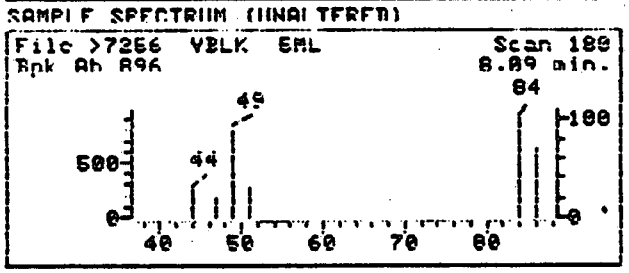
REFERENCE STANDARD SPECTRUM

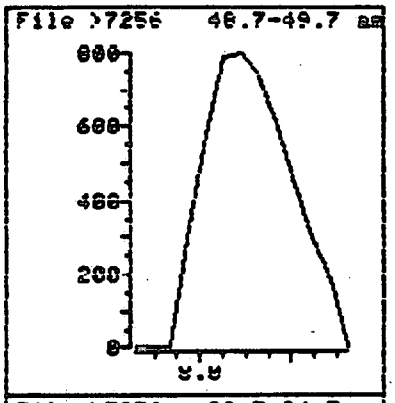


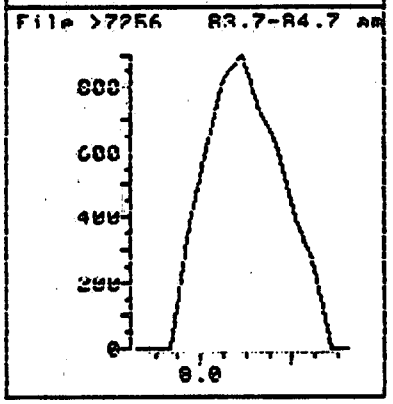
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNAUTERED)







GCMS V1

Data File: >7256::DB
Name: VBLK 5ML
Misc: C6 5UL QC14H
Quant Time: 881026 22:55
Injected at: 881026 21:48

Quant Output File: ^7256::WT
Quant ID File: VOAID1::$$
Last Calibration: 881026 21:42

Compound No: 6
Compound Name: C031 Methylene Chloride
Scan Number: 180
Retention Time: 8.09 min.
Quant Ion: 84.0
Area: 11023
Concentration: 3.75 UG/L
q-value: 82

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

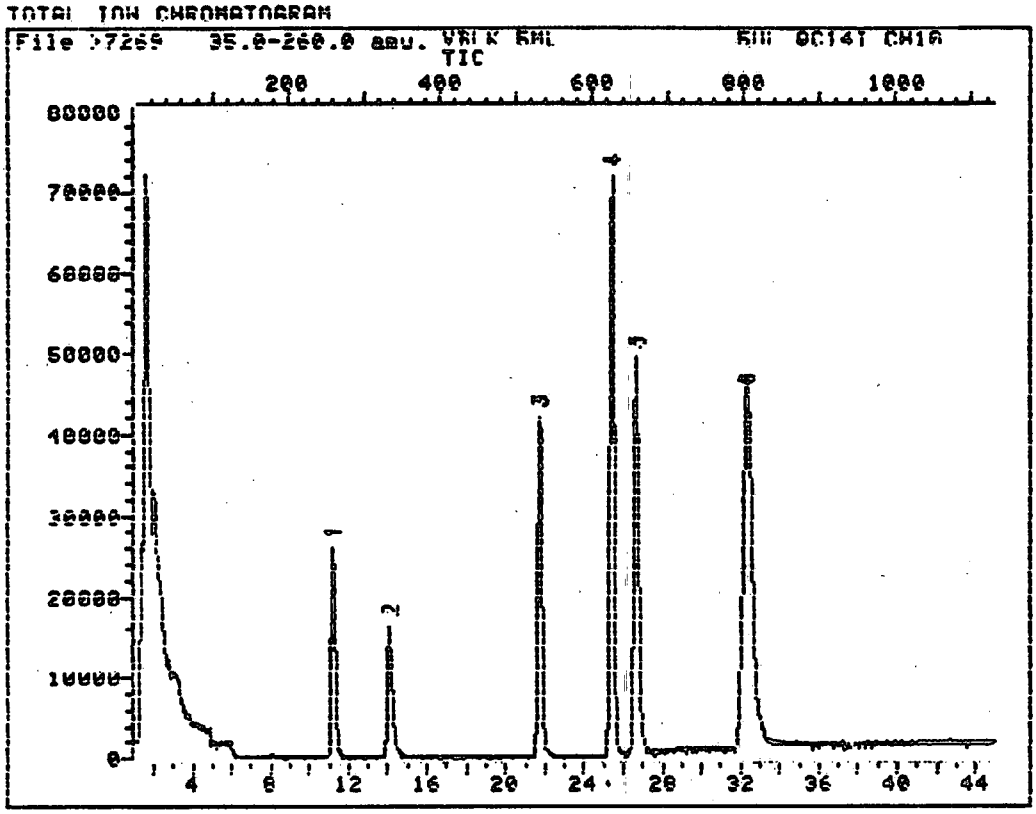
Client Name: GeoEngineering, Inc.
Client ID: Erco Procedural Blank - Water
Laboratory ID: 7269B
Matrix: Aqueous Sampled: NA Received: NA
Authorized: NA Prepared: 10/27/88 Analyzed: 10/27/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride	ND	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

NA = Not applicable.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



GCMS V1

Data File: >7269::D7 Quant Output File: ^7269::WT
Name: VBLK 5ML
Misc: 5ML QC141 CH10

Id File: VHAID1::$$
Title: HSL VOLATILES:RFT 1%SP1000:45-220@H/MIN:GCMS V1:FRCD/FNSFCD
Last Calibration: 88102? 11:21

Operator ID: BILL
Quant Time: 88102? 12:36
Injected at: 88102? 11:41

QUANT REPORT

Operator ID: HILL Quant Rev: 6 Quant Time: 881027 12:36
Output File: ^7969::QT Injected at: 881027 11:41
Data File: >7969::D7 Dilution Factor: 1.000000
Name: VBLK 5ML
Misc: 5ML QC141 CH10 GCMS V1

ID File: VOAID1::$$
Title: HSL VOLATILES:BFT 1%SP1000:45-220@4K/MIN:GCMS V1:ERICO/ENSECO
Last Calibration: 881022 11:21

		Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*CI01	Bromochloromethane	11.28	260	61369	50.00	UG/L	100
14)	CS15	D4-1,2-Dichloroethane	14.02	334	134677	50.64	UG/L 10)	99
15)	*CI10	1,4-Difluorobenzene	21.72	531	260755	50.00	UG/L	100
30)	*CI20	D5-Chlorobenzene	26.66	658	265035	50.00	UG/L	72
36)	CS05	D8-Toluene	25.42	626	230832M	54.83	UG/L 110	96
42)	CS10	Bromofluorobenzene (BFB)	32.29	803	172250	55.28	UG/L 111	84

CL 11/1/88

* Compound is ISTD

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

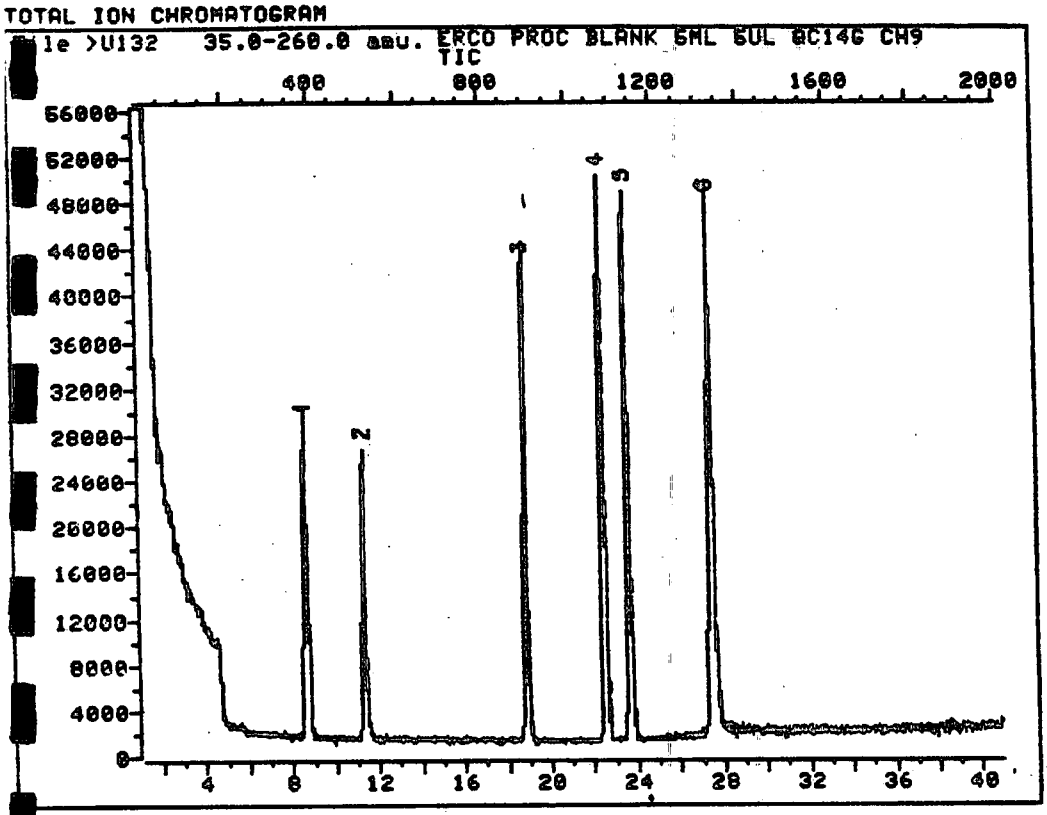
Client Name: GeoEngineering, Inc.
Client ID: Erco Procedural Blank - Water
Laboratory ID: U132B
Matrix: Aqueous Sampled: NA Received: NA
Authorized: NA Prepared: 10/26/88 Analyzed: 10/26/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride	ND	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

NA = Not applicable.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



GCMS V3

Data File: >U132::D0 Quant Output File: ^U132::Q0
Name: ERCO PROC BLANK 5ML
Misc: 5UL QC14G CH9

Id File: VOAID3::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V3:ERCO/ENSECO
Last Calibration: 881026 11:38

Operator ID: GREG
Quant Time: 881026 12:31
Injected at: 881026 11:46

QUANT REPORT

Operator ID: GREG
Output File: ^U132::QO
Data File: >U132::DO
Name: ERCO PROC BLANK 5ML
Misc: 5UL QC14G CH9 GCMS V3

Quant Rev: 6
Quant Time: 881026 12:31
Injected at: 881026 11:46
Dilution Factor: 1.00000

Id File: VOAID3::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V3:ERCO/ENSECO
Last Calibration: 881026 11:38

		Compound	R.T.	Scan#	Area	Conc	Units	q
[illegible]	*CI01	Bromochloromethane	8.61	378	68466	50.00	ug/L	87
1[illegible])	CS15	D4-1,2-Dichloroethane	11.29	513	118234	47.46	ug/L 95	98
15)	*CI10	1,4-Difluorobenzene	18.81	892	158811	50.00	ug/L	100
30)	*CI20	D5-Chlorobenzene	23.59	1133	135851	50.00	ug/L	79
3[illegible])	CS05	D8-Toluene	22.42	1074	110430	48.61	ug/L 97	90
42)	CS10	Bromofluorobenzene (BFB)	27.39	1324	91702	49.54	ug/L 95	75

Compound is ISTD

CL 11/3/88

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

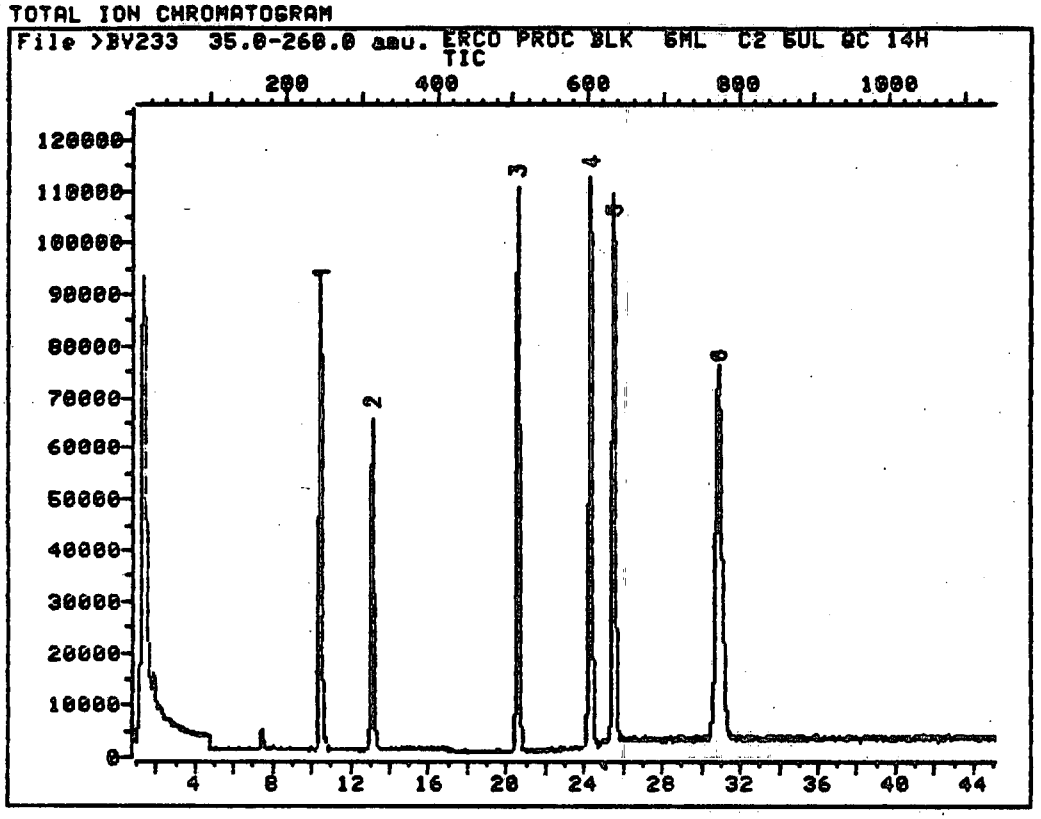
Client Name: GeoEngineering, Inc.
Client ID: Erco Procedural Blank - Water
Laboratory ID: BV233B
Matrix: Aqueous Sampled: NA Received: NA
Authorized: NA Prepared: 10/25/88 Analyzed: 10/25/88

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	10
Bromomethane	ND	µg/L	10
Vinyl chloride	ND	µg/L	10
Chloroethane	ND	µg/L	10
Methylene chloride ----------	2.1*	µg/L	25
Acetone	ND	µg/L	25
Carbon disulfide	ND	µg/L	5.0
1,1-Dichloroethene	ND	µg/L	5.0
1,1-Dichloroethane	ND	µg/L	5.0
1,2-Dichloroethene (total)	ND	µg/L	5.0
Chloroform	ND	µg/L	5.0
1,2-Dichloroethane	ND	µg/L	5.0
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	5.0
Carbon tetrachloride	ND	µg/L	5.0
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	5.0
1,2-Dichloropropane	ND	µg/L	5.0
cis-1,3-Dichloropropene	ND	µg/L	5.0
Trichloroethene	ND	µg/L	5.0
Dibromochloromethane	ND	µg/L	5.0
1,1,2-Trichloroethane	ND	µg/L	5.0
Benzene	ND	µg/L	5.0
trans-1,3-Dichloropropene	ND	µg/L	5.0
Bromoform	ND	µg/L	5.0
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	5.0
Tetrachloroethene	ND	µg/L	5.0
Toluene	ND	µg/L	5.0
Chlorobenzene	ND	µg/L	5.0
Ethylbenzene	ND	µg/L	5.0
Styrene	ND	µg/L	5.0
Xylene (total)	ND	µg/L	5.0

*Trace concentrations detected below the reporting limit.
NA = Not applicable.
ND = Not detected.

Reported by CL Approved by WHC

TOTAL ION CHROMATOGRAM



GCMS ~~I~~ V5

Data File: >BV233::D6 Quant Output File: ^BV233::QO
Name: ERCO PROC BLK 5ML
Misc: C2 5UL QC 14H

Id File: VOAID5::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V5:ERCO/ENSECO
Last Calibration: 881025 21:09

Operator ID: GREG
Quant Time: 881025 21:35
Injected at: 881025 20:31

QUANT REPORT

Operator ID: GREG Quant Rev: 6 Quant Time: 881025 21:35
Output File: ^BV233::QO Injected at: 881025 20:31
Data File: >BV233::D6 Dilution Factor: 1.00000
Name: ERCO PROC BLK 5ML GCMS V5
Misc: C2 5UL QC 14H

ID File: VOAID5::$$
Title: HSL VOLATILES:8FT1%SP1000:45-220@8/MIN:GCMS V5:ERCO/ENSECO
Last Calibration: 881025 21:09

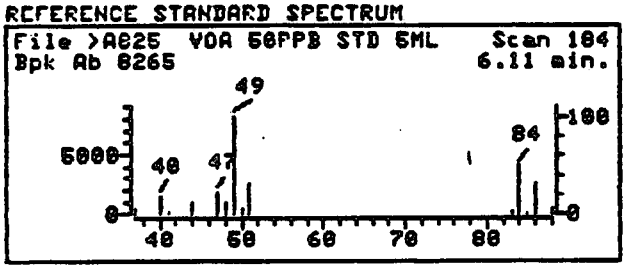
		Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*CI01	Bromochloromethane	10.45	245	187264	50.00	ug/L	85
6)	C030	Methylene Chloride	7.47	168	8639	2.10	ug/L	84
7)	C035	Acetone	8.05	183	6013	5.22	ug/L SNG	100
14)	CS15	D4-1,2-Dichloroethane	13.09	313	277952	49.05	ug/L 98	98
15)	*CI10	1,4-Difluorobenzene	20.57	506	486459	50.00	ug/L	100
30)	*CI20	D5-Chlorobenzene	25.49	633	384764	50.00	ug/L	68
36)	CS05	D8-Toluene	24.32	603	269330	50.85	ug/L 102	93
42)	CS10	Bromofluorobenzene (BFB)	30.87	772	299030	51.95	ug/L 104	98

* Compound is ISTD

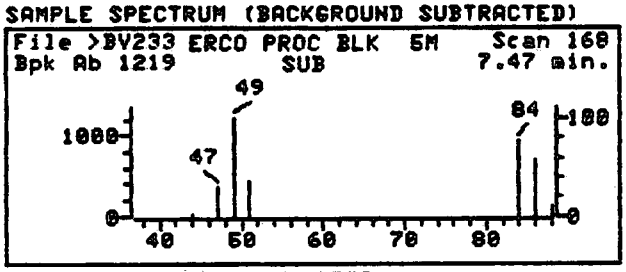
CL 11/11/88

SNG - spectra not good

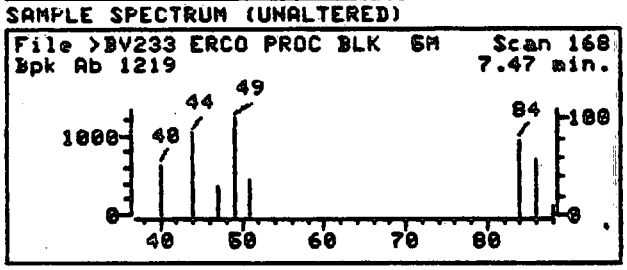
REFERENCE STANDARD SPECTRUM

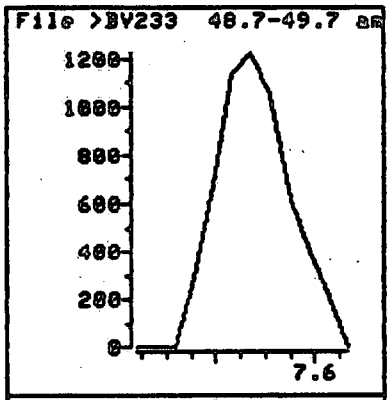


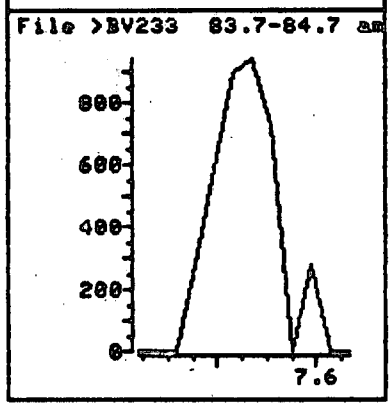
SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



SAMPLE SPECTRUM (UNALTERED)







GCMS VS

Data File: >BV233::D6
Name: ERCO PROC BLK 5ML
Misc: C2 5UL QC 14H
Quant Time: 881025 21:35
Injected at: 881025 20:31

Quant Output File: ^BV233::QO

Quant ID File: VOAID5::$$
Last Calibration: 881025 21:09

Compound No: 6
Compound Name: C030 Methylene Chloride
Scan Number: 168
Retention Time: 7.47 min.
Quant Ion: 84.0
Area: 8639
Concentration: 2.10 ug/L
q-value: 84

Four

Enseco-Erco Laboratory
205 Alewife Brook Parkway
Cambridge, Massachusetts 02138
617/661-3111 Fax: 617/354-5258

CHAIN OF CUSTODY

No. 05296

Attn: Greg Douglas

Enseco Client GeoEngineering, Inc.
Project 5600 - L.E. Carpenter
Sampling Co. Aquifer Systems
Sampling Site Wharton
Team Leader T.P.S.

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10/20/88	10:15	5-5600	water	3	624 HSL	Tier II
	10:30	2-5600		3		
	10:40	3-5600		3		
	10:50	4-5600		3		
	11:15	1-5600		3		
	—	TB-5600		2		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	[signature]	(To Receiver)	10/20/88	16:00
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: _____
Method of Shipment: _____ Airbill # _____
Received for Lab: ERCO Signed: [signature] Date/Time 10/21/88 09
Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001 (CM)

Erco Project No.: #1460

Enseco - Erco Laboratory

Client: GeoEngineering, Inc

Client Contact: Wm Dunnell

Program Name: L.E. Carpenter New ☐ Existing ☒

Client Project No.: 5600

Duplicate Project No.: _____ With Group Codes Yes ☐ No ☐

Client P.O. No.: _____

Report Copy: _____

CSR: _____ TD: T Copeland

LIMS Codes

Client: GEO-NJ00

Contact: GEO-NJ03

Billing: GEO-NJ01

Program: GEO 001

Date Received: 10/24/88

Report Date Due: 11/14/88 21

Date Due To D.C.: _____

No. TA Days: 30

Surcharge: _____

Contract Prices: _____

Reporting Format (Please Circle)

CLP Tier I A, B Tier II A, B ECRA RCRA

Commercial HSL PP Unknowns Appendix No. ___

Other _____

Paperwork		Samples Rec'd by	Samples Date Rec'd	Paperwork		Samples Rec'd by	Samples Date Rec'd
☒	CSR/TD			☐	Metals		
☐	Prep.			☐	Pest.		
☐	GWQ			☐	GC/MS		
☐	VOA/GC			☐	PHIR		
☒	VOA/MS	PO	10/24	☒	D.E.Q.		
☐	SEA			☒	D.C.		

Logged by: PMF

Date: 10/24/88 Time: 1010

Approved by TD/CSR: TRC 11-8-88

Date: ~~12/24~~ 10/24/88 Time: 10:30

Comments: _____

Enseco - Erco Laboratory

Erco Project Number: #1460

ID	Client ID	Coll. Date	Mx.	Code	ID	Client ID	Coll. Date	Mx.	Code
01	151-1516101	10/20/08	A	A	11				
02	121-1516101				12				
03	131-1516101				13				
04	141-1516101				14				
05	111-1516101				15				
06	TIB1-1516101				16				
07					17				
08					18				
09					19				
10					20				

GROUP CODE TEST INFORMATION

Group A				Group __				Group __				Group __			
None	Dump	Return	Hold	None	Dump	Return	Hold	None	Dump	Return	Hold	None	Dump	Return	Hold
624-HSL-TIER II-A															

ERCO/A Division of ENSECO Incorporated

VOA SAMPLE RECEIVING AND TRACKING LOG

Date rec'd.	Client (sample lot size) ERCO IDs	Client ID	Run deadline	Matrix	Analysis	Screen info.	Rerun amount	Good run	# vials rec'd.	Comments	Project due date	Out	Sample custodian
10/21	[redacted]							✓			11/4		DD
	1436-01	Lift Station 0930	10/27	H2O	624	20λ	100µl	7403	3	11/3 4294 20λ 11/3			
10/21	[redacted]							✓			11/4		DD
	1439-01	Monsanto Headwall	10/27	H2O	624	500λ	5ML	BU554	3	11/2 7363 500µl 11/2			
10/24	[redacted]							✓		CLP	11/11		DD
	1459-01	B21-SS-12	10/26 11/2	Soil	8240	3Cf	3g	4184	2	10/28 BU272 1st 10/27			
	-02	Field Blank 3	10/26	H2O	624	—		7237	3	10/25			
	-03	Trip Blank	10/25	H2O	624	—		7238	3	10/25			
	-04	B3-SS-1	10/26	Soil	8240	3g	3g	4256	2	11/1 4155 2nd 10/26 BU273 1st 10/27			
	-05	B3-SS-2	11/4	Soil	8240	3Cf		BU274	↓	10/27			
	-06	Field Blank 4	10/28	H2O	624	—		7239	↓	10/25			
10/24	Geo Engineering							✓		CLP	11/11		DD
	1460-01	5-5600	10/27	H2O	624	5ML		7240	3	10/25			
	-02	2-	↓	↓	↓	500µl	200µl	7272	↓	10/27 7251 2nd 10/26 7241 500µl 10/25			
	-03	3-				100µl	20µl	4137 7257		10/26 10/26 7242 100µl 10/25			
	-04	4-				5ML		7244	↓	10/25			
	-05	1-	↓	↓	↓	100µl	10µl	4138		10/26 7258 100µl 10/27 BU276 100µl 10/25			

ERCO/A Division of ENSECO Incorporated VOA SAMPLE RECEIVING AND TRACKING LOG

Date rec'd.	Client (sample lot size) ERCO IDs	Client ID	Run deadline	Matrix	Analysis	Screen info.	Rerun amount	Good run	# vials rec'd.	Comments	Project due date	Out	Sample Custodian
10/24	Geo Engineering									CLP	11/11		DD
	1460 - 08	TB-5600	10/27	H_2O	624	5mL		BU237	2	10/26			
10/26	[redacted]									see instructions	11/7		DD
	1469 - 01	Filter #1 Front	—	filter matrix	8240				1	samples in #1 door			
	- 02	Filter #4 Back	—	filter matrix	8240				1				
10/28	[redacted]							(✓)		Gas + CBF_2	11/8		DD
	1486 - 06	F	10/31	H_2O	624	200µl		U305	3	11/3			
	- 07	G	↓	↓	↓	200µl		306	3	11/3			
10/28	[redacted]	Co						(✓)			11/8		DD
	1487 - 01	102488 WE25	10/28	H_2O	624	5mL		U241	3	11/1			
	- 02	WEL9	10/28			5mL	500µl	BU570	2	11/3 U242 5mL 11/1			
	- 03	WEL0	10/31			200µl	100µl	7409	3	11/4 7386 200µl 11/2			
	- 04	WE20				20µl		7389		11/3			
	- 05	WEL7				20µl	10µl	7413		11/4 7390 20µl 11/5			
	- 06	WE23				20µl		7392	2	11/3			
	- 07	MISC				5mL		U243	3	11/1 LOW D.L.			
	- 08	Trip Blank				5mL			2	(Hold)			

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
7230		10	[redacted] 1302-01 5ml QC14G	10 ml	2367	6'	1% SP 1000	NR	10/24/88	RR 100 µl	dil = 100x/10ml in MEOH
7231		1	H2O BK	5ml				NR			DIRTY
7232	VOA 341		BFB Dc	50ng	2367	6'	1% SP1000	WmD	10/25/88		9:59 314
7233	/	1	VOA 50ppb STD 5ml QC14G	5ml				WmD			25µl/100ml A,B,C; HSL
7234	/	1	ERCO Proc Blank 5ml QC14G	5ml				WmD			
7235		1	Lab Spike 5ml QC14G/5ml MS8G	5ml				WmD		OK	
7236		1	Lab Spike 5ml QC14G/5ml MS8G	5ml				WmD		OK	
7237		5	GEO 1459-02 5ml QC14G	5ml				WmD		X	
7238		6	GEO 1459-03 5ml QC14G	5ml				WmD		X	
7239		7	GEO 1459-06 5ml QC14G	5ml				WmD		X	
7240		8	GEO 1460-01 5ml QC14G	5ml				WmD		X	
		9	GEO 1460-02	[illegible]						RR	0

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
>7242		10	GEO 1460-03 5ul QC146	100ul	2367	6'	1% sp1000	WMD	10/25/88	re 20ul	
>7243		1	H_2O	5ml	↑	↓	↓	WMD	↓	clean	
>7244		2	GEO 1460-04	5ml	↓	↓	↓	WMD	↓	X	
>						SYSTEM BAKED					
>7245	/		BFB D.I.	50ng	2367	6'	1% sp1000	MM	10.26.88		316 9:49
>7246	/	2	VOA STD 50ppb 5µl QC141H	5ml				MM			25µl/100ml A+B+C+HSL
>7247	/	2	ERCO PROC. Blank	5ml				MM			
>7248	/	2	Lab SPIKE 5µl MS86	5ml				MM		ok	
>7249	/	2	Lab SPIKE 5µl MS86	5ml				MM		ok	
>7250	VOA 341	3	[redacted] 1298-11	5ml				MM		X	
251		4	GEO 1460-2	200µl				MM		re	dark
		5	1302-2	1ml				MM		X	

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
>7253		6	[redacted] 1367-1 5µl QC 14H	5ml	2367	6'	1% Sp1000	[illegible]	10.26.88	X	
>7254		7	[redacted] 1367-2	5ml	↓	↓	↓	[illegible]	↓		} aborted.
>7255		8	[redacted] 1369-1	5ml	↓	↓	↓	[illegible]	↓		
>7254	VOA 341		BFB DIR INJ	50mg	2367	6'	1% SP 1000	[illegible]	10/26/88		Scan #312 20:13
>7255	/	6	VOA STD 50ppb 5µl QC 14H	5ml	↓	↓	↓	NR	↓		25λ/100 ml A, B, C, HSL.
>7256	/	6	ERCO P. BLK	5ml	↓	↓	↓	[illegible]	↓		
>7257		1	Geo 1460-03	50λ	↓	↓	↓	[illegible]	↓	X	EOD 10/26/88
>7258		2	[redacted] ~~STD & d_2f_2~~ Geo 1460-05	50λ	↓	↓	↓	[illegible]	↓	RR 20µl	~~082788~~ [illegible] EOD 10/27/88
>7259		3	[redacted] STD & d_2f_2	5ml	↓	↓	↓	[illegible]	↓		082788.
>7260		4	[redacted] 1287-09	100λ	↓	↓	↓	[illegible]	↓	X	
7261		5	[redacted] 1287-10	100λ	↓	↓	↓	[illegible]	↓	RR 1ML	
[illegible]		6	[redacted] 1287-11	100λ	↓	↓	↓	[illegible]	↓	RR [illegible]	

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
>7263		7	[redacted] 1367-02	5ml	2367	6'	1% SP 1000	MB	10/26/88	X	
>7264		8	[redacted] 1369-01	5ml				MB		X	
>7265		9	H_2O Blk	5ml				[illegible]			clean
>7266		10	[redacted] STD & CCl_4	5ml				[illegible]			cont chamber clean
>7267			BFB Dil	5ml	2367	6'	1% SP1000	WMD	10/27/88		9:35 326
>7268	VOA	10	VOA 50ppb STD	5ml				WMD			25ul/100ml AAC: 146
>7269	341		Erco Proc Blk	5ml				WMD			
>7270	/		Lab Spike 5ul QC14I/5ul MS88	5ml				WMD			
7272 >7271			Lab Spike 5ul QC14I/5ul MS88	5ml				WMD			
7273 >7272		3	GEO 1460-02 5ul QC14I	5ml	2367	6'	1% SP1000	WMD	10/27/88	X	good
273		4	[redacted] 1488-01 5ul QC14I	5ml				WMD			NOT RUN
74		5	[redacted] 1326-01	5ml				WMD			

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
>U122		4	VOA 50 PPB STD 5ml QC14H 25ml (HSLA A,B,C)	5ML	2881	6'	1% Spiow	NR	10.25.88		
>U123	\	4	VOA 50PPB STD 5ml QC14H 25ml (HSLA A,B,C)	5ML	2881			NR			
>U124		4	MEOH BLK 5ml	5ML				NR		NG	200λ ml MEOH LOT# (3) NR 10/25 AT043
>U125		5	MEOH BLK	5ML				NR		OK	200λ ml MEOH LOT # AT043
>U126		6	[redacted] 1359-13	200λ				NR		X	
>U127		7	[redacted] 1336-08	200λ				NR		RR [illegible]	
>U128		8	[redacted] 1336-09	200λ				NR			Leak
>U129		9	[redacted] 1367-05	200λ				NR		RR [illegible]	rang
>U130	VOA		BFB DI	50ng	2881	6'	1% Spiow	WND	10.26.88		10:09 282
>U131	340	9	VOA 50ppb STD 5ml QC14G	5ml				WND			25ml/100ml A,B,C & HSL
>U132	/	9	ERCo Proc Blank 5ml QC14G	5ml				WND			
>U133	/	9	Lab Spike [illegible]	5ml				WND		OK	

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Analysis Log

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
>U134	/	9	Lab Spike 5ml QC14G/5ml MS8G	5ml	2881	6'	1% SP1000	WND	10.25.88	OK	
>U135		1	[redacted] 1387-02 5ml QC14G	5ml				WND		X	
>U136		2	[redacted] 1313-01 5ml QC14G	1ml				WND		X	
>U137		3	[redacted] 1460-03 5ml QC14G	20ml				WND		X	
>U138		4	[redacted] 1460-05 5ml QC14G	10ml				WND		X	
>U139		5	[redacted] 1407-02 5ml QC14G	5ml				WND		RR 1ml	
>U140		6	[redacted] 1407-06	5ml				WND		X	
>U141	\		BFB DIR INJ	50ms	2881	6'	1% SP 1000	[illegible]	10/10/88		Scan #273 19:42
>U142	\	6	VOA STD 50ppb 5ml QC14H	5ml				NR			25λ/100ml AH, GHSC.
>U143	\	6	ERCO P. BLK	5ml				[illegible]			
>U144	VOA 340	1	[redacted] 1302-01	5ml				[illegible]		X	LNS. heat Gun
>U145		8	[redacted] 1375-01	5ml				[illegible]		RR 200ml	EOD 10/26

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Analysis

FRN	Arcv. Tape	Ch. No.	Sample ID	Conc. or Vol.	E.M. Volt	Column Length	Column Type	Analyst	Date	Check if Good Run	Comments
> BV227	✓	1	VOA 100ppb STD 5ml QC14G	5ml	2196	6'	1% SP1000	WMD	10.25.88		good 5-[illegible]
> BV228	✓	1	VOA 150ppb STD 5ml QC14G	5ml	↓	↓	↓	WMD	↓		
> BV229	✓	1	VOA 200ppb STD 5ml QC14G	5ml	↓	↓	↓	WMD	↓		
> BV230	VOA 440	1	VOA STD 20ppb 5ml QC14H	5ml	2196	6'	1% SP 1000	[illegible]	10/25/88		
> BV231	✓		BFB DIR INJ	50mg	↓	↓	↓	[illegible]	↓		Scan# 18:36 18:36.
> BV232	✓	2	VOA STD 50ppb 5ml QC14H	5ml	↓	↓	↓	[illegible]	↓		25λ/100ml A,B,C,[illegible]
> BV233	✓	2	ERCOP. BLK	5ml	↓	↓	↓	[illegible]	↓		
> BV234		2	Lab Spike	5λ/5ml	↓	↓	↓	[illegible]	↓	NG	MS#86
> BV235		3	Lab Spike	5λ/5ml	↓	↓	↓	[illegible]	↓	OK	↓
> BV236		4	Geo 1460-05	100λ	↓	↓	↓	[illegible]	↓	RR 10µl	SOD 10/25
> BV237		5	Geo 1460-06	5ml	↓	↓	↓	[illegible]	↓	X	SOD 10/26
		[illegible]	[illegible] 1407-01	1ml	↓	↓	↓	[illegible]	↓	X	x 2053